Internet in wilderness distance education: a case study of an online course

Stephen L. Peel

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THE INTERNET IN WILDERNESS DISTANCE EDUCATION:

A CASE STUDY OF AN ONLINE COURSE

By

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B.S. Oregon State University, 1995

Presented in partial fulfillment of the requirements

for the degree of

Master of Science

The University of Montana

1999

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12-14-99

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ABSTRACT

In December 1996 a wilderness management course at the University of Montana was offered online to a group of natural resource management students at the University of Minnesota, Crookston campus. The course, Recreation Management 495D: “Management of Recreation Resources”, was adapted from an existing distance education curriculum offered through correspondence method. The purpose of offering an online course of this type was to discover whether the Internet provided an effective environment in which to deliver a wilderness management curriculum. Six characteristics of an effective learning environment were culled from current literature describing the new paradigm in education: student access to instruction and information; relevance and currency of course material; the role of the instructor; student control over the learning environment and format; interactivity, collaboration and engagement; knowledge creation, problem solving ability and cognition. A formal educational evaluation of the course was conducted comparing this course to traditional distance education and classroom courses, based on these six characteristics. Feedback from the students and our own observation demonstrate that the Crookston course excelled in providing opportunities for student interactivity among peers and with the instructor, student control over the learning environment, and an improved ability of students to operate in the higher cognitive domains.

Keywords: distance education, online curricula, wilderness education, learning environment, new education paradigm.
ACKNOWLEDGEMENTS

The work involved in undertaking the research and writing of this thesis is the product of several people. To them I wish to express sincere and heartfelt gratitude. To my wife Karie, who motivated me to attempt graduate school and encouraged me throughout the entire experience. To my academic advisor, Wayne Freimund, who was the inspiration behind creating the Crookston pilot course from the outset. His efforts and insight were invaluable for conducting the evaluation and producing the research. Most importantly, I appreciate the effort and encouragement of Phil Baird, instructor at The University of Minnesota, Crookston. It is because he generously gave his time and technical expertise that the course exceeded even our naïve expectations.

The online Wilderness Management Distance Education Program will undoubtedly continue to grow, but this first class of 23 students will always remain special to us.

Stephen L. Peel
October 7, 1999
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INTRODUCTION

A well-researched, deliberate approach to developing an educational curriculum is likely to provide quality learning outcomes for students. Incremental or casual changes in a course or program are seldom capable of producing the type of results that an intentional effort can generate. Although much of what a student achieves depends on his or her attitude and ability, the learning process is more effective when the learning environment provides optimal opportunities to learn. The learning environment includes characteristics of the learning situation as well as the learner's needs and range of experience, educational and otherwise. In developing a new curriculum, the program designer should use the program delivery means that are most suited to the particular learning environment. The pedagogical approach should be deliberate, well researched, and based on substantive, relevant theory.

This thesis is a case study of a pilot wilderness management course offered on the Internet: Managing Recreation Resources (RECM 495D). Formerly a correspondence-style course, this Internet course was adapted to an online format and offered to a class of 23 undergraduate students at the University of Minnesota, Crookston. The intention of this effort was to adapt a traditional correspondence-style distance education course to an interactive, online format. For the sponsoring program, this constituted an entirely novel delivery medium. The objective was to present wilderness management principles in a learning environment that would support a more effective learning experience for the students, based on our experience with education and technology, than the previous correspondence distance education course. Whether or not this occurred, and to what degree, is the purpose of the educational evaluation in this thesis.

We used a synchronous distance education model for the research design; students met for one hour, three times weekly to participate in an Internet discussion group centering around wilderness issues. An instructor at each location—Crookston, Minnesota and Missoula,
Montana—facilitated these online discussions. The course also included a combination of individual and group assignments, readings, and exams, all of which were facilitated on the Internet. The course was intended as a ‘hands-on’ experience for the students; they were required to participate in the online ‘class’ and find information sources on their own to bring to the discussions. To supplement the Internet course, real-time audio, video, digital photos, maps, and other multimedia resources were utilized. An integral part of this course design, and indeed, a purpose for the study, was a formal, structured educational evaluation. The objectives of the evaluation were to assess the effectiveness of the components of the course’s delivery, content, and instructors. We set out to assess this by the degree of student engagement in the learning activities and in how well they mastered the principles, as suggested by their performance. Results of this evaluation are to be used in directing any future Internet-based offerings of this and other courses in the Wilderness Management Distance Education Program (WMDEP).
Learning is a significant factor in the way humans adapt to their environment. In fact, there is probably no human activity more universal than learning (Lavi, 1994). The ability to perceive new phenomena and create meaning from such experience is key to the process. Learning is fundamentally about memory—the things an individual finds important enough to notice and retain. In learning, sensory information must be interpreted and then stored so that, given the need, it can be recalled from memory.

Learning can be characterized as the active construction of knowledge that occurs when an individual is exposed to new information, attends to it, evaluates it, and incorporates it into existing knowledge (Kilgore and Pendleton, 1993). Information and knowledge are different. Knowledge comes from the very individualized process of assigning meaning to new information. Information is data that has no particular significance to the individual until it has been processed cognitively; it is independent of meaning. Information is public and can be shared. It can be effectively communicated precisely because it does not contain any attendant interpretation.

In contrast, knowledge is information to which the individual attaches some significance. Hence, knowledge is more difficult to communicate. It must be produced by each individual from sensory information, evaluated against that individual’s previous experience, and then allowed to expand the individual’s conception of reality. The resultant meaning depends on how the new information modifies or elaborates on existing schemas already in the individual’s memory. “Knowledge is a result of the process of knowing, which can only occur as the learner actively constructs what he or she knows, using information in this process” (Harris, 1995: 58). The process of acquiring knowledge is that information can be provided or ‘taught’, but
knowledge cannot. To be effective, the educator must manipulate the conditions that favor the optimal creation of knowledge for the maximum number of unique individuals.

Educational psychologists have investigated learning, or the process of converting information into knowledge. One conception of how knowledge is generated is through the ordering of chunks, i.e. the way bits of information become linked to other bits according to their initial arrangement in the mind. For example, short-term memory (STM) has a very limited information retention capacity; most individuals can only retain between five and nine items in STM at a time. However, the information-storage capacity in long-term memory (LTM) is virtually unlimited. In order to convert STM information into LTM knowledge, a person must see how disparate bits of new information relate to and augment existing knowledge, a process referred to as “chunking” (Miller, 1956; Johnson, 1970). Chunking is an opaque code that forms links between objects in LTM to the original representations at the time of encoding (STM), effectively recreating the link(s) during recall (Morgan, 1996). Chunking is an energy- and concentration-intensive activity and humans tend only to convert information they judge to be important. In other words, in spite of the limits on immediate attention, the human brain is able to store and retrieve an unlimited amount of information. Nevertheless, that information must have significance in order for it to become part of a person’s overall knowledge structure.

Once in LTM, knowledge is considered relatively permanent (Connelly and Tully, 1996). This may be an adaptation aimed at efficiency—converting all sensory input into LTM would soon make it unwieldy, with too many loose connections containing little useful meaning. Once an individual perceives and attends to new information, s/he evaluates it for any significant relationship to existing knowledge. If it is found useful, it is then stored in such a way that corresponding bits of information can be recovered collectively (Logan et al. 1996; Wenger and Carlson, 1996). The relationship of each bit to any others creates meaning and transforms what
would otherwise be disparate pieces of information into an overall set of knowledge (Morgan, 1996).

An understanding of how knowledge is created is important to education. For a student, information that has few connections to his/her established knowledge may be irrelevant and consequently make little sense (Wenger and Carlson, 1996). Often this is exhibited in the student’s question: “But how will trigonometry help me in the real world?” The processes whereby the human brain evaluates information for knowledge construction are not entirely understood. However, the construction of individual meaning may be characterized as the result of strengthened synapses among certain sets of neurons (Hebb, 1949). When one cluster, or perhaps pathway, of networked neurons is stimulated, it becomes likely that other related clusters will be activated as well. Thus, instead of recalling a single discrete bit of information, whole sets of related bits, or engrams, are generally recalled along with their various interrelationships (Thompson, 1986). This process of consolidation is a way of conceptualizing how people learn from experiences that are meaningful (Cahill et al. 1995; Cahill and McGaugh, 1995; Williams and McGaugh, 1993).

As new information becomes meaningful to the learner, it influences how subsequent information is processed into knowledge. Proficient learners develop the ability to organize new information efficiently by visualizing its relevance to existing knowledge (Yaniv et al 1995). This gives the student an opportunity to formulate a working set of knowledge (Cordova and Lepper, 1995). As new knowledge is assimilated, learners can continuously create and refine the relationships between discrete sets of knowledge (Johnson, 1970; Morgan, 1996). This process involves ‘negotiation’, where the new information is compared to what is already known and adjustments are made to resolve and accommodate both. The entire revised set of useful information can then be stored in an organized LTM structure and subsequently become available to the individual as knowledge.
Development of Learning Theories

In 1956, Benjamin Bloom published *Taxonomy of Educational Objectives*. Using the combined experience and insight of college and university examiners, he and his colleagues constructed a hierarchical list of educational goals for the American educational system (Bloom, 1956). His purpose was to standardize the description of distinct levels of learning outcomes exhibited by students. Bloom’s objective is founded on the empirical evidence that there are differences in the quality as well as quantity of knowledge acquired by students in the learning process. Bloom’s taxonomy divides learning into three domains: cognitive, affective, and psychomotor (Figure 1). For the purposes of education, my focus is on the cognitive domain of Bloom’s taxonomy. Within it, Bloom and his collaborators judged there to be six levels of ability: knowledge, comprehension, application, analysis, synthesis, and evaluation. The taxonomy is an ordinal, rather than interval, scale in that “synthesis”, for example, is considered a higher cognitive treatment of information than is “knowledge”, although there is no apparent increment between levels.

**Figure 1**: Taxonomy of Educational Objectives (original, adapted from Bloom, 1956)

Gagne/Briggs’ *Principles of Instructional Design* model considers differences in the quality of knowledge in a slightly different way (Figure 2). The researchers identified five categories of learning outcomes: intellectual skills, cognitive strategies, verbal information, attitudes, and motor skills (Gagne et al 1992; Gagne and Briggs, 1974; Wang and Sleeman, 1994). These categories probably compare more to Bloom’s three domains (cognitive, affective,
psychomotor) than to the six levels of ability. Whereas Bloom's taxonomy is hierarchically vertical within the cognitive domain (from 'knowledge' to 'evaluation'), Gagne/Briggs' categories are nominal, with any ordering of ability levels expressed laterally, although indiscriminately, within each outcome.

Bloom's cognitive domain apparently corresponds with what Gagne/Briggs have identified as "intellectual skills", "cognitive strategies", and perhaps "verbal information." Within intellectual skills, the levels of ability range from discriminating and demonstrating distinctions, to acquiring abstract concepts and higher-order problem solving requiring complex operations. Within cognitive strategies, levels range from simple attention to the more thoughtful metacognitive abilities of self-evaluation and -regulation. Verbal information includes memorizing names and terms, understanding their meanings and their relationships to each other, and organizing the information into a coherent body of knowledge. Bloom's affective and psychomotor categories and Gagne/Briggs' attitudes and motor skills are apparently similar terms that describe the same things.

Figure 2: Gagne/Briggs' Principles of Instructional Design

The Five Dimensions of Learning Model (Marzano et al. 1993) suggests yet another perspective in evaluating outcomes of education (Figure 3). Marzano's Dimensions of Learning (DOL) approach focuses on student performance attributes, or outcomes, as they relate to
learning. The five dimensions of learning are: 1) positive attitudes and perceptions about learning, 2) acquiring and integrating knowledge, 3) extending and refining knowledge, 4) using knowledge meaningfully, and 5) developing productive habits of mind. The DOL model presents three levels of knowledge creation within a learning environment depending on what the student brings to the process. Most importantly, this should produce a proper “habit of mind” and appropriate “attitudes and perceptions.” Attitudes and perceptions appear similar to Bloom’s affective domain, and to Gagne/Briggs’ attitudes category. The remaining three dimensions appear linear and hierarchical, bearing a resemblance to Bloom’s six levels of learning. Habits of mind is described by Marzano et al. as being an overall metacognitive strategy for self-evaluation and feedback, not unlike Bloom’s fifth and sixth levels of synthesis and evaluation, respectively. On the other hand, “using knowledge meaningfully” attains the highest level of knowledge in the DOL model. If such were indeed the case, it would perhaps also be better correlated with Bloom’s higher levels. The distinction of the DOL model is apparently in separating the elements attributable to the learner and those that result from the learning process.

**Figure 3: Dimensions of Learning Model (Marzano et al.)**
In contrast to categories of learning ability, Vygotsky (1978) proposed a model of the general relationship between learning and development (Figure 4). Instead of focusing on the domains or levels of processing, Vygotsky conceptualized the area of development where knowledge is formed. Calling it the “Zone of Proximal Development”, or ZPD, Vygotsky described an area somewhere between the level of actual development (what an individual can do without assistance) and the level of potential development (what an individual can do with the help of a more capable person). The Zone of Proximal Development contains those functions that have not yet matured in the individual, but which are in the process of doing so. The quality of the learning experience within the ZPD is directly related to a balance of challenge and actual ability (Moneta and Csikszentmihalyi, 1996). Based on the proposition that learning should be matched in some way to the individual’s development level, Vygotsky asserts that learning occurs mostly within the ZPD, e.g.: “The only ‘good’ learning is that which is in advance of development” (Vygotsky, 1978, p. 89).

**Figure 4: Vygotsky’s Zone of Proximal Development**

Social Theories of Learning

One major purpose of learning is to help an individual discover more useful strategies and behavior in formulating knowledge. Since social controls, social status, and social
institutions all influence behavior (Berger, 1963), learning can be considered a social process, whether it occurs in the presence of others or individually (DeVillar and Faltis, 1991). Symbolic interactionism is a social learning model that emphasizes the social aspects of learning. In symbolic interaction, the learning process is not uniquely an individual event but a social one as well (Blumer, 1969; Schwandt, 1994; Shibutani, 1955). Similarly, it is a way of describing how and why individuals who are given the same information and environment will differ in their interpretation of events and thus generate distinct knowledge. As such, symbolic interactionism describes the process that filters perception and provides a dialogue for subsequent interpretations of sensory information.

Perception is influenced not only by one's perspective but also by the feedback received from others. For example, an individual may possess multiple perspectives of a concept or event. What action that person takes depends on which of several perspectives they assume. Symbolic interactionism is based on three premises: 1) human beings act on physical objects, events, and other people in their environment based on meanings these have for them. 2) meanings derive from social interaction between and among individuals. 3) meanings are established and modified through an interpretive process (Charon, 1979). Information becomes social and symbolic, acquiring meaning for the individual and are defined according to its utility to the learner (Altheide, 1995; Harris & Lipman, 1980). In other words, an individual's understanding of the physical world is constructed from daily observation of new of information and how it relates to existing knowledge (Greider and Garkovich, 1994; Nelson, 1985).

Symbolic interactionism's relationship to learning resides in how the theory describes the processes of perception and attention. Students who are attuned to their surroundings and attend more effectively to the learning process have a tendency to perform better (Logan et al. 1996; Maslow, 1970). Because more attentive students often demonstrate better understanding of the material (Wenger and Carlson, 1996), the opportunity for effective learning is more likely when
the learning environment is purposefully arranged to engage the students’ attention and help them develop and expand their existing knowledge (Billman and Knutson, 1996).

High motivation and attention to a task are regarded as characteristics of achievement-directed learners (Cooper, 1983; Lan and Repman, 1995). This state of optimal engagement has been conceptualized as ‘immersion’, or ‘flow’ (Csikszentmihalyi, 1995; Moneta and Csikszentmihalyi, 1996). The flow condition can be described as the result of participating in activities that require skill, concentration, and involvement—a self-induced state that focuses student attention and motivates action. Enjoyment and motivation in learning seem to have a greater correlation with academic success than cognitive ability alone (Wong and Csikszentmihalyi, 1991). These conditions tend to produce learning outcomes in the higher ranges of synthesis and evaluation where fact discovery supplants fact knowledge (Csikszentmihalyi, 1997).

Problem solving is an effective method of disciplining attention in the learning process. Harris (1994) reports that problem solving can be an efficient method of focusing discovery of knowledge—that “Aha!” moment. Creative problem solving can be cooperative or competitive, and performed in groups or individually. Applications include information searches, sequential discussions, parallel problem solving, and social action projects. An advantage to the problem-solving approach is that it encourages students to concentrate on a ‘real-life’ problem and discover how what they already know may contribute to a solution—a general rule for how problem solutions can be created from previous examples (Ross and Kennedy, 1990). In effect, this is essentially a description of Vygotsky’s ZPD; solving one problem allows a learner to apply his/her experience to a more complex problem-solving task. When it is used with groups, problem solving opportunities give students experience in teamwork and in generating solutions collaboratively. In many cases, a collaborative problem solving technique may enhance students’ ability to be self-directed learners as well (Amodeo and Bullowa, 1995).
Constructivist theories of education originated with the work of cognitive psychologist, Jean Piaget (1987; 1973; 1970; Fosnot, 1996). Formally known as the “Social Construction of Reality”, constructivism embodies the idea that understanding, or knowledge, is actively created by each person (Berger and Luckmann, 1966; Wilson, 1995). Objective knowledge and truth are the result of perspective and experience. What people often take to be self-evident truths are actually the products of a complex, discursive mental creation, hence the term “constructivism” (Schwandt, 1994). Piaget visualized constructivism as a balance between accommodation (accepting ‘truth’) and assimilation (creating ‘truth’).

In contrast to the behaviorist paradigm of Bloom and Gagne/Briggs or the developmental paradigms of Vygotsky, constructivists take the position that reality is as much created as it is discovered (Fosnot, 1996). Adherents of constructivism assert that learning is not the result of cognitive or behavioral development, but in fact is development (VonGlasersfield, 1995). Unlike the behaviorist philosophy of Piaget and Vygotsky, constructivism focuses on developing concepts rather than individuals. Constructivists acknowledge that it is easy to lead learners to solutions but difficult to teach them to manufacture answers by reasoning and experience (Dede, 1995). Constructivism’s unique contribution to education is how it describes a process learners go through as they experience deeper and more original understanding and organize or reorganize their own existing knowledge. Accordingly, constructivism assumes a learner-centered, participatory approach to education (Thomas et al. 1996).

Constructivism does not suggest simply turning individuals loose in a classroom, however. Effective teaching dictates a match between teaching and learning styles (Grow, 1991). For example, learners who are less independent are usually more suited to an authoritative teaching style whereas self-directed learners may perform better with a collaborative teacher. In either case, constructivism requires that the learning environment be purposefully structured and
disciplined toward providing more and better opportunities for learner discovery and self-
management (Billman and Knutson, 1986; Chaiklin et al. 1990; Savery and Duffy, 1995).

Critics of the constructivist paradigm argue that it minimizes the role of human
subjectivity in learning (O'Loughlin, 1992). They assert that differences in perception account
for some, but not all, of the differences in cognitive ability. Another criticism of constructivism
is its focus on the individual, to the exclusion of other cognitive processes (Buck-Morss, 1975).
Others cite the undue importance given to abstraction and decontextualized intellectualism and
recommend less emphasis on practical, hands-on experience (Buck-Morss, 1975; Riegel, 1979).
This criticism appears misapplied however, given the importance that constructivism attributes to
learning and meaning within a contextual environment. Still others report there is little evidence
suggesting that students know their own instructional needs well or are capable of adjusting the
instruction to meet those needs (Hannafin and Sullivan, 1996).

Perhaps the greatest obstacle is the disagreement within constructivism as to what the
term really represents: whether it describes a cognitive structuring process for learners, involves
an approach to teaching, or whether it pertains more to purely sociocultural effects on learning
(Fosnot, 1996). Notwithstanding these criticisms, constructivism’s relationship to education
should be apparent. It describes how information becomes more meaningful to a learner when it
is discovered rather than ‘taught.’ The goal of education, from a constructivist perspective, is to
allow learners to operate in the higher cognitive domains as they structure their world and thereby
produce a more meaningful understanding of it.

The distinction should be made here between constructivism in education and the broader
use of the term in scientific inquiry. Although both essentially share the same origins, in the
broader scientific paradigm, constructivism is a way of conceptualizing discovery, including that
which leads to scientific knowledge (DeVries and Zan, 1994). Formerly, the term “naturalistic
inquiry” was used to denote what has now largely become known as constructivism (Guba and
Lincoln, 1994; Lincoln and Guba, 1985). The broader concept involves a revolutionary approach to scientific inquiry in which the researcher is immersed in the environment of the study.

Constructivism in education shares some of the same characteristics as its counterpart in science. For example, a tenet of both is involvement in the environment in which inquiry occurs. For scientific inquiry, the researcher assumes this role; in education, it is the student. In this regard, constructivism in education treats learning as social inquiry. Constructivism and symbolic interactionism perceive learning in much the same way, meaning and understanding evolve from conversation and interaction within a social environment (DeVillar and Faltis, 1991). Cooperation and sharing of information are important elements in this process (Lan and Repman, 1995). Students can be active learners, especially when given some degree of control over their environment and allowed to become engaged (Laszlo and Castro, 1995). Duffy and Jonassen (1992) describe constructivism as an alternative to the almost ‘stimulus-response’ objectivist approach to instruction:

"There are many ways in which to structure the world, and there are many meanings or perspectives for any event or concept. Consequently, there is not a single correct meaning or understanding for which learners must strive” (Duffy and Jonassen, 1992).

Constructivist approaches of education treat learners as more than passive observers. A constructivist learning environment provides students opportunities for creating meaning as well. Constructivism is a participatory formula that allows learners to actively build, and then build upon, their own knowledge (Collins and Green, 1990). Nevertheless, the approach may not be suited to learning every type, subject matter, or situation. For subjects where concrete facts and rules apply, a positivist approach may prove more appropriate. In the scope of the entire learning experience however, students may develop a more complete set of skills if allowed opportunities to develop knowledge within both paradigms.
Summary: Characteristics of an Effective Learning Environment

The benefit of investigating multiple educational theories is to identify the strengths of each, especially attributes of a ‘good’ learning environment. The theories and learning approaches discussed to this point have several common themes. For example, Bloom and Marzano identify qualitative differences in educational objectives. Piaget and other constructivists see these as varying degrees of cognitive processing that are largely determined by the student, but also influenced by the learning environment. Vygotsky maintains that education should target a certain, specified level of cognitive development in the student—the Zone of Proximal Development—regardless of the type of material or learning environment. Essentially, Bloom and Gagne and Briggs describe what education should accomplish, while Marzano, Piaget and Vygotsky explain how it should be done.

Based on the review of the learning theories described here, it should be possible to describe the important elements to consider when developing an educational curriculum. Explicit learning outcomes should be the framework for designing what, when, and how material is presented. Those developing the curriculum should acknowledge Bloom’s observation and Gagne and Briggs’ assertion that there are different levels of knowledge acquisition and that the higher levels can be encouraged by thoughtful, purposeful design. For instance, shaping the material to accommodate as wide a range of individual abilities as possible will engage learners with distinct levels of competency (Morgan, 1996). The course material should be considered a scene on which to stage particular problems—not a collection of possible solutions to a precast problem (Britzman and Pitt, 1996). Subject material can be presented in ways that will occupy the students’ natural curiosity, teaching them the process of learning and helping them internalize the ability to solve problems (DeVillar and Faltis, 1991; Lavi, 1994). Indeed, a major focus should be on teaching learners to be self-directed and preparing them for life-long learning (Grow, 1991).
According to Piaget, the learning environment should encourage student discovery and creativity, allowing them to develop their own meaningful cognitive structures. This implies that students should have a degree of control over their learning environment (Lan and Repman, 1995). Symbolic interactionist and constructivist theories recommend that opportunities for interaction among students and between students and instructors should be high. Vygotsky’s suggestion is that the material should be relevant, targeted, paced, and engaging. Multimedia resources can be incorporated to involve as many of the senses as possible, to help students visualize and compose meaningful cognitive relationships. Finally, Vygotsky and Csikszentmihalyi recommend that learners should be given opportunities for engagement and interactivity (flow) with the material.

Following is a table of six functions of the learning environment, as identified from this review of educational theory. These six functions will provide a basis for comparing traditional classroom instruction, distance education, and the paradigm shift recently emerging in education. Additionally, it will serve as a framework for evaluating the course RECM 495D.

Table 1. Functions of a learning environment

<table>
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<th>Functions</th>
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<tbody>
<tr>
<td>1. Access to information</td>
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<td>2. Relevance, currency of material</td>
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<td>3. Role of the instructor</td>
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<td>4. Control over learning environment, format</td>
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<td>5. Interactivity, collaboration, engagement</td>
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<tr>
<td>6. Knowledge creation, problem-solving ability, higher cognitive domains</td>
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Access to information describes the amount and quality of information that is available to the student. In the discussion of classroom instruction, it includes access to printed learning material, retrieval from other information sources, and the expertise of the instructor. In the case of distance education, it also includes access to external sources of information and expertise available outside the ‘classroom.’ Satellite and cable communication links, packaged instructional programs, videotape lectures, CD-ROM and computer-based instruction, and the Internet are all examples of external information sources used in distance education.

Most people want the reassurance that what they are learning will be useful at some point. Regardless of the quality of learning, information that is irrelevant or outdated is of little use. Accordingly, for learning to be effective, information must be relevant to the student and reflect the most current thinking available. Since that student knowledge will be built and elaborated upon constantly, it is vital that the information be accurate and up to date. This function also has significance for society at large as well. In order for students to be productive following their formal education, they must have more than just static knowledge; they must have developed discovery skills and know how to find creative solutions to novel problems.

Vygotsky’s model describes the learning process as an interaction between the learner, the object of inquiry, and a “more capable peer.” For most students, the peer is a teacher or other student who is able to direct the learner’s attention and provide feedback. The role of a teacher may vary however, from a militaristic, top-down style to that of a facilitator or advisor. Which teaching style predominates in the learning environment has a significant influence on the type and quality of learning students will experience. Nevertheless, no one style is likely to be universally preferred; differences in circumstances and the students themselves determine which style will be more effective in a given situation. An optimal match of teaching and learning styles should be one of the most important objectives in creating the learning environment (Hannafin and Sullivan, 1996)
Constructivism describes a student’s control over the learning environment as the degree of involvement the student has with the nature, timing, and content of the subject matter. With respect to distance education, it also includes the student’s command of the technology used in mediating instruction. For students who are comfortable with delivery devices such as computers and the Internet, the devices can become almost invisible. Students who are less familiar with the technology often find that they have to learn the technology first before they can access the instructional material (Norman, 1993). For these students, technology may actually prove a barrier to the learning process (Norman, 1998). Consequently, the amount of control a learner has over the tools in the environment and format of the class may have a direct influence on the quality of instruction the student receives.

A high degree of interactivity among learners, the instructor, and the material is considered desirable in education. Usually, the more give-and-take interaction that occurs during the learning process, the more meaningful will be the resultant knowledge for the student. Through collaboration with others, students are often able to test tentative ideas and eventually negotiate the significance of new information. This then contributes to their existing knowledge set and provides a foundation for organizing yet more information in a recursive, iterative process. As students become engaged in this operation, they tend to perform in the higher cognitive domains of learning—analysis, synthesis, and evaluation. Consequently, the caliber of education is influenced greatly by the degree and quality of involvement a student demonstrates.

The nature of a student’s knowledge created indicates the level of information processing at which s/he achieves. Obviously, students who operate in the higher domains of cognitive processing are often able to understand more complex relationships than those who do not. Using Bloom’s taxonomy for example, when learners evaluate and synthesize new information, they are able to apply concepts to new situations, or even combine individual concepts to solve a more complex problem. Compared to the simple memorization of ‘facts’, this quality of knowledge is
very often much more useful to students because it allows them to approach problem solving flexibly. To encourage this ability in a student, the instructor may first demonstrate a principle and then have the students to apply it to a new set of circumstances. As the students see more instances where the concept is applicable, they make more elaborate constructions concerning the meaning of the principle. As a result, a high level of problem-solving ability becomes another important function of education.

These six functions of a learning environment form the framework by which to evaluate how education operates in traditional classroom instruction, correspondence distance education, and online distance education. As a part of this discussion, we will consider education's paradigm shift in terms of delivering material to students at a distance, and how it is different from the two other forms of delivery. The objective is to provide a foundation for evaluating the real-life application of an online, interactive distance education course: RECM 495D.
CHAPTER 2
Methods of Instruction

Traditional Classroom Instruction

Given the attributes of an effective learning environment, what has been the history of educational methods in the United States? Generally, traditional classroom education bears little resemblance to the characteristics of an effective learning environment described by educational theory. With few exceptions, traditional education relies on mass production, standardized learning material, and independent student work (Reinhardt, 1995). Hence, students do not develop learning skills to their full potential. What a top-down, one-to-many lecture style supposedly provides in efficiency, it neglects in the opportunity for interaction between the students and the instructor. Indeed, a significant amount of the learning that does occur takes place outside the classroom environment. Moreover, classroom experiences have been criticized as being insular with little bearing on real world situations (Oblinger and Maruyama, 1996).

These apparent weaknesses of the traditional classroom instruction paradigm have been blamed for creating an inferior learning environment. Requiring students to work individually, with little opportunity for collaboration, produces students that are inexperienced in the more social processes of learning. While this style may be preferable in learning some subjects, it ignores many of the beneficial effects of collaborative learning. Often it emphasizes a sense of competition among students with few cooperative opportunities for them to work together. Outside the classroom, many professions require a degree of social skills and the ability to collaborate with others—skills many students are not given by the education profession.

Burt (1989) asserts that the traditional classroom environment originated in a society where education was perceived as a type of career training for business and industry. Modern education was largely conceived in the last century when the industrial revolution required a vast resource of skilled workers. This thinking traces back to a philosophy of education advocated by
pragmatist John Dewey and more recently, Richard Bernstein (Ozmon and Craver, 1995). According to many, it has gradually become an outdated paradigm (Mead, 1958). Instead of encouraging students to be creative, critical thinkers, much of modern education continues to mold a student’s thinking into a narrow set of pre-cast alternatives (Burt, 1989).

The common tasks within many classrooms tend to focus on content memorization and routinized learning. Csikszentmihalyi (1995) agrees that traditional education’s chief shortcoming is that it passes on only ‘factual’ knowledge, rather than the more valuable ‘ability to learn.’ DeVillar and Faltis (1991) observe that this style of education unevenly favors students who are more adept at competing for attention. A lecture-style approach to instruction does not stimulate a student’s higher cognitive processing abilities adequately because it tends to assume only one level of ability for the entire class. Given what we know of Vygotsky’s Zone of Proximal Development, it is not surprising that many learners are either left behind, frustrated, or uninterested.

Given that there are significant problems with traditional instruction, why does it persist as the dominant educational paradigm? For one thing, tradition has a momentum of its own and is difficult to overcome. As long as the educational system produces adults who are modestly capable in their fields and have some idea of how to learn what they need to know after their formal education, there is no great impetus to change. Furthermore, much of what a student learns is accomplished outside of the classroom, away from the influence of the instructor. Thus, students very often discover methods of learning that work best for them individually and use the classroom as only one information source among many. Finally, the requirements of education have tended to focus on factual knowledge—exactly that lower level of information processing at which classroom instruction is most capable of delivering. Since business and industry have become willing to provide post-formal training in critical thinking and problem solving—the higher cognitive domains—educators will likely have little incentive to alter the status quo.
The result is that classroom instruction has failed to adopt many of the effective principles suggested by modern educational theories. Where theory prescribes collaborative problem solving, immersion, discovery and mentoring, traditional classroom instruction is inconsistent in implementing these approaches. It is not surprising that teachers, who are themselves educated in the system, tend to perpetuate this cycle.

Distance Education: An Improvement?

Distance education is defined simply as instruction that occurs where the student and instructor are separated spatially and/or temporally. Until the advent of more advanced communication media, this was generally accomplished via written correspondence. Broadcast and closed-circuit television, audio links, and computer technology, among other things, have made the correspondence method an increasingly inefficient delivery tool for education. Distance education is now in the process of becoming a central strategy in most university programs (Wagner and McCombs, 1995; Wang, 1994).

Distance education has become a legitimate alternative to traditional classroom instruction in many universities for a variety of reasons. From the institution’s perspective, more courses and sections can be offered without the additional expense of physical facilities. Once the curriculum is in place, there is often no need for a full-time faculty instructor, nor is there a limit on the number of students enrolled in a particular course. From the students’ perspective, the most important advantage is that distance education provides access to courses that would otherwise be unavailable. In addition, distance education students can work at their own pace, outside the confines of a fixed time and location. Also, the quality of the course content can be equal or superior to that of a classroom when, at the outset, deliberate efforts are made in designing the curriculum (Berge and Collins, 1995).

Nevertheless, there are significant disadvantages inherent in distance education. Foremost among them is that there is often little interactivity between student and instructor—
usually no better than that of a strictly correspondence-style course. This lack of immediate feedback inhibits what would otherwise be a normal two-way communication in a classroom setting (DeVillar and Faltis, 1991; Sherry, 1994). Even with the use of e-mail and other tools, communication is often slow and tedious thereby inhibiting instructor feedback or student follow-up (Garrison, 1989). In addition, distance education is often heavily dependent on technology as a delivery medium and is likewise subject to its vagaries. For instance, a class that takes place via satellite TV connection offers little recourse for students when the link is interrupted.

Whether by correspondence or other means, distance education also relies a great deal on the content of the course material for instruction. This can be a disadvantage if the curriculum fails to engage students sufficiently by arousing their interest or natural curiosity. Furthermore, the initial capital investment in resources to produce distance education curriculum is often relatively high. Additional costs for printing, marketing, and maintenance are incurred throughout the life of a distance education program. Thus, an institution is justifiably cautious in offering distance education courses unless a significant demand can be demonstrated beforehand. Finally, students tend to require more motivation and self-discipline in completing a distance education course than they otherwise would in a traditional classroom; their completion rate is often significantly lower. As a result, while distance education is a desirable adjunct to a university's normal operation, its contribution is mixed.

Table 2 below summarizes the characteristics of traditional classroom instruction and distance education, with respect to the six functions of the instructional environment to be evaluated in this study.
Table 2. Comparison of classroom instruction and distance education

<table>
<thead>
<tr>
<th>Function</th>
<th>Traditional Classroom</th>
<th>Distance Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Access to information</td>
<td>Poor to moderate ¹</td>
<td>Moderate to good</td>
</tr>
<tr>
<td>2. Relevance, currency of information</td>
<td>Poor to moderate</td>
<td>Fair to moderate</td>
</tr>
<tr>
<td>3. Role of the instructor</td>
<td>Teacher, lecturer ²</td>
<td>Instructor, facilitator</td>
</tr>
<tr>
<td>4. Control over learning environment, format</td>
<td>Poor: little control over either within classroom setting</td>
<td>Moderate control over environment. Poor, little control over format</td>
</tr>
<tr>
<td>5. Interactivity, collaboration, engagement</td>
<td>Poor to moderate interactivity, collaboration. Fair to moderate engagement</td>
<td>Poor to fair interactivity, poor collaboration. Poor to moderate engagement</td>
</tr>
<tr>
<td>6. Knowledge creation, problem-solving ability, higher cognitive domains</td>
<td>Poor to moderate knowledge creation, higher cognitive domains</td>
<td>Poor to moderate knowledge creation, higher cognitive domains</td>
</tr>
</tbody>
</table>

¹ Ordinal scale: "poor, fair, moderate, good, excellent."

² Nominal designation, based on characteristics of the instructor's role.

Traditional classroom environments provide varying opportunities for access to instruction and material that range from poor to moderate. Inasmuch as they expose students to information contained in texts, other assigned reading, and lecture material, they furnish poor opportunities for learning. Nevertheless, students must be in physical attendance in the classroom to take advantage of these resources. Consequently, lack of access to the classroom itself can be a significant barrier to learning. Distance education generally does a better job of providing access in this respect. By removing the barriers associated with having to be at a specific place at a particular time, distance education usually improves access to instruction by offering courses to students who would otherwise be excluded.

Relevance is the degree to which information is potentially useful to the student. Currency describes how closely the information reflects the state-of-knowledge within a given discipline. A classroom setting ranges from poor to moderate in its ability to bring either of these
two characteristics to instruction and is influenced significantly by the instructor. Distance education is marginally better at delivering relevant information to students but provides little if any improvement with respect to currency. Currency depends on the willingness and ability of program administrators the instructor to update existing materials.

In a classroom setting, the usual role of the instructor is as a teacher. Lectures are the dominant means of communicating information and the result is usually a top-down, one-way communication style. This provides little opportunity for interaction and consequently students may often operate in the lower domains of cognitive processing. While this may be an efficient and appropriate means of delivering information for some subjects, generally it fails to take advantage of the benefits of interactivity. The degree to which interactivity occurs varies and is a function of the structure of the classroom as determined by the instructor. Overall, the nature of most distance education exhibits even less student-teacher interaction. The instructor is generally not involved in the daily operation of the course. When s/he does participate, it is often only as a facilitator.

Students generally have little control over the learning environment in a classroom setting. In the same manner, they also have little control over the format of the class including what material is covered and how it will be presented. It is important to note that in contemporary education, any degree of student control must be relinquished by the instructor. Accordingly, the classroom setting usually does not grant many opportunities for students to investigate concepts from different perspectives or engage in critical thinking unless the instructor consciously provides those opportunities. Instead, social norms operating in the classroom tend to encourage conformity and limit divergent thinking. Distance education fares equally poorly with regard to offering students control over the format of the class. However, some formats of distance education do seem to do a better job of giving students limited control over the learning environment, simply by allowing them to determine the time and/or location of their instruction.
The classroom setting can provide a relatively high number of opportunities for interaction and collaboration among students and between students and the instructor. A significant amount of interaction between a student and the material is usually relegated to outside the classroom, however. In distance education, what interaction does exist occurs almost exclusively between the student and the course material. There are relatively few opportunities for interactivity or collaboration with other students or the instructor and these are mostly limited to programmatic issues—for example, when and how to take an exam. Student-teacher interaction is usually incidental and rarely extends to a discussion of conceptual questions or clarification. This is probably the area where distance education has traditionally suffered the most with respect to learning.

An inspired, dedicated teacher may deliberately include problem-solving activities in classroom instruction. When this is done, students may operate in the higher domains of cognitive processing and construct a more complex elaboration of the principle being taught. Nevertheless, this circumstance is often the exception. Generally, classroom instruction tends to focus on knowing ‘facts’ and on being able to duplicate information given by the instructor. As a result, classroom instruction often does an inadequate job of teaching students the problem-solving skills characteristic of higher cognitive operations. Distance education’s performance is no better in this regard and possibly worse. Although the lesson material in a distance education course may be similar to classroom lectures and readings, the opportunity for interaction is absent, and consequently, so are the benefits.

In summary, distance education holds two marked advantages over classroom instruction: better access to information and more learner control over the learning environment. In a qualitative sense, the role of the instructor is significantly different in distance education. Indeed, the entire structure of the learning environment is dramatically different. Whereas students learn in a fairly social atmosphere within a classroom, distance education students are often somewhat isolated. This accentuates a disadvantage of distance education—less opportunity for interaction.
and communication among students and with the instructor (Sherry, 1994). Nevertheless, by
careful and deliberate design, distance education courses can be structured to mitigate some of
these inherent weaknesses (Berge and Collins, 1995).

While traditional classroom instruction and distance education were once adequate for
conveying basic knowledge in a static environment, these conditions are no longer as relevant.
The state of the world’s knowledge is increasing exponentially so that students must learn more
material over a wider range of subjects (Ubois, 1995). By the time a student completes his/her
formal education and prepares to enter the marketplace, the knowledge s/he possesses will no
longer be current (Bates, 1990; Reid, 1995; Reinhardt, 1995). For example, the shelf-life of a
technical degree is now estimated to be about five years (Oblinger and Maruyama, 1996). To
counter this effect, students must know how to learn beyond the classroom environment or their
knowledge will quickly become obsolete. Consequently, there is an increasing need for a new
approach to education.
CHAPTER 3
The Paradigm Shift in Education

The apparent disconnect between what is known and what actually occurs in education has been the source of considerable debate over the last decade. Educators have long recognized the value of quality instruction and learning. In the first issue of the (British) Quarterly Journal of Education, Thomas Coates (1831) asserted, “It is of the utmost importance...that every possible effort should be made to diffuse sound instruction.” Toward that end, there have been numerous calls for a change in the way the business of education is done:

It used to be what people learned in their youth would remain valid for the rest of their lives. We are [now] living in the first period in human history for which this assumption is false (Whitehead, 1931).

No one will live all his life in the world into which he was born, and no one will die in the world in which he worked in his maturity. In this world, no one can ‘complete an education’ (Mead, 1958).

The most socially useful learning is the learning of the process of learning (Rogers, 1969).

What is desired is that the teacher cease being a lecturer, satisfied with transmitting ready-made solutions; his role should rather be that of a mentor stimulating initiative and research (Piaget, 1973).

The way to help students become more effective learners is to broaden their conceptions of what learning is (Henderson, 1984).

We have to learn to learn in a new way (Laszlo and Castro, 1995)

How do we teach the skills and knowledge we want to teach and not be bound by the barriers of the limited-utility containers that we now offer education in? (Levine in: Reid, 1995).

Many people today are not convinced that schools are adequately educating students. In 1968, George Leonard observed that the modern system of classroom teaching is a good way to ensure the transfer of information from the notes of the teacher to the notes of the student—without touching the student’s mind (Laszlo and Castro, 1995). Despite promises of educational reform (Blumenstyk, 1995; Brown and Dalziel, 1993), national policymakers have persistently
failed to elevate schools to the forefront of the nation's agenda (Shenk, 1996). As a result, some have reported that confidence in the American education system is in decline (Solomon, 1996). There are an increasing number of people—among them, educators and the public—who are calling for significant changes in education (Mead, 1958; Merryfield, 1991; Oblinger and Maruyama, 1996; Shenk, 1996). This movement is stimulating the paradigm shift in the way education is perceived today (Amodeo and Bullowa, 1995; Kimeldorf, 1995; Scheponik, 1995; Sherry, 1994). It involves revisions along at least two dimensions: instructional style and method of delivery. The call for revision in instruction (pedagogy) is an effort toward recognizing and implementing what is known about the learning process itself from theory and research. At the same time, changes in the delivery of education are suggested as a means of providing better access to education and of engaging learners more effectively (Reid, 1995; Reinhardt, 1995).

Some of the shortcomings of education today originate in the continued predominance of the traditional classroom model of learning with its inherent problems (Donlevy and Donlevy, 1995). We have also seen that there may be more effective methods of instruction. Incorporating problem solving and critical thinking exercises and including multimedia, visualization, collaboration, contextualization and interactivity into the curriculum can provide students with a more complete set of learning skills (Cordova and Lepper, 1996; Lavi, 1994; Reid, 1995; Rossman, 1992). In addition, the roles of instructors, students, and the course material are evolving as well. Communication is becoming more two-way and collaborative. No longer restricted to a flat text, course material can present a more current and wider global perspective of events (DeVillar and Faltis, 1991; Laszlo and Castro, 1995). This constitutes the pedagogical dimension in the educational paradigm shift.

Universities and other institutions are increasingly dependent on technology to administer curricula (Richardson, 1995; Ubois, 1995). This is especially true in distance education, where the delivery medium is a critical part of the curriculum (Bates, 1990; Wagner and McCombs, 1995; Wang, 1994). It is also true in traditional classroom instruction as well. In fact, it is
becoming increasingly difficult to find a class in which some application of computer and/or network technologies is not being used (Bates, 1991; Berge and Collins, 1995). The motivation behind this change in education delivery is driven by the students’ need for increased information access, society’s needs for more capable individuals, and the institutions’ need for more efficiency in delivering instruction (Blumenstyk, 1995; Harris, 1995a). As a consequence, courses are delivered by satellite TV, distributed on videotape or CD-ROM media, and most recently are facilitated over the Internet. It is a fundamental change in the way education is provided and constitutes the delivery dimension of the paradigm shift in education.

The paradigm shift should not be seen as a monolithic entity, for in fact it is not. Among educators and technocrats, there exist relatively narrow factions that pursue modest changes within one or perhaps a few areas. For instance, the use of multimedia is promoted by some as an aid to visualization and engagement (Reiber, 1995; Reinhardt, 1995; Woolf and Hall, 1995). Similarly, some advocate increasing diversity within education by providing potential students improved access to courses (Carter, 1996; Green and Sommer, 1995; Kearsley et al 1995). Nevertheless, the scope of changes called for within the new paradigm include these and many other aspects of education.

The new paradigm in education is being motivated by practical factors as well as pedagogy. For example, demographics indicate that there are more non-traditional students enrolled in community colleges and universities now than ever before (Berge and Collins, 1995; Blumenstyk, 1995; Grow, 1991; Youngman, 1995). In 1987, the Center for Education Statistics reported that in the ten-year period from 1975 to 1985, enrollment increased an average of 37% for college students, ages 25 to 44 years. During that same period, enrollment for college students ages 18 to 24 years decreased by an average 6%—evidence that the concept of a ‘traditional student’ may be changing (U.S. Department of Education, 1987). Projected enrollment through the year 1996 was expected to increase an additional 30% for the older group, and decline by an additional 13% for the 18- to 24-year-old group. In that report, the largest
projected trend was an expected 50% increase in the number of PhD degrees conferred on women during the 20-year period.

In addition, the institutions themselves are changing. Whereas they have traditionally resisted innovation, many universities now find that they can no longer maintain the status quo and remain competitive. Reduced or changing budgets, increased costs per student, uncertain enrollment, and the increasing cost of physical facilities are some of the obstacles schools are now confronting. The evolving paradigms within education theory itself make curriculum development more problematic and complex. The challenge for educators is to recognize and adopt those practices that have the most beneficial effect.

For this discussion, I will narrow the focus of the paradigm shift in education to the six functions of a learning environment discussed earlier. To the previous tables is added the column "Paradigm Shift", with a description of each of the six functions. This is intended as a comparison of the three methods of instruction.

Table 3. Comparison of classroom instruction, distance education, and the paradigm shift.

<table>
<thead>
<tr>
<th>Function</th>
<th>Traditional Classroom</th>
<th>Distance Education</th>
<th>Paradigm Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to information</td>
<td>Poor to moderate</td>
<td>Moderate to good</td>
<td>Should be open, create a global classroom</td>
</tr>
<tr>
<td>Relevance, currency of information</td>
<td>Poor to moderate</td>
<td>Fair to moderate</td>
<td>Information should be most current, state-of-art, include outside sources</td>
</tr>
<tr>
<td>Role of the instructor</td>
<td>Teacher, lecturer</td>
<td>Instructor, facilitator</td>
<td>Facilitator, mentor, collaborator</td>
</tr>
<tr>
<td>Control over learning environment, format</td>
<td>Poor: little control over either within classroom setting</td>
<td>Moderate control over environment. Poor: little control over format</td>
<td>Learner demand, learner-centered,</td>
</tr>
<tr>
<td>Interactivity, collaboration, engagement</td>
<td>Poor to moderate interactivity, collaboration. Fair to moderate engagement</td>
<td>Poor to fair interactivity, poor collaboration. Poor to moderate engagement</td>
<td>High degree of interactivity, collaboration, engagement</td>
</tr>
<tr>
<td>Knowledge creation, problem-solving ability, higher cognitive domains</td>
<td>Poor to moderate knowledge creation, higher cognitive domains</td>
<td>Poor to moderate knowledge creation, higher cognitive domains</td>
<td>Constructivism, mutual learning, problem-solving, highest cognitive domains</td>
</tr>
</tbody>
</table>
For the new paradigm of education, access is a significant issue for the delivery of education opportunities—one that has been difficult for traditional instruction to overcome. The old approach has been to require students to be in physical attendance at an appointed time and place. Nevertheless, this tends to exclude those who cannot be present. In order to maintain their function as the primary providers of higher education, universities and colleges need to find a way to capture those groups of potential students whom they do not now reach (Reid, 1995). Maxcy et al. (1994) observe: “Distance education creates a unique opportunity for schools to extend their academic offerings to new audiences and, at the same time, address the issue of equal access.” As higher education adopts the technologies associated with distance education and online classes, access to computer and Internet technology may eventually equate with better access to education. By offering classes outside the confines of a physical space, institutions can reduce or remove the barriers of time and place and effectively broaden access to education.

“The dilemma that educators and trainers will continue to face is that, given the current and future conditions under which education and training are to be provided, and given the expectations that exist for the ‘well-educated person’ in schools and in the workplace, it is simply no longer appropriate to develop systems or methodologies which are more likely to serve the needs of certain student populations at the relative expense of others” (Wagner and McCombs, 1995, emphasis added).

Access can also become a pedagogical factor once the student is enrolled. Computer-mediated classes, with multimedia, can target and correct individual weaknesses in learning (Scheponik, 1995). Course material can be flexible and self-paced to match the abilities of the learner. Material can be constantly available for every lesson and for each concept. If true, a student’s interactive engagement with the material would essentially increase the time spent ‘on task’, in Vygotsky’s Zone of Proximal Development. In addition, when an instructor replaces lectures with hands-on learning, students often receive more of the instructor’s attention during the moments when they most need it.

The new paradigm suggests a shift in the nature of the course material as well. As we have seen, there is considerable discussion over whether education today adequately prepares
students for their careers, especially in rapidly evolving fields (Donlevy and Donlevy, 1995; Lavi, 1994; Shenk, 1996). The degree of currency within a curriculum is a critical factor if students are to be competitive once they leave academia and enter the global market (Nye and Owens, 1996; Reinhardt, 1995; Solomon, 1995). The relevance of the material is also an important consideration. Indeed, within the education field itself there is an increasing awareness of the value of useful knowledge:

Currently decried as well, of course, and not only by students, is the per force preoccupation with 'irrelevant' research resulting in de-emphasized, egocentric teaching and isolated, misanthropic professors (Youngman, 1995).

Consequently, Youngman (1995) reports that students often become disengaged from learning, leave school before they complete a degree, and become “intellectually insecure” adults. To overcome these effects, the utility of knowledge should be made apparent; learners should be confident of the value of their knowledge.

Inasmuch as continuing professional education has historically undervalued and de-emphasized practical professional knowledge and skill, much that is offered beyond higher education is accused of being irrelevant, excessively theoretical, inconvenient, and poorly conceived (Chambers, 1992). The ability of students to make the transition into a professional career following graduation is perhaps the greatest societal demand on higher education. The students who are best able to assimilate into the market are those who have been taught the process of learning—those who have the skills to remain current even after their formal education is completed (Reid, 1995).

The new paradigm of education introduces a new role for the instructor. No longer the only source of knowledge, the instructor becomes more than a teacher or facilitator (Amodeo and Bullowa, 1995; Sheponik, 1995). Instead of dispensing knowledge, s/he assists the students in discovery—a type of collaborative learning process involving both the students and the instructor (Sherry, 1994; Ubois, 1995). In distance education, the instructor assumes the role of facilitator.
because of the physical constraints of not being in proximity with the distance education student. Within the new paradigm, however, the instructor’s role extends beyond those roles in distance education and also in the classroom. The instructor’s task is to use all means available to expose learners to new ideas and use them to build on or reinforce existing knowledge.

Some have characterized this new role as a return to the apprenticeship, where the instructor becomes a mentor or model for the students (Chambers, 1992; Gagne and Briggs, 1974; Youngman, 1995). According to Vygotsky’s model of development, the instructor becomes the “more capable peer” that guides discovery and facilitates learning (Devillar and Faltis, 1991; Vygotsky, 1978). This is indeed a significant change in education because it alters the nature of communication within the instructional environment as well as the process of learning itself. The intent is to make learners aware, mostly through their own discovery, of the nature of the things they encounter. As a result, learning becomes more of an experiential activity (Henry, 1987). One may notice that this essentially describes a constructivist approach to learning.

In contrast to the traditional classroom model, the new paradigm proposes that students be given more control over the content and format of education curriculum (Oblinger and Maruyama, 1996). Specifically, this includes making the students more autonomous and responsible for how they learn (Henry, 1987). Instead of focusing on the instructor or the curriculum (or on the medium, as is sometimes the case), the efforts of education are redirected toward the learner. Students learn to be more self-directed which increases the likelihood that the material they encounter will be more meaningful to them individually (Chambers, 1992; Davie, 1989). Consequently, students are thought to have a better chance of operating in the higher cognitive domains because their new knowledge has application to real experience.

For instance, older, non-traditional students tend to have unique demands compared to younger students (Youngman, 1995). Non-traditional students often take only one or two classes at a time, sometimes at night, in order to mesh their education demands with career and family. Thus, a course that can be taken from home or done ‘after hours’ can be of benefit to them. At
issue is who will exercise control over the nature and delivery of education. Furthermore, students from the entire spectrum appeal for more voice in what, how, and when they will learn. Control, for them, is a dynamic balance of independence, power, and support (Garrison, 1989) and may be a significant factor in achieving motivation and performance (Hannafin and Sullivan, 1996).

One of the most noticeable differences between traditional methods of education and that called for in the new paradigm concerns the degree and quality of interaction between the student, the instructor, and the curriculum. Certainly the interaction between the students and instructor is an important influence on the learning process within a classroom environment. But it is perhaps more crucial in the case of distance education since:

Interactivity takes many forms; it is not just limited to audio and video, nor solely to teacher-student interactions. It represents the connectivity the students feel with the distance teacher, the local teachers, aides, and facilitators, and their peers...the quality and integrity of the educational process depends on sustained, two-way communication.

(Sherry, 1994: 5).

Sherry (1994) and others observe that this provision for interaction is especially important in distance learning. Without it, the experience may quickly deteriorate into something resembling the old correspondence model of independent study (Garrison, 1990; Sherry, 1994). Consequently, for distance learners to benefit from the interaction called for in the new paradigm, they must have good access to information, other students, and the instructor.

While conventional education does allow students a limited opportunity to apply new knowledge, too often the exercises involve little analysis, synthesis or evaluation—the higher levels of Bloom’s taxonomy. Instead, problem-solving exercises are directed at detecting the ‘right answer’ rather than developing any deep comprehension on the students’ part. The new education paradigm recommends that learners be provided opportunities to apply a newly acquired skill or concept to new situations. This search for a solution is one of the most effective tools for accessing the higher cognitive domains because it allows a learner to observe how
concepts operate under varying conditions (Harris, 1996; Harris, 1994). In the literature, this problem solving approach can be either an individual or social process and often involves an iterative procedure of trial and error (Baiocco and DeWaters, 1998; Starling, 1992). In many cases a solution to one problem can teach a student how to structure and frame more complex problems (Lan and Repman, 1995; Ross and Kennedy, 1990).

The new paradigm of education, especially within a constructivist approach, recommends educators consider several principles when designing a curriculum involving problem solving:

1. That learning activities have a clear objective and utility to the learner.
2. That the learning environment and tasks are authentic, meaningful.
3. That problem solving challenges, targets the learner’s potential ability level.
4. That the learning environment provides the learner with ownership and control.
5. That the learner has the opportunity to test a concept under varying circumstances and perspectives, through which s/he can negotiate the meaning of the outcome(s).

(Adapted from Savery and Duffy, 1995).

Problem solving complements the constructivist approach to learning (VonGlasersfeld, 1995). Indeed, both recognize that students will make more sense of the lesson material if they are given some freedom to manipulate their environment (Dede, 1995). Learner-centered education—the changing view of students from passive recipients of knowledge to active creators—is in fact a near description of constructivist learning (Berge and Collins, 1995). When a learner thinks through a difficult concept, is allowed to see its function in different situations, and then elaborates on that information by discussing his/her perspective with others, the resulting knowledge becomes more meaningful (Berardi-Coletta et al 1995). This is because the learner has created the knowledge internally, accessing the higher cognitive functions of synthesis and evaluation in the process.

Generally speaking, the paradigm shift in education involves a rethinking of how our society approaches learning. The new paradigm includes different roles for the instructor and students, improved methods of creating knowledge, wider access to instruction, better quality of and access to information, and a more learner-centered instructional style. These elements combine to form a model for more effective education. To date however, policymakers have had
little success incorporating the principles of the new paradigm into education. The learning environment where the new paradigm has made the most inroads has been in distance education.

According to Wagner and McCombs (1995), there is a common assumption that distance education students who achieve are intrinsically motivated, success-oriented, self-confident, and in control of their learning environment.

Ironically, evidence from psychological and educational literature indicates that ALL learners benefit from instruction in which they are motivated, feel that they exercise control over their learning experience, are respected, and are accountable for their own learning outcomes. However, because there is the perception that these variables tend to distinguish distance education learning experiences from traditional learning experiences, there appears to be a greater willingness on the part of distance educators to consider employing instructional designs, models, and techniques to accommodate these variables...Simply stated, distance educators have opportunities to leverage the variable of distance to demonstrate the efficacy of instructional practices designed to benefit all students.

(Wagner and McCombs, 1995: 32, emphasis added).

Because distance education is somewhat different than classroom instruction, educators have had the perception that it must be accommodated in unconventional ways. The efforts to adapt curricula and instruction for distance education resemble the 'best practice' recommendations for education generally. Consequently, distance education provides a unique opportunity for incorporating principles of the new education paradigm that have been resisted by traditional classroom instruction. By forging a natural niche within the new paradigm, the field of distance education is presently at the forefront of teaching research (Wagner and McCombs, 1995).

Distance education is in some ways an improvement over traditional classroom instruction. Educational institutions are increasingly relying on distance education to offer curricula because it provides a way to deliver instruction to learners who would otherwise be excluded. More students are brought into the higher education system because of the reach of distance education. Nevertheless, if it only provides a different method of delivering the same old material and presenting it in the same tired ways, it is at best a marginal improvement. The questions for educators are: Can distance education incorporate elements of the new education
paradigm into its curriculum? And, which characteristics of the new paradigm are best suited to
distance education?

Although distance education offers distinct advantages over classroom instruction, it
generally does no better at problem solving activities involving the higher cognitive processes.
Furthermore, it does relatively poorly with respect to interactivity, collaboration, and
engagement. If the strengths of distance education could be combined with some of the
advantages of the new education paradigm, students could potentially experience a much more
effective learning environment. This setting would provide the distance education with the
advantages of improved access, more learner control and a redefined teacher’s role with the goals
of the new education paradigm:

1. To provide nearly global access to information and instruction,
2. Present students with current, relevant information,
3. Involve the instructor as a collaborator,
4. Focus on the learner’s needs and abilities,
5. Interact with and engage the learner by giving immediate feedback, and
6. Access the learner’s higher cognitive abilities in a rich environment for problem solving.

It is my position that the Internet provides the best tool for merging distance education
and the new education paradigm. This is supported by the proliferation of recent research into the
role of the Internet in distance education since 1994.
CHAPTER 4
The Internet in Distance Education

In the January 1996 meeting of the Western States Governors Association, plans were announced to establish a “Virtual University” (Blumenstyk, 1996). The idea was to create an institution that would have no campus and no faculty but could offer degrees and certificates to students under a partnership arrangement with existing colleges and universities. The Internet would provide the essential medium for delivering the proposed curricula (Richardson, 1995). The idea was that, eventually, online instruction would assume a more prominent role in higher education. For many people, this is the direction in which education is heading; the purpose of online distance education will no longer supplement on-campus classes but replace them altogether (Rossman, 1992).

The eleven participating governors criticized educators for moving too slowly in recognizing and adopting technological opportunities and charged accreditors with stifling innovation. Vocalizing the call for education reform, beginning with the Virtual University, the association reaffirmed many of the tenets called for in the new paradigm of education (DeLoughry, 1995). The curricula would be learner-centered, accessible to a broader group of potential students, provide students and instructors with more ways to communicate real-time, and involve the multimedia capabilities of Internet technology. The motivation behind this call for change was to respond to increasing enrollment pressure, demands for more currency in education, and the expense of building new facilities (Blumenstyk, 1995).

The Evolution of the Internet in Education

In 1981, the Internet began as a single network connection linking the computer systems of the State University of New York and Yale University. Within a year, several more universities had joined this Bitnet network, as it was then known. By 1985, Bitnet joined with
Arpanet, a Department of Defense computer network, and for the first time bridged the United States. The strategy of decentralized computing power, a relic of the Cold War, also made it easy for other computer networks to join. This network structure provided the backbone for the eventual development of the Internet (Bigelow, 1993). In 1990, the sharing of electronic documents across the network was achieved. By 1994, the Internet was fully functioning with its own language (hypertext markup language, HTML, and more recently SHTML, Java Script, and others). Hence it was possible to transmit and receive multimedia documents and files, including audio, video, graphics, and satellite imagery (Jensen and Hino, 1996; Thoen, 1996; Ubois, 1995).

The movement that generated interest in the introduction of computers into schools over the last 20 years is once again exhibited in the increasing use of the Internet in education (Collis, 1996; Richardson, 1995). Many of the advantages that educators have recognized in using computer-mediated instruction in a classroom setting are now being noticed as the Internet is applied to distance education. Essentially, the ability to network brings the ‘computers in the classroom’ movement to distance learning students. Judging by the considerable volume of literature reporting the outcomes of using the Internet as a learning resource and delivery medium, educators are finding that the Internet is indeed a valuable learning tool (Barron et al 1994; Beadle, 1996; Donlevy and Donlevy, 1995; Kimeldorf, 1995; Kook, 1997; Liu et al 1996; Maxcy et al 1994; Scheponik, 1995; Thoen, 1996). As a source of published information, the Internet favorably compares with the best libraries (Reinhardt, 1995). It also provides a medium for communication among students, instructors, and administrators. The Internet can also be an effective pedagogical instrument in that it can provide students with a more authentic learning environment (Kearsley et al 1995; Reid, 1995).

There are advantages to Internet-based instruction that have not been overlooked by smaller colleges. With a good academic program and capable technicians, small schools can have an Internet presence superior to that of a “Top 10” university. The quality of an institution’s
online curriculum often has very little to do with the size of the campus. With thoughtful design and planning, a small college can offer an online program competitive with the largest universities (Richardson, 1995). On that account, the Internet tends to minimize the differences between large and small institutions. As a result, community colleges and technical schools have an obvious economic incentive to adopt Internet technology into their curricula (Reid, 1995; Scheponik, 1995). By the same token, larger universities see online distance education as a way of expanding their offerings and increasing their student base (Lavi, 1994; Wang, 1994).

Computers have a well-established history in education. Their use in word processing, reading and comprehension, mathematics, geography, and other areas has been increasing across all levels of education since the late 1970s (Woolf and Hall, 1995). The first computer applications involved relatively simple routines and tasks, but subsequently they evolved into more complex applications as user-friendly software and capable desktop hardware became more widely available (Berge and Collins, 1995). Because of their multimedia capabilities, prepackaged CD-ROM software extended the utility of computers in education to an even greater degree (DeVillar and Faltis, 1991; Morgan, 1996).

How has the Internet facilitated instruction? Since about 1994, there has been an increasing awareness of the potential role of the Internet in teaching classes. Many of the early applications involved the students using the Internet to perform information searches and problem-solving activities in the classroom. While HTML and Java languages, hyperlinks, and multimedia have allowed some degree of interactivity to students, it is the communication capability that has intrigued distance educators (Berge and Collins, 1995; Itzkan, 1994). In classrooms using the Internet, students communicate real-time with other groups of students remotely. They can see and talk to each other using live video/audio connections, collaborate on projects, and participate in live discussions using ‘chat’ areas. This ability of interactive technologies demonstrates that students do not have to be in a classroom to participate in an
active learning environment. It has been a revolution for distance education because communication for the first time was real-time, two-way, and interactive. It effectively introduced collaborative learning to distance education.

Recall that distance education compares favorably with classroom instruction in all but a few areas: interactivity, collaboration, engagement, and in cognitive problem solving. A significant cause of this is the lack of face-to-face contact and interaction between the students and the instructor and the inherent limitations of printed lesson material. The promise for distance education is that these functions can all be improved by utilizing the Internet's communication capabilities. Early researchers began to investigate student outcomes of distance learning involving the Internet to see if in fact this is the case.

The dispersed nature of the distance education audience provides a natural niche for wide area computer networks, like the Internet, to make inroads into higher education (Wagner and McCombs, 1995). Reiber (1995) demonstrated that visualization is a powerful cognitive tool for problem solving. To the degree it is used as a thoughtful supplement to learning, the multimedia capabilities of the Internet can provide effective problem-solving situations for students. Liu et al (1996) have used the Internet to facilitate a graduate general chemistry course and determined that the format significantly improved discussion and interaction among the students and the instructor. Students reported that the course material was very relevant to their focus of study and some students even integrated the material into their own teaching method. Codde (1996) agrees that Internet-based distance education courses can incorporate more current information. Liu also reported that an Internet course provided access to the instructor, a distinguished professor of chemistry, that otherwise would have been difficult. Amodeo and Bullowa (1995) observed that a collaborative learning environment enhances the problem-solving abilities of high-school students. They noted that their students seemed more self-directed when they were given more control over their learning environment. Barron et al (1994) concur that the Internet provides a
useful resource for generating problem-solving activities and allows students to process
information more thoroughly.

Early Results of Internet Use in Online Distance Education

Wang (1994) describes communication as the critical element in distance education, and
that to communicate effectively requires some form of interaction. Kearsley et al (1995) found
that online learning generated extensive, sustained interaction among graduate distance learning
students. Reinhardt (1995) reports that the Internet provides distance education students with
“rich, two-way communication” that allows enhanced participation and feedback—previously
lacking in correspondence- or video-style distance education. Beadle (1996) found that students
in an Internet-based communication course rated e-mail contact with each other and the instructor
as the most useful feature. Donlevy and Donlevy (1995) accede that the online format may
improve communication, and thus interactivity, in distance education.

Interactivity encompasses more than just communication, however. Beadle’s students
also reported a fascination with searches on the Internet; they spent a considerable amount of time
interacting with the information returned by their search queries. Devillar and Faltis (1991) found
that computer-assisted instruction was a factor in increasing their students’ interest and
engagement in the course material. According to Laszlo and Castro (1995), interactive learning
provides a good opportunity for learners to personalize the learning experience and create their
own knowledge. In the constructivist education paradigm, interactivity between the learner and
the environment is a critical factor in creating knowledge.

At this early stage, the Internet appears to provide distance education with several
significant advantages over traditional instruction and correspondence-style distance education.
As we have seen, traditional classroom instruction generally does not perform adequately in terms
of the relevance and currency of the material presented. While it does offer somewhat more
interactivity and engagement, classroom instruction does not provide much learner control over
the learning environment nor access to information. Distance education fills some of this need, especially in providing access to students who would be excluded from the classroom setting. Generally, distance education is an improvement in the relevance and currency of the material and in providing the learner with some control over the learning environment. However, distance education does not provide the same opportunities for collaboration or engagement that the classroom atmosphere does. Nor is it much of an improvement on the classroom with respect to making information meaningful by allowing students to access higher cognitive processes. In these instances, the Internet appears to surmount some of these shortcomings.

The Internet's Role as an Educational Device

With all its capabilities, the Internet is a tool and, like any instrument, its utility depends on the skill with which it is used (Mossbacker, 1995; Turkle, 1996). Involving any technology in the learning process is only useful if the students remain active and engaged (Woolf and Hall, 1995). Consequently, the effectiveness of computers and the Internet on education depends on how they are applied (Reinhardt, 1995; Wang & Sleeman, 1994). Indeed, experience with computers and the Internet has demonstrated that the instructor is a key figure in the effectiveness of any program that involves technology in education (Collis, 1996).

What distinguishes online instruction from entertainment or recreation is the purposefulness of the designers and developers in provoking certain intelligent responses to the learning materials, context and environment. (Berge, 1996).

Those who enthusiastically embrace the Internet in education without recognizing its suitability to a specific instance may find little ultimate benefit from the technology (Mossbacker, 1995). In fact, the Internet will be no more than a gimmick if, at the outset, the curriculum does not lend itself well to the format. The problem is the possible reification of technology by some educators—where the requirements of technology are allowed to guide program design without
an understanding of the purpose for its use. The result becomes perhaps a "tyranny of the latest technology", when little thought is given to a rationale for its use (Pepi and Scheurman, 1996).

No medium is a neutral transmitter of information. Every form of delivery has particular strengths and weaknesses, and the Internet is no exception (Altheide, 1995). There are distinct qualitative differences in the learning/teaching environment of an on-line course, compared to a traditional classroom (Gonzales, 1994; Kearsley et al, 1995). Accordingly, inherent inadequacies of the Internet must be understood and planned for in order to produce an effective learning environment (Collis, 1996; Straus and McGrath, 1994). Pepi and Sheurman (1996) propose a set of questions educators should be willing to consider before launching into an on-line program:

1. Does the Internet format offer something that is currently lacking?
2. Does the technology effectively transform learning theory into instructional practice?
3. Does computer technology help in achieving educational objectives?
4. Is the use of technology synonymous with good teaching?
5. Does the technology encourage students to think critically?
6. Is access to the Internet the same as access to knowledge?
7. How much information is enough?

The inherent limitations in an on-line format make a deliberate, well-conceived approach necessary. For example, Straus and McGrath (1994) found that long-distance group problem solving via computer was less effective than in a classroom setting. According to them, personal, face-to-face communication includes social context cues that elaborate on and help discern meaning from speech. When the communication medium is electronic, participants are separated spatially and/or temporally and are therefore unable to fully utilize cues like body language or voice inflection. These limitations were seen as most important when productivity is critical (Straus and McGrath, 1994).

The multimedia character of the Internet provides access to graphics, allowing distance learners to visualize some types of lesson material. Harp and Mayer (1997) found that a curriculum can be more interesting with the addition of entertaining illustrations and graphics, but
only those relevant to the material were of educational benefit. Summary or descriptive illustrations were judged to be the most effective pedagogical tool. Images or illustrations used for entertainment only contributed very little to the learning process and in some cases constituted a distraction.

Davie (1989) found that computer use in online education depends on standardization. Differences in hardware and software compatibility have decreased recently but can still be problematic. The dynamic landscape of computer hardware and software raises significant compatibility and access questions for learners (Green and Sommer, 1995). There is a very real hazard that today's state-of-the-art computer technology will be virtually useless in two or three years. In addition, Davie observes that any computer application in education is subject to the limitations of the technology—things like the “small-window” of the monitor, disjointed transactions, problematic metaphors, and non-verbal expressions differentiate computer-based communication from other forms of conversation. Applebaum and Enomoto (1995) add that the limitations of Internet technology may actually slow down dialogue, compared to face-to-face communication.

Another restraint is the dependency on technology required by an online format. When the computers, network servers, and data transmission lines function properly, Internet technology may be virtually transparent to learners—that is, it does not appreciably interfere with the learning process. When one of these elements malfunctions however, it can disrupt the entire operation. Consequently, a heavy dependence on equipment and software exposes the instructor and students to an entirely new anxiety: losing the network connection during class time. Indeed, Maxcy et al (1994) and Wildstrom (1995) report that technical problems are a major drawback of Internet-based distance education.
CHAPTER 5
Evaluating an Online Distance Education Course:
The Crookston Case

The Wilderness Management Distance Education Program (WMDEP) is a collaborative effort between the University of Montana and the Arthur Carhart National Wilderness Training Center. It comprises six undergraduate courses treating topics ranging from wilderness ecology, philosophy and ethics, to wilderness planning and recreation. The WMDEP has been offered by traditional correspondence methods since its arrival at the University of Montana in August 1995 and since the program's development at Colorado State University in 1988.

While students' response for the courses has been generally positive, the program has not met expectations for growth in enrollment. Various marketing strategies and campaigns to raise public awareness have been applied throughout the life of the program with mediocre results. In 1995 the program's directors, the deans of the Center for Continuing Education and School of Forestry, began considering ways to increase the program's reach to make it more accessible to the potential audience while at the same time incorporating more of the desirable elements of the paradigm shift in education. The Internet appeared to offer a way to accomplish that objective.

Before committing to such an effort, however, the steering committee decided to pilot test one course and evaluate its performance. Managing Recreation Resources (RECM 495D) was selected as the pilot program. The traditional correspondence-style study guide and supplemental readings were adapted to an Internet format with a class web site and discussion group areas provided to facilitate interactivity (Figure 5). The University of Montana and the University of Minnesota arranged to offer the course at the latter's Crookston campus during Winter Term, 1995-96. Real-time audio and video capabilities allowed the entire class to participate in live group discussions and 'lectures.' Although most students participated from a single classroom at the Crookston campus, students could—and did—connect from home as well.
Welcome

The University of Montana's, Wilderness Institute, School of Forestry, and Center for Continuing Education, and the Carhart National Center for Wilderness Training, welcome you to the Wilderness Management Distance Education Program and specifically the course **Managing Recreation Resources**. Your course will be facilitated by Dr. Wayne A. Freimund who will be assisted by Stephen Peel.

The Instructors

Dr. Freimund is the Director of UM's Wilderness Institute and an Assistant Professor of Outdoor Recreation Management within the School of Forestry. He holds degrees from The University of Minnesota, College of Natural Resources (Ph.D.), College of Education (B.S.) and the Natural Resources Program at Crookston (A.S.). His M.S. was taken in Wildland Management and Public Administration at West Virginia University.

His research interests include the use of information technology in natural resources education, management and planning, social carrying capacity in National Parks and Wilderness, and, understanding the social meanings of natural resources. He has worked for several years as a consultant to the National Park Service on issues of park planning and management and is Executive Editor for Electronic Communication for the International Journal of Wilderness.

Stephen Peel is a Graduate Teaching Assistant in the School of Forestry and is completing a M.S. in Recreation and Park Management. Steve has extensive experience as a Wilderness Backcountry Ranger and landscape photographer. He is highly
RECM 495D offered the Crookston students the opportunity to interact with an instructor in both locations. It also allowed them additional flexibility with the course material. Students were required to read the assigned material before each class time and come prepared for a discussion. The 'lectures' usually consisted of a brief overview by one (or both) of the instructors that was followed by a general discussion of the relevant concepts. Generally, the overview occurred in an Internet 'discussion group' using typed text or via live audio/video feed using Microsoft Corporation’s NetMeeting software. The ensuing discussion occupied a majority of each class period and took place in the discussion group area.

Programmatic information related to the syllabus or class schedule was facilitated on the website. Each 'segment', included web pages containing a summary of the material from the study guide, links to other information sources, and a schedule indicating each week's lesson plans (Figure 6). These were provided in much the same way a syllabus would be normally with the exception that the web pages were easily updated or revised to supplement the lesson material. Students came to depend on the website for announcements and use it as an information resource.
Syllabus: Chapter 3
Informing And Educating Wilderness Visitors

Introduction and Objectives:
See Chapter 3: Objectives and Outline Page

Readings:
Wilderness Management (pages 477-480) Appendices D and E

Web Sites:
- Glacier National Park Homepage
- Environmental Education Homepage
- National Park Service Homepage
- Leave No Trace Homepage

Applying the information:
Optional exercise

Background
You are a group of managers responsible for managing the high levels of backcountry use in Glacier National Park. You are also faced with continued budget cuts and increasing use. You have a strong belief in and reliance upon the use of information as a tool to prevent impacts to resources and ensuring quality visitor experiences. You are particularly supportive of the leave no trace program that has been developed by the National Outdoor Leadership School, the USDA Forest Service and the...
A typical class period often began with one of the instructors asking for questions regarding the reading or the previous discussion. Following that, a five- or ten-minute overview would be given by the instructor describing the content and context of the topic to be discussed during that period. Often, the instructor would frame the discussion around a particular instance from his own experience or from a recent event. In many cases, the discussion of a concept would begin with the instructor’s narrative account describing a problem or managerial dilemma. Students were asked to consider the information they had been exposed to in the reading and in previous class sessions and then determine a solution based on that information. These problem-solving exercises, or “scenarios”, were used extensively during the course. Students were asked to respond to the problem with possible solutions. In many cases, the problem had no well-defined solution and consequently the students’ responses often generated considerable discussion among the group. The instructor occasionally intervened in the discussion to direct the students’ attention to important considerations that may have been overlooked. At the conclusion of the class period, the instructor would briefly summarize the discussion and make sure the students understood the concept(s) covered.

As instructors, we made a conscious effort to include some of the elements of the paradigm shift into this course. Our objective was to find ways to make the information meaningful to the students. As a result, we hoped that they would have a better, more complete understanding of the concepts surrounding wilderness recreation. Our intent was to judiciously provide opportunities for learning that would create a richer learning environment, namely: discussion and interaction, multimedia resources, problem-solving activities, information searches, opportunities to apply new knowledge, and familiarity with Internet and computer technology. Furthermore, we made a thorough effort to allow the students to have access to us and to each other outside of regular class times.
Focus for Assessing an Internet-based Course

This brings us to the purpose of this study and the questions to be answered regarding on-line distance education. Educational evaluations of other curricula using Internet technology have been overwhelmingly ardent. In fact, the few existing criticisms in the literature have been philosophical excursions leveled at the application in general—not critiques of a specific curriculum (Gross, 1996; Thoen, 1996; Wildstrom, 1995). The question we set about to investigate is whether the Internet is indeed a good medium for presenting a wilderness management course to students. Does the material lend itself to the on-line format and in what ways does the technology benefit or obstruct student learning?

Why this program? There are several reasons for selecting wilderness management as the course material. First, the wilderness audience is dispersed; potential students reside in virtually every country around the world (Queen et al 1998). Second, wilderness issues transcend political boundaries. The need for accurate information and education worldwide has placed wilderness issues in a global setting (Burgess et al 1997). Finally, wilderness is a good forum for studying ecological, social, geographical, and political principles in general. The eclectic science of wilderness management draws from these and other disciplines, consequently it provides a meaningful context in which to discuss them.

A cursory look at the types of curricula offered on the Internet demonstrates the need for environmental studies curricula in general and a wilderness program in particular. For example, Cape Software (CASO) publishes an Internet guide to on-line curricula offered by accredited institutions. Of the 732 courses they list, nearly 52% (379) are in the fields of business and technology; 18% (132) are in language and education; 17% (123) are in the traditional sciences; and 12% (86) are in the humanities (Figure 7). Just over 2% (15) are courses in ecology or earth science. According to CASO, there are currently no online courses or programs that specifically offer wilderness management as part of the curricula.
Figure 7. On-line courses by category (reported by CASO Internet University, 1996)

Judging by the descriptions provided, the definitions of interactivity vary widely among institutions. Consequently, the numbers of on-line courses may be somewhat inflated. The syllabi are provided by the institutions themselves and vary widely in the amount and type of interactivity they provide students. While some institutions dedicate significant resources such as multimedia, interactive web pages, real-time audio and video to their curricula, many supposedly on-line courses provide e-mail participation only and no truly interactive component at all.

Methodology for Evaluating the Course

RECM 495D was not meant to imitate the experience of a traditional classroom environment, nor was it intended simply to add glamour to a previously unexciting 'home study' course. Instead, it was designed to add various opportunities for interaction between students, with the material and the instructors to an existing distance education course. In addition, RECM 495D was developed to examine by experience some of the learning outcomes other institutions were reporting from their online curricula. This study was not meant to replicate the work of other programs. Rather, its purpose was to refine RECM 495D and justify its initial development, improve the program's efficiency in developing future curricula through this experience, and
increase the reach (access) of potential students to the information available within the WMDEP program.

In order to gather the necessary information to conduct the evaluation, several instruments were devised to query the students regarding their assessment of RECM 495D. The approach can best be described as a descriptive/interpretive case study using naturalistic inquiry as a guiding principle. The 'data' gathered in this study comes primarily from four sources:

1. Archived discussion from each class period, and reports from participant observers,
2. A telephone/e-mail survey of students during the course,
3. A group interview of participants shortly after completion of the course,
4. And a mailed follow-up questionnaire three months following.

The first three data sources are qualitative in nature. The follow-up questionnaire is quantitative and used a Likert scale for students’ responses. A timeline of the events is illustrated below.

**Figure 8. Approximate sequence of events in collecting data.**

![Timeline of Events](image)

Each of these methods has already been administered and the data collected as a part of the course. The telephone/e-mail survey was given during the course near the end of the term. The group interview and follow-up questionnaire were conducted beginning about six weeks
following course completion. The archived 'classroom' discussions are transcriptions of the daily conversations that occurred throughout the actual class. Because the first four weeks of archived discussion group postings are unavailable, the transcriptions commence from January 13, 1997. Although potentially valuable, due to the limited scope of the evaluation, we did not analyze newsgroup postings we judged to be irrelevant to the class discussion.

The purpose for the follow-up, mailed questionnaire was to gauge student perceptions of the relevance of the course material, the relative utility of various elements of the course's format, and the students' assessments of the instructors' effectiveness. Given the small size of the sample population (N = 23 students) and the low response rate (43%), the follow-up questionnaire is probably inadequate for characterizing any substantial aspect of the course. Consequently, its value is limited to a guide for focusing the in-depth questioning during a later group interview. Responses were used as a tool to direct attention to elements of RECM 495D that were either particularly effective or were noticeably unsatisfactory according to the students. The intention was to target 'areas of concern' so that questions for the group interview could be tailored. A facsimile of the questionnaire is contained in Appendix A.

The e-mail/telephone survey was administered during the course and is intended as a first attempt to evaluate RECM 495D's effectiveness. Of the 23 students enrolled, 8 completed the survey for a response rate of 34%. A copy of the survey questions is contained in Appendix B. The purpose of the survey was to provide some insight as to how the students perceived the course and was the first time their feedback was solicited. The significance of the e-mail/telephone survey is that it was a first step at constraining our focus to the characteristics of RECM 495D that the students considered important. Broad, open-ended questions were used to elicit the students' perceptions generally, and included the following:

1. Why did you take this course?
2. What did you like most/least about the course?
3. What things would you have liked to see more/less of?
4. Describe how your knowledge of wilderness issues has changed (if at all) as a result of taking this course.

5. Compared to a classroom course, what were the advantages/disadvantages of using the Internet

The group interview is the final information-gathering tool used to explore the 'areas of concern' in depth. As mentioned, these issues were narrowed from the responses of the e-mail/telephone survey and the follow-up questionnaire. The group interview was an hour-long, focused investigation into very specific aspects of RECM 495D and was meant to probe topics at length. It was conducted on-site and in person with 12 students (12/23 = 52%) and 2 instructors (2/3 = 67%) in attendance. This phase of the study was included to provide the opportunity for the students to expand on their previous responses. By allowing for follow-up questions, the interviewers provided a setting for discussing why the course operated the way that it did. An open-ended question after the interview had supposedly concluded: "[Is there] any final comment on something we haven't covered?" gave the students a final opportunity to make suggestions about any aspect of the course.

The discussion group postings are almost purely observational data. They serve the purpose of field notes and give useful insight into the dynamics of the 'classroom' environment. Because the messages are archived exactly as they were originally posted, they are likely not as subject to the same interpretation bias that field notes may be. The reason for including them in the study is to compare the students' perceptions about the course with the record of what actually occurred. For example, if students reported that they occasionally felt frustrated with the technology used, discussion group postings could be used to corroborate or contest this response and would be cited directly from the transcript as evidence.

Each of the four methods has a distinct purpose and provides different information relevant to the study. The e-mail/telephone survey, follow-up questionnaire, and group interview provide a progressive narrowing of focus where what occurs in one step depends on information gathered in the previous step. All three allowed me to organize the students' perceptions into
distinguishable themes. For example, when asked to name some of the limitations of the online format, the students identified the unreliability of the Internet connection most often. Seeing this response appear prominently in the survey, questionnaire, and interview indicated that the reliability of the technology was indeed a major problem for the students. On the other hand, the discussion group data put some bounds on the students' responses by supporting or challenging their perceptions. In this instance, we referred to the discussion group archives to see when the connection actually failed and how much of a hindrance it proved to be.

The overall design of the study can be characterized as a strategy of triangulation; each data-gathering approach has inherent advantages and disadvantages (Miles and Huberman, 1994). We considered that, by combining the advantages of all four, we should obtain a more complete and accurate sense of RECM 495D's performance.

**Purpose of the Research: Using a Qualitative Approach**

There are two major elements to the Crookston research. The first involves how the information was gathered. This comprises the case study component of RECM 495D. It includes the general paradigmatic approach to observing and describing what occurred. The case study also influences the way information was to be organized and used in the curriculum evaluation. Feagin et al. (1991) describe the case study as a “Research method that relies on the examination of a single instance of a phenomenon to explore, often in rich detail, the *hows* and *whys* of a problem” (p. 21). For the purpose of this study, the case is limited to the bounds of the Crookston experience within the classroom. It includes the ten-week course period from the first day of class to the final exam. Our observations during this period are associated with the case itself—what went on in the context of the ‘classroom’—and its dynamics.

The second element is the evaluation of the course and the context in which it took place. The evaluation commenced about two weeks before completion of RECM 495D and continued afterwards until the pertinent data could be gathered. Its purpose is to report the results and, to a
lesser degree, interpret their significance. The evaluation is distinct from the case study in that its objective was to extract information from the students about the mechanics and substance of RECM 495D. Generally, this aspect of the research was separate from the activities of the course itself. The case study, on the other hand, relies mostly on passive observation of behavior within the context of the class. The sum and substance of the research effort was the educational evaluation of the Crookston experience.

An evaluation is an important element of a pilot program because it provides a standard whereby the present and subsequent efforts will be judged (Stockdill and Stoehr, 1993). For the Crookston case, the evaluation had an overriding purpose: to determine whether the Internet was an effective delivery medium for a course of this type according to the six functions previously identified. It was essential that the information that we gathered be useful. Accordingly, we formulated a strategy during the early development of the course that would make evaluation possible. In addition, the evaluation was to provide a language and format with which to discuss the program's future generally. The information gathered for the evaluation was used to make mid-course corrections as needed during the offering. Ultimately, the information produced by the evaluation is to be used to monitor activities, determine future emphases, understand factors of success or failure, and account for the money and time committed.

Of course, there were and are limitations to this type of evaluation as well. In this instance, the questions examined by the study were limited to "what occurred?" and "why?" The obligation was to discover qualitative characteristics in the students' learning experience and postulate some explanations for their occurrence based on our observations and their reports. The evaluation was not intended to test differences in student outcomes resulting from RECM 495D nor to compare them to a traditional classroom course. Consequently, there were no 'treatment' or 'control' groups among the respondents. Instead, the evaluation is meant primarily as an accurate, intimate description of the characteristics of the Crookston phenomenon.
Interpretations or comparisons, although perhaps inevitable, are mostly left for the reader to make.

From the beginning, there was no intention of measuring quantitatively the outcomes of learning associated with RECM 495D. Neither was there a design on our part to quantify the students' performance or other characteristic. Rather, the overarching purpose was to observe the 'classroom' dynamics of RECM 495D in an interactive, Internet environment and increase our understanding of this relatively complex social phenomenon within its context. Based on the nature of the course and the constraints it posed, in our judgment, a qualitative case study approach simply provided a better set of tools for describing what occurred (Worthen and Sanders, 1991). Indeed, the very nature of a standard educational evaluation is qualitative and hypothesis-generating—rather than quantitative and hypothesis-testing—in nature.

The case study offers a means of investigating complex social units consisting of multiple variables of potential importance in understanding the phenomenon. Case study research has proved particularly useful for studying educational innovations, for evaluating programs, and for informing policy (Merriam, 1988, p. 32, emphasis added).

Strictly speaking, the case method approach of this study is accurately categorized as field research. Babbie (1995) describes field research as a "...social research method that involves the direct observation of social phenomena in their natural settings" (p. 303). The concept of 'field' is more than a substitute for 'laboratory.' Whether abstract or concrete, the field is simply the domain from which the data is collected (Schatzman and Strauss, 1973). In a social environment, field research provides a way to observe and describe behavior from within a context. Denzen (1971) refers to this as naturalistic behaviorism—actively entering the world of the subjects in order to recombine covert, private features of the social act with the public, observable behavior. Field research is often better than its experimental counterpart at identifying relationships among variables within a complex phenomenon. Although data collected by this method may suffer from lower reliability and generalizability, the relative advantage is the higher potential validity of the results (Miles and Huberman, 1994). Reportedly, the greatest strength of
a naturalistic inquiry approach is the depth of understanding it is capable of producing (Babbie, 1995; Denzin and Lincoln, 1994; Guba and Lincoln, 1988).

The purpose for choosing field research, as a method, was determined based on the nature of the phenomenon observed, the subjects involved, the questions to be answered, and the constraints of the study. The questions we were asking in this pilot study related to the six functions of an effective learning environment. The focus was to identify elements critical to the learning process and then evaluate them in terms of RECM 495D. For the Crookston case, we were interested in describing the online class phenomenon and in evaluating its effectiveness from within the learning environment—that is, from the students’ perspective. As a result, we depended heavily on the input of the students for the necessary information.

The study is accurately described as non-causal research and evaluation. In this type of investigation, the questions were not apparent before the course began. Consequently, a pre-existing problem statement was not applicable to the research (Schatzman and Strauss, 1973). We judged that, given the constraints of the study, the questions we wanted to explore, and the preliminary nature of RECM 495D, field research would be especially useful for studying the subtle interactions of attitudes and behavior we expected to observe.

Constraints: Justifying a Qualitative Approach

Marshall and Rossman (1989) suggest four characteristics that describe a qualitative approach. First, researchers are immersed somewhat in the study setting. That is, the objectivity of a classical experimental design is exchanged for collaborative inquiry. As mentioned, we were active participants in the process. Accordingly, a significant degree of subjectivity was inherent in any information we gathered. Second, a qualitative approach is an attempt at deep understanding—or thick description. As such, participants can be encouraged to explore their individual perspectives, identifying significant but recondite details. Consequently, the degree of researcher control is usually much less than in a classical experimental design. In the Crookston
experience, this was certainly the case. Third, qualitative research is appropriate in situations where the nature of inquiry is perceived as an interactive process between the researcher and the respondent. In other words, the subject may have the ability to elaborate on their responses or otherwise help shape the results of the study. The students did have some influence on the manner and content of the material taught. Because we were aware of the students’ reactions to the course as it progressed, we did occasionally alter some aspects of the course’s presentation. In this sense, the students also had an indirect influence on what occurred during class. Finally, since qualitative analysis relies on the participants themselves for primary data, the information is necessarily descriptive rather than predictive.

There are several reasons for approaching this study qualitatively. At the outset, there were several significant constraints to the research design of the case study:

1. The group of 23 Crookston students is not a representative sample population of university students in general.
2. The student respondents are self-selected by virtue of their enrollment.
3. RECM 495D is a preliminary effort.
4. The type of information generated by the study indicates a certain approach with inherent limitations.
5. The degree of researcher involvement precludes any significant attempt at objectivity.

Because of the very preliminary nature of RECM 495D, an offering to a small group in a single location seemed the most judicious approach. However, because of these two factors—the small sample size and the pilot nature of RECM 495D—the respondents are not representative of, nor can the observations be generalized to, a more universal population. The 23 students who participated in RECM 495D represent a relatively narrow range of interests and backgrounds. All were full-time undergraduate students at the time. Most are majoring in a natural resources curriculum, and many have a family history of several generations in the Red River Valley of Minnesota and North Dakota.
Another constraint that suggested a qualitative approach is that there was no random selection or assignment to groups. Because all students enrolled in the course were automatically included in the study, it was neither practical nor perhaps ethical to apply different treatments to a self-selected group of subjects. Their purpose for enrolling was primarily to learn the information presented within RECM 495D and receive college credit for doing so. Withholding or reducing one group’s access to any or all elements of the class presents an ethical dilemma. As instructors, we could not conscientiously treat groups differently for the purposes of research. Although students were partitioned into five working groups for small group assignments, and into two larger groups for morning or afternoon discussion, the material covered in each group and the assignments given were essentially identical. The justification for creating the groups was for practical reasons related to their coursework—not to this research. Ultimately, we wanted to present the material as thoroughly as possible to all the Crookston students.

RECM 495D contained so many variables throughout the course of the 10-week term that early on it became obvious there would be no reasonable way to control for most of them. Similarly, because this was a first attempt at offering the course in an online format, it was likewise impossible to identify a priori many of the significant variables involved. Furthermore, because this was a pilot study, our objective was not to test hypotheses or verify results, consequently there was no preconceived hypothesis. Given the traditional experimental strategy’s limited ability to detect multiple interactions, at this early stage and given the constraints, there seemed little purpose to identifying a cause-and-effect relationship among significant variables without knowing what they were or their degree of influence (Cronbach, 1983; 1975). Adopting an ill-suited quantitative perspective could subject the study to a Pandora’s box of previously unidentified interactions, and raise incessant ex post facto challenges to the validity of the results. Instead, we were much more interested in understanding what was occurring within the context of the case, regardless of whether the experience could be applied to
another population. Recognizing this, we determined to take an inductive approach to investigating the phenomenon.

The type of information we expected to derive from this study also indicated a qualitative approach. Much of the information and insight gathered from the Crookston case came from the students themselves. On some occasions, they were directly asked for their responses; on others, insight came from our observation of their behavior within the class setting. In either case, because we had to rely on the respondents as our primary sources of information, the study became a descriptive analysis of what occurred. Consequently, the results emerging from the data dictate reporting in a qualitative format.

One element of a research design that concerned us in the beginning was the degree of involvement we, as instructors and researchers, would have in the study. The demands of RECM 495D required that we interact with the students almost daily. In addition to teaching the course, we also participated as researchers. This dual role—instructor and participant observer—could be problematic in a traditional experimental design. We were aware of the inherent influence we would have on the students, controlling what information they would be exposed to, the format and direction each class period would take, and how we ourselves would shape the course based on feedback from the students. This collaborative control, the interactive relationship between the students and us, ruled out a more conventional experimental design. The relatively high level of researcher control required by a ‘true’ experiment not only raises ethical and practical issues for us in this instance, but as our participation in the class was a given, the opportunity to conduct an ‘objective,’ quantitative study was precluded.

**Educational Evaluation of RECM 495D**

In Table 1, six functions of an effective learning environment were presented as a framework for comparing a classroom learning environment, distance education, and the changes recommended within the new paradigm of education. Added to that will now be another column
that identifies the nature of these functions as they occurred in the Crookston pilot offering of
RECM 495D. At the conclusion of this evaluation, Table 4 summarizes the performance of these
functions in each environment and compares them to the new education paradigm. At this point,
itis should be noted the difficulty of assigning categories to the 6 functions. Although ideally they
should have been mutually exclusive and exhaustive, in fact they proved to be neither.

Access

As has been discussed previously, “access” describes the quality and quantity of
information available to the student. This is principally a matter of the student’s ability to gain
useful information through the instructor, the material, other students, and external sources.
There are at least three aspects to this function: first, it includes the student’s ability to enroll in
the course in the first place (access 1). Whether or not the course was offered at all inherently
affects the ability of students to be exposed to the new information delivered by the curriculum.
The second aspect is that, once a student is enrolled, “access to information” becomes a matter of
following through on the delivery of information (access 2). A third aspect may involve access to
the learning environment itself—exposure to information is a necessary but insufficient factor of
learning (access 3).

In the Crookston Case, access 1 is demonstrated by students’ responses in the telephone
survey to the question: “Why did you take this course?” They are as follows:

"I took this course mainly because I had a conflict during registration and I needed one
more class. [The instructor] advised taking this course because it could be applied toward
my major."

"For a required elective."

"The course sounded interesting to me...part of the reason was also curiosity."

"It was a 3000-level course that would go toward my degree...there were no other ones
that would fit in my schedule."

"Because my advisor picked it out for me. I also felt it would be an interesting course,
something that UMC usually would not offer."
Their responses to the question: “Compared to a classroom course, what were the advantages and disadvantages of using the Internet for this course?” were similar.

“One advantage to using the Internet for this course was that you could get together with the teacher no matter what the weather was outside, even when school was cancelled.”

“The advantages would be that you got different teachers and if you couldn't get to class because you were sick or something, you could always plug in from your room or from your house.”

The point illustrated by these responses is that the course filled a need for these students and offered them more flexibility in when and where they learned. It was more convenient to enroll in this course than to take it through correspondence study or attend another university altogether. RECM 495D also provided them a way of completing a curriculum requirement while participating in coursework that was not usually offered at Crookston in the traditional system. As a consequence, the students judged that RECM 495D provided them with improved and increased access to instruction.

Access 2, exposure to new information, is illustrated in students’ responses in the telephone survey to the question: “What did you like most about the course?”

“The fact that I learned more about how to manage a wilderness that I didn't know before and that I could apply some day.”

“I...liked the reading (even though it was a lot at times). The readings were very informative and written in an understandable way, especially the text.”

“We got the experience of having class over the Internet, had different teachers (you and Wayne) [Montana instructors], so we could learn from your experiences instead of hearing about the same ones from Dan and Phil [Crookston instructors].”

“The ability to be in touch with teachers 24 hours daily.”

“...I found the information offered very interesting. Although I may never manage a wilderness area, I can use the info from this class to manage sensitive areas, rehabilitate impacted areas, or reduce impacts.”

“I liked the interaction between all of the students—being able to hear what everyone else had to say.”
Some responses to the question, “Compared to a classroom course, what were the advantages and disadvantages of using the Internet for this course?” reinforced the idea that new information and different instructors were significant factors in the students’ access to information sources:

“It was nice to get a look from a different view—a non Red River Valley view.”

“Advantages would be access to resources on the Net, the ability to communicate with so many other individuals, and having to put your ideas out there.”

“Learning from a different instructor and institution broadens the mind.”

Access 3, participating in a constructive learning environment, was a little more difficult to discover. In response to the telephone survey question, “What did you like most about the course?” students responded:

“The fact that we could view the conversations that were going on in the other class section. It was nice to be able to see everyone’s input on it. It helped me to see things from different perspectives.”

“I liked the video and audio parts of the class, but the different situations that were given each day was a good idea [too].”

Responding to the question, “Compared to a classroom course, what were the advantages and disadvantages of using the Internet for this course?” students identified the problem-solving environment as more interesting and that it allowed them more creativity:

“Applied coursework is an advantage for a wilderness course.”

“A different learning environment such as the Internet opens a person’s mind to more creativity with class material and communications. There is more than just letters or speech out there.”

“I liked the instant feedback.”

And finally, in response to the follow-up mailed questionnaire question, “Do you have any other comments or suggestions relating to the course, its format, or the instructors?” a student commented:
"I believe a course like this should be widely offered to college students with majors in this area of study. I would be very interested in taking another class in this subject again, if offered the same way."

Overall, the Crookston offering of RECM 495D was perceived by the students as providing improved access to a course of this type. From their reports, they related that it provided a valuable adjunct to their usual course of studies. In addition, RECM 495D afforded the Crookston students relatively good access to instruction originating outside the confines of their campus, including the instructors in Montana and the course material. Students' access to one another was reported as good, but it is unknown whether they perceived it as different than a traditional classroom—the Crookston classes were in fact held on campus within a classroom. Presumably, access to the class was an improvement over correspondence-style distance education, as evidenced by the students' comments regarding connecting from "home."

Opportunities to participate in a constructive learning environment surfaced as another access issue. In general, their responses indicate they felt that they were productive learners and that the resources offered in the class were useful. Compared to a classroom, the online format was no worse in providing an effective learning environment. Compared to correspondence-style distance education, it was almost certainly better.

According to the students' responses, access was improved in comparison to the traditional classroom and distance education environments in nearly every respect. This claim is made with one caveat however: the various aspects of the access function only operate as long as does the technology. When the system failed, connectivity between the students and the instructors, with the course material, and to a degree even among themselves was no longer possible. This loss of communication was identified by the students as a major disadvantage of the online format:

"I didn't like when the network went down (either at your end or our end). Of course, that is bound to happen, but it's just annoying."
"The biggest disadvantage would have to be the technical difficulties, and being so reliant on the technology."

"The technology didn't work consistently."

"The Internet wasn't always functioning."

"A bit frustrating when the network was down and you wanted to do something. Especially when the technology wasn't working very well during the class session."

"Most of my feelings [about the technology] are positive, except for those occasions when you needed to get something sent in or get some information from the Internet and you couldn't get logged on or the system was down. This was probably more of a disadvantage to me because I lived off campus and was logging in from home many times."

"Everything gets slowed down when the Internet goes down."

"The technology has greatly improved, but it does need to be more reliable in order to be less interrupting to the class."

In summary, the Crookston class benefited when the technology was functioning properly. When it was not operational however, it impeded the learning process. Consequently, reliable computer technology and network connections are fundamental requirements in order for an online course to claim improved access.

Currency, Relevance of the Course Material

The paradigm shift in education prescribes using the most up-to-date, state-of-knowledge information in instruction. Furthermore, the material should have some obvious validity and application to authentic circumstances. Information that meets both qualifications is not only more meaningful to the learner, but likely more useful as well. In RECM 495D, we purposefully drew from a variety of sources in order to make the material as current and applicable as possible to the Crookston students. The Study Guide provided a basic direction for the course, as did the texts. Nevertheless, we also brought in research articles, agency publications, maps, anecdotal reports, and other information from numerous external sources to keep the material as current as possible. These were all incorporated into the course website by various means: on a web page, as downloadable files, as 'hyperlinks' to other sources, etc. Students were aware of this effort to
some degree and reported it as part of the evaluation. Comparing RECM 495D to a classroom course, two students said:

"[An advantage] would be access to resources on the Net..."

"The principles were modem and up to date."

Referring to the problem-solving scenarios that were used, a student identified the relevance of the information that was being taught:

"[The scenarios] worked better when you would gear your questions more to the subject rather than making them a little broader."

In contrast, some students observed that the course could have involved a greater variety of sources and types of information than those that were used. When asked how helpful the photos were in representing an area or illustrating a concept, students responded:

"I think they helped. I mean, where you...showed that area, I think one of them was where the people were climbing and then the problem with climbers getting injuries without having the means and ways to get out of...accidents. Showing the pictures helped a lot...especially around here" [referring to how the photos helped “flatlanders” visualize the climbing situation].

"I thought more of it would be helpful too. Sometimes one picture just doesn’t describe it. I mean maybe something like a videotape of it."

Additionally, the students were asked in the group interview whether access to the Internet was a valuable resource for information. There was general agreement among the participants that the sites to which we directed them were both helpful and useful. Of course the disadvantage to the Internet is that currency and relevance do not necessarily equate to accuracy or quality of information. Indeed, a significant problem for students is that ‘published’ material found on Internet sites can be—and often is—of doubtful origin. For this reason, we tried to keep most of the readings ‘in house’ and only sent students to official external sources such as the National Park Service or Forest Service websites.
From our experience with the Crookston class, it seems that the ability to ‘publish’ material on the Internet provides a unique opportunity to make and keep course material current. Whereas the information in a textbook may be as much as several years out of date at publication, an Internet website can contain information almost as soon as it is generated. The degree to which the material is relevant to the students may be another matter, however. In this instance, our experience indicates that the relevance of information contained in an online course is likely more a function of the instructor than of the technology or format of the course. The difference may be that, once the instructor determines to focus the material toward a certain application, the technical capability of the Internet makes it occur sooner and with less effort.

Role of the Instructor

The roles of the instructors in RECM 495D are difficult to characterize. There were essentially two instructors in Montana and one at Crookston. Depending on circumstances, the roles were somewhat fluid from one person to another and from one class period to the next. In spite of this, overall there were obvious qualitative differences between our responsibilities in the online class and, for instance, those of a teacher in a traditional classroom environment. For one thing, we seldom presented ourselves ‘in front’ of the class. That is to say, as instructors for RECM 495D, we operated alongside the students (at least metaphorically). We were not found standing in front, nor was communication unidirectional, from us to the students. We would introduce a topic or question to initiate discussion and then let the students operate rather freely. Our roles thus became more similar to facilitators or collaborators, helping the students discover for themselves rather than directing them to a predetermined conclusion. For instance, during one class period there was a discussion of wilderness impacts and their possible indicators:

Discussion Transcript (2/3/97)

Date: Mon, 03 Feb 1997 12:09:45 +0100
Instructor:
Okay, let’s get started...
Say you manage a wilderness that gets a fair amount of use. What things could you do to determine whether the physical impacts of use are within tolerance or are excessive?
Student:
Obviously we would have to know what the condition of the site was prior to impact. So we could compare the sites (a before and after).

Student:
I think that a person should have to know what the area looked like when it was undisturbed and then go from there.

Student:
You should be able to remember what the site condition was in before the impacts.

Student:
We would also probably need to know the amount of use the area has been receiving, and look at the resistance that site has to human impacts. In other words, does the soil, vegetation, or animal life in the area have the capability of absorbing the current use level?

Student:
We have to determine where they fall in accordance to the LAC providing we have one set up. We need to know about the environment. Is it fragile, can it recover from use or absorb use. The evidence of a foot print on a particular sight may be devastating to the sight and demand immediate management. On the other hand the abuse to an area by pack animals may not demand use. Things we must consider include vegetation, soil erodability, organic matter (OM). The frequency of occurrence of disturbance, change of an area over a matter of time.

Student:
You have to be really familiar with the area and I think they would have to know the kinds of vegetation and such would be native to what areas. They might be able to compare it to previous records of that site in order to determine how much change there has been.

Student:
You would need to assess the impact by looking at prior use as well as the history of the area.

Instructor:
What is an example of a 'good' indicator? Say for campsite impacts...

Student:
Trampling and vegetation cover would be a good indicator.

Student:
A good indicator may be that the soil is not eroding, or vegetation is still in good condition, very little compaction or trampling.

Student:
A good indicator might be the amount of soil that has been compacted or eroded, the number of trees that have been damaged and the amount of vegetation that has been trampled.

Student:
A good indicator might be loss of vegetation or the number of trees that have been damaged.
Student:
You have to look at the vegetation. is it just a little [worn] down or is it all gone. is the impact
spread out any. for example: a trail - is it widening in some spots and not in others.

Student:
Say the amount of bare soil present. This would correspond with the amount of vegetation
around the campsite. Look at the trees and roots and determine whether they are exposed or not

Student:
Presence or absence of vegetation, types of vegetation (invaders, increasers, decreasers),
condition of soil (depth of OM compaction engineering on site, watch for new un-approved sites
popping up).

Student:
An example of a good indicator for a campsite might be the spots of grass missing

Student:
A good indicator would be bare soil, eroding soil, tree roots exposed, loss of vegetation, those
items that are obvious to sight especially when the site may have been in pristine shape
previously.

Instructor:
What if the impacts have been there since 1920s and have been increasing since? How would you
decide then which areas are unacceptable?

Student:
If the impact has been going that long then one way to say that the change is unacceptable is
when it becomes too dangerous for the visitor.

Student:
If the damage started in the 1920s then we would have to compare the site to an area close to it or
right next to it that is untouched.

Student:
Well if you look at a trail - the trails should not be [dug] into the ground with water erosion and
misuse. Campsites should be looking as if nobody ever was there. The Prairie [meadow?] around a campsite should not look like a cow pasture from stock grazing. There should be no
human waste around, toilet paper, plastic forks and knives. The trees should not have old rope
hanging from them as well as boards nailed into the side of trees for cuttin' fish up, etc.

Instructor:
Okay. I saw a lot of good examples of indicators:
• vegetation loss
• campsite spreading
• trail widening, incision, social trails
• soil compaction
Did I miss any? Any others?

Student:
the absence of a plant species, the condition of the soil
Instructor:
Also:
- exposed tree roots
- new sites emerging

The proceedings of the discussion yield at least two points. First, that the students were able to participate rather extensively in this brief discussion (about 10 minutes). Compared to a classroom setting where the teacher may do most of the talking, there was a relatively high level of student participation in this online discussion. Second, after the topic was introduced, the instructor contributed very little to the conversation. The first message was an attempt to narrow the focus from a discussion of impacts to one of indicators. The purpose of this maneuver was to test the students' experience with impacts. Those who could visualize what an impact looked like should be able to construct a way of describing it—an indicator. Having the students discuss what an indicator looked like was intended to make the discussion more relevant and hands-on. The next time the instructor interjected a question was to use the discussion of impacts and their indicators to frame a managerial dilemma: how to determine impacts in the absence of baseline data. The objective was to give them the chance to think a little more carefully about alternative methods of identifying impacts. The last instructor comment was simply to give the students feedback on their responses and provide an opportunity for them to expand on them.

This was not always the case, however. In some discussions, the instructor exhibited a more noticeable presence by his newsgroup postings. Often this was limited to responding to an individual student's comment, sometimes suggesting they complete their avenue of reasoning or to encourage them to consider other factors. On many occasions though, the increased instructor participation was to provide additional information requested by the students. This is illustrated in the following excerpt from a discussion of technical climbing:
Instructor:
Okay, here we go.
You manage the Diamond Peak Wilderness in West-central Oregon. The area is increasing in popularity with climbers because of the challenge of several of the peak's routes. You realize however, that not all climbers have the same skill level, and you know it is a matter of time before a major rescue incident occurs. How do you manage now and in the future for such an emergency? Can you prevent an accident from occurring? Should you try?

Student:
One thing that you would have to prepare for is an emergency and that means having trained staff readily available for any rescue procedures. It also means that you would want staff that are equipped to handle medical emergencies and know some basic first aid. As a preventative measure, you would want to scope out the areas that these people are climbing in and determine which are basically 'unsafe' in terms of the conditions. You don't want to take the challenge away from these people, you just want to ensure them of their safety.
p.s. I'm logged in from the dorms.

Instructor:
You've got the idea. Climbers are there mostly for the challenge. If a manager takes that away by overmanaging, there's not much reason to go anymore.

Student:
A manager must inform the emergency rescue squad at the nearest town at the potential dangers from the inexperienced climbers. If the budget allow have an emergency rescue team at the park on stand by. Caution the climbers about the skill level needed to climb the rock. Post warnings and provide information about the skill level that is needed to ensure a successful climb.

Student:
I guess I don't know if you could prevent people from going where they want to. They will go there if they want to The best thing that you could do is be prepared to handle some emergencies when they happen like having the proper equipment and other things like that.

Student:
I would try and persuade novice climbers to go to a little easier climbs. Otherwise have a well-trained rescue crew. I think accidents will always occur but you can tell people what the safe ways are. You should definitely try to avoid accidents because it is always fun until somebody gets hurt.

Student:
You can rate each of the climbing routes, just like rapids are rated by different classes. Warning sign would help to discourage some of the not so gifted climbers. Making trails to the base of the peak could help to make it easier for First responders to access. No you can not keep people out of danger at all times. No, it would cost too much and be to hard to enforce.

Student:
One thing is to have trained and knowledgeable staff on hand for any type of emergency. You also should examine the climbing areas and check out the risks. Maybe you could have classes
once or twice a week dealing with experimental emergencies and see how the medical team responds to get them prepared for the real thing.

Student:
Good morning [instructor's name],
You get your search and rescue people trained as the best you can and have people patrolling the area as much as possible. You should also try to educate the local outfitters as to how difficult the peak is and have them try to monitor the climbers that they outfit. The outfitters can help prevent inexperienced climbers trying something that is too difficult for them. As far as preventing any accidents, the only thing you should do is educate people as to the difficulty of the climb. There are people who will not listen and go get hurt anyways though, so you have to be prepared to go and get them down.

Student:
Well we've a problem. Most people who are in the wild are usually experienced enough. I mean, what kind of person would start climbing a mountain top out of the blue? I would anticipate that people who would try this are with a friend who is experienced enough to teach them as the inexperienced one climbs. Thus you would not have a problem. I would not think any Bozo would go and spend thousands of dollars for equipment for climbing and be ignorant enough to try to use the equipment on his/her own.

Student:
[Instructor's name], if not all the climbers have the same skill level then the area should have different routes of skill level. Have more advanced climbers take the more difficult routes. Also training classes there could help them climb in those conditions. If just beginners they should not be allowed to climb yet until they have training and experience. You would have to have trained emergency personal working there. At least first responders or EMTs. Have a link with area hospitals for immediate response. Have the personal also have climbing experience and training. You may not be able to prevent it. But you can minimize the possibility of something happening with training and experience. You should try and minimize the possibility of an accident occurring.

Student:
Well, there are a few things that could be done. First of all, Signs could be posted saying what skill level this peak is rated at, and what climbers should and should not climb it. Maybe some regulations could be established. Is there some sort of degree you can get in mountain climbing? Such a degree could be made mandatory for someone to climb the peak, if such a degree exists. Other then that, it's best to play the boy scout, and always be prepared. Have things ready to go and planned for an accident.

Student:
The different routes could be rated for minimum skill level. Those considered too dangerous could be closed to climbers. Naturally there are those who won't follow these guidelines. The first thing, probably, would be to ensure the staff are properly trained in first aid and/or first responder techniques.

Instructor:
I'm seeing responses like:
- Have a rescue team on standby
- Have proper equipment and training let people climb where they want but give them information
• Scope out potential hazards yourself
• Inform and coordinate with local government emergency personnel
• Make sure access to base of climb is provided
• Patrol area frequently
• Work with local outfitter and climbing groups
Did I miss any?

Instructor:
One thing I think I should mention: Park or wilderness managers are not the ones who rate climbs; it's the climbers themselves. All a manager can do is to pass along information to others about what the degree of difficulty is and what the current conditions are.

Student:
Why aren't park managers responsible for this kind of information? It seems strange to me that this type of life-depending information isn't passed to the public from the people who manage the area.

Instructor:
I don't know why, [student's name]. I think that generally, a park or forest tries to keep on staff people who are at least somewhat familiar with the more extreme sports so they have at least some understanding of any potential situation. I think the agencies DO pass along the information if they have it. Often the problem is that they do not.

Student:
Couldn't the park manager talk to a local climbing group and have them find someone who can come in and rate the different climbing trails?

Instructor:
Yeah, they sometimes do.
The rating of a climbing route has been just kind of a de facto thing. Kind of like when the AAA rates the 10 best resort destinations. In other words, what is a 5.10 to one person may seem like a 5.8 to another.

In the discussion above, the instructor interjected comments on six occasions after framing the original topic. The first two messages were in response to the students, with the objective of acknowledging their input and encouraging further participation. The third message from the instructor was to provide the students with some feedback to their responses by summarizing them. The fourth time the instructor commented was to provide the students unsolicited information about how climbs are rated. The fifth message was a direct response to a student's question about whether the managing agency has the responsibility to provide information about conditions to climbers. The final comment was also a direct response to a
student’s question. In this case, the student was trying to think through the problem expressed by another student in the previous dialogue. The instructor’s response was to provide information and clarification.

This increased participation by the instructor did not reduce the students’ opportunities to join in the discussion. Our sense is that it may in fact indicate a degree of engagement by the students in wanting to know the factors involved in climbing before coming to a conclusion about who has responsibility for climbers’ safety. The objective of this discussion was to encourage the students to consider the issues involved in safety and liability of wilderness or backcountry visitors, not to lead them to a particular ‘right’ answer. Indeed, in this situation there was no correct answer, only that this is a common problem for recreation managers.

These examples are meant to illustrate the nature of the relationship between the students and the instructor in the Crookston class. Although the students were not in the same room with the instructor, the latter was still able to exert a significant presence on the learning environment. In the first instance, he had a fairly limited role in the discussion—in the second, considerably more. Nevertheless, both cases demonstrate that the role of the instructor is fundamentally different than in a classroom setting, or in a correspondence course. The instructor’s role as we observed it in the Crookston case was as a facilitator or collaborator, and in that respect resembles the characteristics described in the new education paradigm.

Control over the Learning Environment, Format

A fundamental tenet of constructivism is that learners should be given opportunities to create their own knowledge through experience and direct contact. This implies that students determine to a certain extent the conditions under which they will learn, an important concept in the new education paradigm. Toward that end, RECM 495D was structured so that the students could have some input into the operation of the course. Certainly, one purpose for the evaluation afterward was to solicit feedback from them, asking what things worked best from their perspective. In addition to that, however, we also allowed the Crookston students some control
over the delivery and content of the course during its operation. For example, the Crookston

campus was closed several times during the academic term, first because of snow, and later

because of flooding. As a result, some five or six class periods were cancelled as well. In order
to adapt the course material to fit the shorter schedule, we asked the class for input on which two-
week segment should be dropped.

Indeed, by relying on both the availability of the classroom and on the online technology,
RECM 495D became a victim when either one was unavailable. There were two occasions when
the school campus was closed because of weather, but Internet access was still available. In this
case, the online format could have been used to run classes in spite of the closure of the physical
facilities at the Crookston campus. Nevertheless, because too few students had Internet access
from home, it was impractical to do so. On the other hand, students were in class several times
when a server or the Internet connection malfunctioned. In both instances, the lesson plans were
interrupted for those class periods as well.

In spite of these shortcomings, there were students who individually found it convenient
to log on to the class discussion from home. In some cases, when they could not be connected
real-time (i.e. when the discussion was occurring), they would read the posted messages after the
fact. On other occasions, students would review discussions from a previous class period in
preparation for an upcoming class or exam. In the group interview, the students were asked if the
discussions were useful for keeping current after having missed a class:

Excerpt from Transcript of Group Interview (5/19/97)

Student:
You know, even if you weren't able to make it to class, just log on from someplace...from home.

Student:
It was very useful to keep up with what was going on--But I'm long-distance too [lives off
campus].

Student:
Very helpful.
Student:
Yes, that was definitely a good thing.

Student:
You could come back and read what everyone else had said...

Student:
I thought it was nice just going back and looking at the [discussion] questions, kind of in preparation for the class.

Perhaps another example of learner control relates to the method of instruction as well. Two items, study questions and problem-solving scenarios, were included as a part of the course to help the students learn the material and prepare for the exams. When asked whether they were useful, the students responded affirmatively, describing what it was about each that was helpful. Following are their responses:

Discussion Transcript (1/13/97)

Instructor:
Subject: review questions
Date: Mon, 13 Jan 1997 12:40:57 -0700
are they helping?

Student:
It gives us a good idea on what to be focusing on

Student:
Yes, they were helpful because you had to go in and find the answers.

Student:
The review questions helped a lot. They gave me an idea of what you were looking for from us.

Student:
Yes, I found them very helpful; they pointed me in the right direction.

Student:
They were a huge help. Could we get them when the readings are assigned so we can utilize them as we go through the chapters the first time?

Student:
The study questions are helpful as you make your way through the reading. It helps the material stick in your head.

Instructor:
Subject: scenarios
Are they helping?

Student:
They helped me to apply what I read in the books to different situations.

Student:
They helped us to visualize how these management practices really affect the wilderness.

Student:
I find these to be helping also. They give us a sort of hands-on example of what we are learning. Enabling us to apply our knowledge.

Student:
The scenarios are a good way of applying what we are learning.

Student:
I think the scenarios are very helpful also. I know most people do not like essays, but a scenario essay on the exam may be in order. I feel the information is just too intense to be tested on in just the multiple choice format.

By asking for feedback from the students as to how they perceived the study questions and the scenarios, we had a better idea of whether to continue them or to moderate how they were used. While the decision remained that of the primary instructor, we relied on student input for the final determination. In fact, as a result of these and subsequent comments, we incorporated the problem-solving situations to an even greater extent as the course progressed. The Crookston students reported that the scenarios were of significant value in helping them understand how theoretical concepts could be applied. In the mailed follow-up questionnaire, 7 of the 10 students responding felt that the scenario-based discussion should have been used more in RECM 495D. No students responding to the questionnaire felt that there should have been less.

Table 4. Student preferences regarding the use of scenarios in class discussion.

<table>
<thead>
<tr>
<th>How much should the scenario-based discussion have been a part of this class?</th>
<th>Much less</th>
<th>Less</th>
<th>Same</th>
<th>More</th>
<th>Much more</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

It is not clear whether incorporating the scenarios to a greater extent after the students’ positive response to the first few was a factor in the students’ regard for them. It is more likely
that they provided an effective way for the students to see and exercise their new knowledge by applying it to the situations we framed. In most instances, the scenarios did not have a predetermined conclusion to which we were leading them. Rather, we wanted the students to reason through a dilemma using dialogue and conversation, applying the principles contained in the lesson material. We noticed that this was very often an iterative, collaborative procedure among the students that allowed us to observe them in the process of creating knowledge:

Excerpt of Discussion Transcript (2/21/97)

Date: Fri, 21 Feb 1997 09:06:23 -0700
Okay, here we go.
Let’s say you manage a wilderness area in southern California. It gets a lot of use and has its share of problems, including some that damage the resource itself. During a patrol, you come across a group that is throwing M-80’s into the lake. The other rangers on patrol let you know by radio the concussion can be heard as far away as 8 miles or so. Using what you know about persuasion, communication, information, law enforcement, “Authority of the Resource”, etc. how will you handle this? What approach (there are several) will have the most desirable effect? Think about this one a moment before you respond.

Student:
What are M-80’s?

Student:
Are M-80s fireworks?

Instructor 2 (Crookston):
Firecrackers on steroids!!

Instructor 1 (Missoula):
O, sorry. They’re really big fireworks the military uses to simulate cannon fire.

Student:
Thanks.

Student:
I would use direct management. The use of education, persuasion can prohibit such activities that go on. Education will provide a sense that they are harming the water and air. Persuasion will provide incentive not to endanger themselves, fish and others that are nearby.

Student:
Inform the M-80 throwers that there are noise restrictions. If against the law then they will have to be taken away. Inform office that you are doing this. If not at level this can be done then get higher official there. Tell them they are disturbing the solitude of the other campers in the area. Get your point across without prompting a disturbance.
Student:
Well if these people were disturbing the wilderness then the manager would have the right to
make them stop and possibly prosecute them.

Student:
Well you would have to go up and confront the people doing this. From my experience of being
an RA [resource assistant?] it helps to not just rip into people but to try to act as a friend and talk
them out of doing what they are doing. If all else fails you may have to resort to something else.
You would like to get them to stop doing that and understand why they shouldn't with out causing
problems and as quickly as possible.

Instructor 1:
Good approach, [student's name]
In this case an indirect approach may prove to be more effective at changing behavior AND
attitudes.

Student:
This party is not making a positive impact on anyone. Even though a manager wants to have a
small amount of effect on a visitor’s experience, action has to be taken. Telling this party why
they cannot do this act would be a good place to start and more actions could follow.

Student:
Hello, just sitting in on this session today.
I would approach the group and talk to them about what they are doing, and why they shouldn't
be doing this. I wouldn't go ape as far as trying to arrest them. If they are not cooperative, I
would warn them about getting a fine and suggest that if they wanted to shoot off fireworks they
leave the wilderness. A brief discussion about fire hazards would probably also be appropriate
here. I would also have to remove the fireworks from the wilderness, especially if it was during a
dry period. Informing them where they could recover the fireworks IF they were cooperative and
showed genuine concern about what they were doing and that they realized the damage they were
doing.

Instructor 1:
Hi [student’s name]
I agree with you up to returning the fireworks, I guess. You’re definitely right about the
informational approach. It’s somewhat less direct than in-your-face law enforcement—and more
effective.

Student:
Why would you return explosives to someone who is using them so irresponsibly?

Instructor 1:
Subject: Re: Fri (2-21) Discussion
I don't think you would. I know I wouldn’t. Besides, I'd keep them in case they were needed for
evidence later.

Student:
I guess the only reason I would return the fireworks, is if they completely cooperated. If you take
them and never return them, you have the possibility of negating any progress you may have
gained talking to the people. They will have some hard feelings about what you did and probably
hold a grudge.
Student:
I'm weighing grudge against serious damage and/or injury...

Instructor 1:
Good, what if there's 3 of them and they look like bikers? How can you convince them to knock it off without looking like a weenie?

Student:
Well, I would put on my Harley Davidson jacket. Throw a couple of M-80s. Get them on my side and then say this is a lousy place to throw these. Let's go over to a quarry in another town and throw them in. Just kidding.

Student:
That sounds like a Y chromosome thing!!!

Instructor 1:
And then would [student's name] or [another student's name] be arresting you and your buddies later that month for throwing M-80s in the same lake?

Student:
probably right.

Student:
Persuade them to stop, inform them that it is wrong, good communication skills is the key. If the problem continues to happen, law enforcement might have to come into the picture, and then things could get ugly.

Instructor 1:
Good. You're going to give them information and tell them why they can't do it rather than ripping off the law or statute that tells them they can't.

Student:
put-em in the slammer, or give them a fine.

Instructor 1:
You favor the direct, no-nonsense approach, I take it.

Student:
Actually. I would be firm but friendly. Don't come off like a tyrant but look like you should be respected.

Instructor 1:
A lot of you favor taking the direct approach. This would be behavior modification (applied behavior). However, this only works for about as long as your badge is in their face. How would you get them to change their own attitudes so that the next time they visit they won't do this behavior even if no ranger is there?

Student:
If they continued after I have left I would come back and tell them to stop once more and if they still continue I would have them arrested for disturbing the peace.
Student:
Yea it kind of puts the ball in their court.

Student:
A fine seems to have an effect on what they do or even kicking them out of the wilderness for a while will change their minds if they are uncooperative.

Student:
You will have to explain to them what they are doing impacts other people and what effects it has on the environment. If done right maybe they will listen and not do it again.

Instructor 2:
is anyone distinguishing between “telling” and “asking”, followed by explanations (eg. endangered trout species, federal laws, etc.)?, as far as initial contact goes

Student:
[Instructor 2’s name]- I think after the first m-80 thrown into the lake, the fish would swim tail out of the area! Federal Law...m-80’s I thought are illegal anyways everywhere? Kinda like the cherry bombs of the 70’s. Too many folks lost hands over them!

Student:
I suppose the thing to do would be to educate them on the impacts that they are having on the wilderness. Make them attend seminars and educational sessions. They would probably not like that too much and would think twice about doing it again in the future.

Student:
Let them know that they are affecting more than just their hearing. The noise pollution could be heard for miles. The amount of harm to some fish and wildlife in the area are less than beneficial. A blast can cause bird egg shells to not function properly.

Student:
Inform them well enough the first time about why they should stop, and all of the negative effects it has on the park.

Student:
Or you could tell them that they are ruining the experience for all the other people for miles around and ask them if they would appreciate it if other people were doing something as destructive as what they were doing.

Student:
I don’t know. You make it sound as if talking calmly and explaining why will solve all the problems. Speaking as the parent of a teenager, I know this isn’t always the case. What are the alternatives available?

Instructor 1:
No, I know that’s not the only way. The idea is to confront them at first but then to reduce the intimidation somewhat as you see that they become more receptive to a ‘teaching moment’. The direct approach is good for immediate behavior change but then a less-direct approach afterwards will often produce a more lasting attitude change as well. I think you could try the combination, depending on the circumstances.
Student:
I guess I'm not suggesting that it will always solve the problems, but I feel that the first reaction is to talk down to earth with the people. I would have to get much more forcful [forceful] with them if they weren't cooperating. I guess I was just thinking back to when I would have done something like this. I wouldn't have changed a bit if someone used the face to face “knock if off!” approach.

Instructor 1:
That's exactly right. In some cases, people are more likely to change their attitudes with an indirect approach, and if they understand the WHY of the regulation.

Student:
Well, getting control of visitors using explosives would probably require a heavier hand than would telling a visitor to please keep their dog on a leash. I think I would first attempt to separate them from the rest of their “toys”. Then I'd explain to them, in great detail, why what they're doing is wrong. I'd then ask them to leave and not come back until they know how to behave.

Student:
I would inform the visitors that their actions are unacceptable and illegal. And, if necessary, take appropriate law enforcement actions. You can usually “read” the atmosphere of the group and tell if they are going to listen to your warning, or if they need a stronger discipline approach. I would also be concerned with the over all management situation of the area, if you are having a fair amount of “trouble” in the wilderness. What kinds of users are you targeting? Are you educating enough outside of the area?

Student:
Every situation is different when dealing with campers. Try to use these experiences to best determine what to do in this situation.

Notice that in this discussion, there was an evolution of the approaches considered by the students throughout the course of the conversation. The first issue was whether to use a direct or indirect approach in modifying the undesirable behavior. Once a contingent of students agreed on modifying the behavior directly, the discussion turned to the method that should be used: assessing a fine, removing the fireworks, ejection from the area, incarceration, etc. The process was iterative in the sense that the students came back frequently to the subject of the best approach, direct or otherwise. It appeared that they were struggling to visualize how each response would affect the situation, using their own experience as a model. Our learning objective for this discussion was to have the students consider the differences between modifying someone's behavior and changing their attitude. The point was to demonstrate to them—or have
them demonstrate to themselves—how different circumstances require a different law
enforcement approach.

Another feature of this discussion highlights a point made previously: that the 6
categories often overlapped. In this instance, I have included the discussion into this section
because I think it demonstrates that the students had a certain amount of control over the learning
environment. However, it undoubtedly also demonstrates that the students were capable of
formulating their knowledge with respect to people management within wilderness. In addition,
the reader may notice the degree of interaction among the students and between the students and
the instructor in this discussion excerpt.

Our experience with RECM 495D is that the amount of control within a classroom
environment should be balanced between the students and the instructor. Although we did try to
provide more opportunities for student control of the class periods, we recognize that still more
could have been given. For instance, discussion topics were usually selected and introduced by
an instructor. Allowing students to select the topics or to lead a discussion could have been
workable and would have let the students retain even more control.

What can be said, then, about control over the learning environment for the Crookston
students? In many ways it was an improvement compared to a classroom setting.
Correspondence distance education students are often able to select the time and location of their
learning, consequently they tend to have somewhat more control than in a classroom setting. In a
similar fashion, we observed that the Crookston students had significant influence over where and
when they learned as well; when absent from class, they could log in from home or review the
discussions ex post facto. As a result, our experience indicates learner control was generally
greater in RECM 495D than it might have been in a classroom, and better in many respects than
correspondence distance education.
Interactivity, Collaboration, and Engagement

A theme that permeates modern learning theory is that for learning to be effective, it must be active (Bates, 1990). In other words, if information is to be meaningful, it is essential that the learner interact in some way with the material. Interactivity describes the association between the student and the material, the instructor and the student, or the student and his/her peers.

Collaboration denotes the intellectual relationship between one learner and another. Engagement is the amount of involvement that exists within either of these relationships—the strength of the connection, so to speak. Engagement is a measure of the amount and quality of participation a learner demonstrates while 'on task.'

When designing the content and format of RECM 495D, we determined to include multimedia resources as much as possible. The purpose was to help the students overcome some of the barriers of being remote and to help them visualize the concepts being discussed. With this in mind, on several occasions we included photos, maps, or other graphics on the class web pages. These were in addition to the multimedia resources available externally, on the Internet. Frequently, a class discussion benefited by having photos attached to a message posting. For example, one problem-solving scenario presented the issue of human-caused impacts in wilderness and ways to control them:

Excerpt of Scenario 5 (1/29/97)

Instructor:
Scenario #5
OK. Here’s one for you.
Recreation is allowed in wilderness by the Wilderness Act of 1964. But the nature of recreation is up to the individual manager and his public, provided it conforms to the purposes of the Act. In the Superstition Wilderness (near Phoenix, Arizona), guide trips take people in on horseback for an all-day ride. The favorite trail is an 11-mile loop that takes them in to the central basin of the Superstition Mountains see: (http://ajnet.ci.apache-jct.az.us/supr1.htm) for a picture of the mountain. The area is also a favorite site for backpackers because the inner basin has reliable water. Nevertheless, horse use over the years has worn the trail into ruts as deep as 5 or 6 feet in some places. In addition, horses have had a visible impact on the quality of the springs and
streams in the basin. Here's a picture:

Questions:
1. How would you respond to the impacts caused by the horse operations?
2. How effective would you expect this response to be?
3. Are there any potential problems with this response?

The objective was to engage the students in the discussion as much as possible. If the students perceived the problem as artificial or as having little relevance to 'real life' it is doubtful they would be as thoughtful in their responses. Consequently, we incorporated several interactive elements into framing this discussion. First, in describing the circumstances of the problem, we presented the dilemma: recreation is an appropriate use of wilderness, but different groups of users (in this case, horse outfitters and hikers) may interfere with one another’s experience. The second interactive element is the ‘hyperlink’ to an external website giving a description of the Superstition Mountains, including a photograph of the area. A third element is the photograph attached to the message itself. It is meant to demonstrate the seriousness of the problem with impacts of horse use. It depicts a group of hikers having to straddle the 2- or 3-foot deep ruts in the trail, cut by horses. The final interactive element is the group of questions posed at the end of the scenario. The three questions provide an opportunity for the students to interact with the material (the scenario and their knowledge of impacts to date) and with one another. The purpose of the questions was to focus their attention on problem solving as if they were indeed managers of this wilderness area and were responsible for managing these impacts.
Once the students were accustomed to being presented with problem-solving scenarios in this fashion, we were able to concentrate more of the discussion on the issues rather than on the circumstances of the scenario. In fact, the following class discussion was not even framed as a scenario; instead of introducing a problem situation and asking for solutions, we showed several pictures and simply asked the students to identify the nature of the impacts occurring, if any. The objective here was to familiarize them with recognizing potential impacts from the activities depicted in the photos:

Excerpt of ‘Impacts’ Discussion (1/31/97)

Instructor:
Date: Thu, 30 Jan 1997 22:14:26 +0100
OK. Now here are a couple of pictures showing the effects of use (impacts). Look real carefully and make a mental list of what you see.

Instructor:
The horses are in a meadow, off the trail.
The backpackers are also in a meadow, with no identifiable campsite (at 10,200 feet elevation). Impacts here?
The Crookston students recognized these opportunities for interactivity. In the telephone survey, they were asked what things they liked most about the course. Several students responded that interactivity was beneficial to them:

“I liked the [live] video and audio parts of the class, but the different situations that were given each day [scenarios] were a good idea too.”

“The Internet interactions and technology.”

“I liked the interaction between all of the students—being able to hear what everyone else had to say.”

In spite of this, when asked what things they would like to have had more of in RECM 495D, several students also reported:

“I would like to see more interaction...talk directly to you and do something more than just move fingers on a keyboard.”

“I would have liked to see better group interaction. With the group assignments, they did not work very well.”

“I would have liked to see more daily assignments and more situations on the readings.”

Clearly interaction was of significant value to the students in the Crookston class. The fact that there were opportunities for interaction rated highly with them, but apparently they would have liked to have had even more. Responding to the group interview question “Did interactivity help, compared to a classroom?” students reported:

“I thought it was better because not everyone can talk at one time [in a classroom setting]. But working at the computer, everyone was giving their input and you could look at what everyone else was saying...where, say, shy people in the class wouldn't get a chance to speak up. But you know, who don’t care to just type messages on the screen—all of the sudden, it's easier for some people.”

“That’s the part I liked best too, is that everybody could ‘talk’ at once and we could respond to each other...”

“You know, I’ve never been in a classroom with that in-depth of a conversation. Even though we weren’t talking to each other...even though it takes a little longer to read everything. I thought it was great.”
Our experience with the Crookston class made it clear students liked the opportunity to interact with the instructors and one another. We provided numerous occasions for them to work together on assignments collaboratively as well. At the beginning of the term, students were assigned to small groups of four or five members each. During the term, we assigned projects to be completed and turned in by each group, collectively. In spite of the students' enthusiasm for interactivity, these collaborative group efforts did not enjoy the same success. In some cases, group assignments did not get turned in at all. When asked what was the obstacle to completing them, students reported scheduling conflicts, lack of leadership, decreasing interest, and asymmetric effort among some members of the groups:

"To be honest, it was the group projects, just for the fact that I didn't like relying on other people for part of my work. When those others don't have the same aspirations and inclinations as you, it becomes frustrating."

"The group assignments did not work very well. Everybody at [Crookston] never had time to get together and actually discuss the problems given. The group I was involved with never wanted to get together. A large part of our learning to work with people is doing it; my group did not give me a chance."

"I realized that there is a difference between what I expect and what others expect."

Small-group discussion areas were created at the beginning of the term for the students to use in communicating privately with each other. The idea was that these "District Offices", as they were known, were to facilitate the tasks associated with the group assignments. They did not. The first week of the term, they were used occasionally for contacting one another within the group, but as the novelty wore off, so too did their amount of use. Midway through the term, they were not being used at all. Curious to discover why this was so, we asked them in the group interview:

**Excerpt of On-site Group Interview (5/19/97)**

Interviewer:
Am I missing something? What else was there?
Student:
I think the District Offices...they just seemed to...

Interviewer:
They died?

Student:
Right.

Students:
[Laughter, agreement].

Student:
Oh yeah....

Student:
They were there, but...

[Laughter]

Student:
We didn’t use them much.

Interviewer:
Why was that, do you think?

Student:
For me, when we were doing group projects, it was just as easy that way to hop on the e-mail.

Student:
This campus is so small, you see everybody every day anyway.

Student:
Everyone’s in the library. Just talk to them.

Student:
There’s no real need.

The students report here that there was no need for the District Office discussion groups. Nevertheless, the students reported elsewhere that they had other problems collaborating on the group assignments. The fact that several groups failed to submit assignments at all indicates that there was more to it than just not needing the District Offices. Below are student responses to the follow-up mailed questionnaire regarding the relative utility of several activities and resources in RECM 495D:
Table 5. Student evaluation of the relative usefulness of activities, resources in RECM 495D.

<table>
<thead>
<tr>
<th>Activity/resource</th>
<th>Not useful at all</th>
<th>Very useful</th>
<th>( \bar{y} )</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likert-scale integer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Course web page</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>General discussion group</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>District Office discussion group</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>E-mail contact</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

The number within each cell indicates the number of student responses ranking the activity/resource in that particular category. The coefficient for “very useful” is 5; the coefficient for “not useful at all” is 1. Therefore, a lower average score indicates that the item was generally rated less useful by the students than an item with a higher mean score. A score of less than 3 indicates that, on average, students did not consider the activity/resource very useful. Mean score and standard deviation for each category are included. Summary tables representing student responses to the entire set of questions from the follow-up questionnaire are contained in Appendix C.

As described in the table above, all elements were rated useful overall, in that all scores were above 3. However, the course web page, general discussion group, and e-mail were rated as relatively more useful than was the District Office discussion group. Granted, with only 10 of the 23 students responding, the weakness of the data precludes a firm statistical conclusion. Nevertheless, for those students who answered the survey, there is an indication that the Discussion Groups were not as effective as other elements of the course.

Another question in the same survey asked the students, “How much of the following materials or activities do you think should have been a part of this course?” Table 6 illustrates the responses:
Table 6. Student evaluation of the use of activities and materials in RECM 495D.

<table>
<thead>
<tr>
<th>Likert-scale integer</th>
<th>Much less</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>( \bar{y} )</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario-based discussions</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>3.9</td>
<td>0.74</td>
</tr>
<tr>
<td>Study questions</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>3.5</td>
<td>0.53</td>
</tr>
<tr>
<td>Group projects</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>3.5</td>
<td>1.08</td>
</tr>
<tr>
<td>Internet searches for information</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>3.4</td>
<td>0.84</td>
</tr>
</tbody>
</table>

The responses to this question were somewhat enigmatic. Although all four items had averages greater than 3 (suggesting that students generally would have preferred more of them), the scenario discussions were apparently the most favored. According to the results, 7 students (70%) expressed a preference for more scenario-based discussions as a part of the class, while none reported that they preferred less. Conversely, students did not demonstrate a marked preference for fewer group projects overall, as would have been expected from their previous feedback. In other words, while there was some indication from the telephone survey and the group interview that small-group assignments were problematic, this judgment was not strongly reflected in the follow-up questionnaire.

Regardless, our observation of the Crookston class suggests that group assignments did contribute to the students’ learning, and that collaboration was a factor. There were occasions when students did work fairly well together. During one assignment, we observed one group operating rather efficiently within their domain; they parceled out assignments to each other, got the outside information individually, and then reported their discovery back to the group. Instead of writing the final paper together however, each person wrote a piece that was then edited and compiled by the group ‘leader.’

It is unclear whether this illustrates a problem with the groups themselves or a more fundamental problem with the online format of the course. What is clear however, is that some of
the students felt frustrated by the lack of control over their group work. Certainly the Crookston class was unique; few traditional distance education students meet together regularly on a college campus. In this instance, the Crookston group bears some resemblance to a classroom environment. This may account for the perception that District Office discussion groups provided less advantage for small group collaboration than they might have, had the students been more dispersed geographically. With a dispersed group there may have been more incentive to participate. It may also be that collaborative assignments function well in a classroom setting but, for whatever reason, do not adapt as well to the online format of RECM 495D. Our sense is that group assignments require a considerable commitment of time and effort of students regardless of where they are staged. Consequently, the problems may be more characteristic of the assignment than the setting in which it occurs. More thoughtful consideration of collaborative group involvement in online courses like the Crookston class will probably be necessary before this issue is settled, however.

As can be seen from the excerpts of the discussion transcripts, the students exhibited a reasonable amount of engagement in the Crookston class. Overall, they were attentive and thoughtful in their responses to questions posed in the scenario discussions. They demonstrated higher-order cognitive operations; they were able to draw on new information presented in the readings and class to reason through the problems. In comparison to traditional distance education, this is a significant accomplishment. The interactivity observed in the Crookston class resembles the interaction that occurs in a classroom; if anything, more students had an opportunity to participate in RECM 495D. This is an indisputable advantage for normally hesitant students, and one that was recognized by them as well.

Knowledge creation, problem-solving, and the higher cognitive domains:

The final focus of our effort in developing the online version of RECM 495D was to apply principles of effective education as described in education theory and outlined in the new paradigm of education. In other words, to provide opportunities for the students to operate in the
higher levels of cognition. This objective required us to thoughtfully consider the structure of the Crookston course as well as the content of the material. To do so, we determined to involve the students as much as possible in this process.

In order for information to become meaningful, it must have some relationship to a learner’s experience and elaborate on existing knowledge in the learner’s mind. In developing the Crookston course, our intent was to frame the information presented in class in ways that would stimulate the students’ thought processes. By making the information relevant, we expected that they would recall personal experiences that would confirm or refute the new information. This indeed happened, as can be seen in the discussion on M80 fireworks. Although some had very little experience with the M80s themselves, others in the group were able to describe the fireworks to them. As a result, the inexperienced students were able to draw on something similar in their experience that would help them work through the scenario.

Vygotsky (1978) describes learning as a social process that is intimately dependent on conversation. Providing an opportunity for discussion, as an integral part of the learning process, allowed the Crookston students to negotiate the meaning of the material they were being exposed to and find application for it. The problem-solving scenarios and subsequent discussions performed an indispensable function in this regard.

The benefits of the scenario-based discussions have already been treated at some length. It should be apparent at this point that the students enjoyed the challenge of problem solving. Rather than simply deliver information and test the students’ ability to retain it, we presented open-ended discussions so that the students could draw on any resource at their disposal (knowledge, experience, reason, information, intuition, etc.) in responding to these situations. What we discovered is that the Crookston students seemed unaccustomed to this approach at first, requiring several class periods before they became comfortable with it. Their hesitance to become engaged initially may have been a result of previous classroom experience, or perhaps a response to the novel format of RECM 495D. In any event, they became more involved as the

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class progressed. An excerpt from a class discussion about animal/human interactions illustrates how this may have occurred:

Excerpt of Discussion Transcript (2/5/97):

Instructor:
Date: Wed, 05 Feb 1997 9:14:13 -0700
Okay. Let's look at one more thing re: impacts.
The Wilderness Act does not specifically limit mechanized equipment from wilderness, nor does it prohibit permanent construction, although these things are certainly not appropriate in most cases. The Act does in fact reserve the right to use these things to the agency that manages the resource.
Today, we're going to discuss a scenario where this occurs.
On Monday, we talked about the animal problems in Glacier National Park. Remember how it was discussed the bighorn sheep and mountain goats would follow backpackers around—sometimes stealing their clothes from camp? Several of you suggested placing salt blocks as a possible solution. Actually, to prevent animals from taking clothes, the park encourages visitors to secure clothes while in camp (information). In addition, park management has built outhouses to keep the animals away from human waste (technical fix). Permanent structures are usually not allowed in wilderness. But in this case, a permanent latrine is considered the least intrusive of all possible impacts.
What do you think? Is this an effective way to deal with the animal problem?

Student:
I think this is a very effective way. If the animals don't have any reason to come to camp they will leave the campers and the campers stuff alone.

Student:
I think that this will work. But the animals might find a way into the temporary outhouses. People just have to be more careful when leaving clothes out.

Student:
I think these are two ways of solving the problem with the least amount of impact

Student:
It sounds like a good temporary fix. As far as being effective it only is as effective as the people using the area make it.

Student:
Yes, I think that would help with the problem. Are the toilets ones that can be pumped?????

Instructor:
Nope. There are actually two toilets: one is totally enclosed with barbed wire around it. This is for liquid waste only. The other is an open pit toilet. There, anything goes. In your opinion, which would have more total impact? The outhouse, or putting out salt? What about the impact of concentrating human waste in one small area?
Student:
I think that the salt licks would be more of an impact in that the animals would all congregate in
one area and cause trampling. The outhouse would have little impact because only one person can
fit in the outhouse at a time.

Instructor:
That's true, [student's name]. I hadn't thought about that.

Student:
I think that the salt is a larger impact. We have cattle on our farm and I know the pressure that
cattle put around the salt blocks, but it is a pretty small area that gets beat down. The waste in one
area could be a problem....

Student:
That's a tough one. The salt licks will attract the animals which can be good (away from people)
or bad (concentrates the animals). the out house can at least be monitored and controlled to
reduce its impact. the salt lick is pretty variable

Student:
I think putting out the salt would have more impact, because not only do the mountain goats look
for the salt but all the other animals in that area would probably find it appealing as well. There
would be impact form concentrating human waste also but it could be lessened if done right.

Student:
Putting the salt lick blocks out would make animals dependent on the humans for the source of
salt.

Instructor:
I think this is the major reason Glacier did not do it.

The above discussion centers around how to control the physical impacts of humans in
Glacier National Park's backcountry, and manage the human/animal interactions. There were a
number of issues to consider. First, that any people at all in an area produce some type of impact.
In this case, human waste was the offender, because of the goats' dependence on salt, in addition
to esthetics. The problem was to figure out ways the impacts could be managed with the
minimum intrusion into the wilderness experience of visitors and the least effect on the wildlife.
As can be seen in the discussion transcript, the students considered several approaches, based on
their experience. They also used logical reasoning to predict the probable outcome of their
actions. Although none of them identified eliminating the campsite altogether as a possible
solution, they did argue the effects of placing salt versus retaining a permanent structure (latrine) in the wilderness.

Another instance where the Crookston students demonstrated problem-solving ability occurred in a discussion regarding the appropriateness of helicopter rescue in wilderness:

Excerpt of Discussion Transcript (2/24/97)

Instructor:
This is a real situation that just happened in our area over the weekend. Suppose someone is in a remote area of the backcountry. Hal (the superintendent) is contacted by the county sheriff and told that this guy's wife has gone to the emergency room and delivered a premature baby. The child is not expected to live through the night. Should an attempt be made to locate him and drag him out? If so, how?

Student:
First of all, what kind of husband would leave their pregnant wife home alone? I think it was a great idea to have a chopper go and find the guy. The park should have access to an emergency helicopter in case of an issue of this magnitude or some other emergency. If they didn't find the person they could say that they looked for him instead of just saying we can't do anything to locate him.

Student:
I would let them take the helicopter to find him because it could possibly be a death situation. On the other hand this guy should have probably had a pager or something for his wife to get a hold of him since she was this far along.

Student:
Good morning. I was running late this morning but I made it. In response to this scenario, I don't think that this a situation where the helicopter should have been allowed in. The legislature would want you to let him in based on the fact that they are concerned with votes. Not on what the effects of this action would cause. My question is what is the guy doing out there hunting when his wife is due anytime?

Student:
I think you should let the helicopter go in and find the man. In a situation like this, the need for the father is important and should be assisted in any way to get the family together. As a manager it might be tough to be ready for a situation like this one.

Student:
Well...I think that you would need to notify this guy, but it would have to be under the assumption that he would have to pay for the helicopter ride. To be prepared for it, I suppose that you could have your handy dandy helicopter parked near your location, but that probably isn't too realistic. The best plan would probably be to know what general area the hunter would be in, so you could go directly there, and lift him out.
Student:
I think that it would be only proper to make an effort to find this man that is in the wilderness. It is of a great importance to have this man there for his child but he should have been there any way if his child was that close to being born. For the rangers to be better prepared one would think that if the people enter through a gate they should be asked or maybe it should be posted that they should call and get in touch to a person where they are from and tell them where they are going in the wilderness.

Student:
I would have asked Hal if it was o.k. This is an emergency situation in the fact that there were members of his family that were in trouble. If I were Hal I would consider sending personnel and air support out to find him, but a possibility could be to send him the "bill". My opinion is that this man should not have been out there anyway. Could he carry a beeper?

Student:
I guess it depends on how serious the situation is and I am wondering why the guy was away when his wife was having a baby. A way to help make finding a person like this faster is find out where people will be in the wilderness so if things like this happen they could be found.

Student:
(What a dork. He shouldn't have been out there to begin with. I'll never understand how so many men can be so cavalier (sp) about these things). I think he should definitely be found! The first thing that should be done is to find out if he's filed some sort of a plan so you can find him. In situations where a life is in question, I don't think this a typical situation to follow the rules (verbatim). Filing a plan so these people in remote places can be found might me a solution.

Instructor:
A chopper and crew costs about $500/hr. An extraction like this could easily run a bill of $10,000. Should you call in a rescue team? Who should foot the bill?

Student:
Perhaps either local tourist outfits, area ranchers, local rescue units.

Student:
They could probably get a chopper from the local Armory or nearby army base.

Student:
I think that the guy should have to pay for it, if it wasn't for him they wouldn't have to look for him.

Student:
Absolutely...he should pay for it. He should pay for any other costs that are needed to find him, also. Injured people have to pay for ambulances, right?

Student:
Sure I think that he should have to foot the bill or at least part of it some how. If it were me I would not have left my wife pregnant as she is alone and 9 months along.
Student:
If it were me, I wouldn't have been out there. But I would expect to be billed for my mistake, no
one else should pay for it. Think of adding that cost on top of the hospital bill.

Student:
Yes he should have to pay. No I wouldn't want to pay, but I wouldn't be out hunting when my
wife is pregnant. People who start fires have to pay part of the cost of fighting them. If it were a
serious injury then it would be different, but in this situation the guy was not in any danger.

Student:
I would be willing to pay for it. If it had to do with my family, i'm game for anything. But
because of the effort of the rescue people and perhaps wrecking other peoples trip, they should
have to pay.

Student:
I suppose there isn't a "dork" clause in the search and rescue handbook. while I think the guy
should have to pay, if you make him pay and others not, are you setting yourself up for a lawsuit?

Student:
I wouldn't want to pay for it but I think he should pay for it since he left his wife at home nine
months pregnant. Set some rules. Just have the real rescue situations that people won't have to
pay for. Stupid stuff like this guy leaving his wife he should have to pay for this.

Instructor:
What about a child who goes into diabetic shock while in the wilderness? Should the parents be
responsible for paying?

Student:
Or in some cases I guess some people might not be able to pay for it. Would insurance pay for
something like that?

Student:
$10,000 is a bit steep but what is the price on a human life. I wouldn't want to have a bill like
this. All people who are saved should have to pay some sort of money to compensate for the time
and the rest should come from a gov. fund set up for emergencies like an appendix attack or some
other emergency that can't be avoided.

Student:
Back up the truck...A person who gets injured or who's in trouble because of something that's
happened in the park is different than a guy who leaves his wife in a mess at home. Right!!!

Student:
First, that's not a mistake or poor planning error. But if it saved my child's life last thing I would
worry about was what it cost. Of course you need to inform people that they could be paying
before they go in.

Student:
I do think he should pay. if my kid had this problem I wouldn't think that a phone would be
present when it happened I would have to get him out alone. then find some way to get him to a
hospital.
This scenario generated considerable discussion regarding the disposition of responsibility for accidents in wilderness. This was not an artificial, academic exercise. The example evolved from an authentic situation that was then being reported in the news. When presented with the circumstances of the incident, the discussion followed two tacks: questioning the visitor's judgment in placing himself in such circumstances, and challenging the idea that the managing agency should be responsible for his/her safety. In a superficial treatment of the discussion topic, students would be expected to state an opinion or rehearse the responsibility of the agency to protect all visitors. Instead, the discussion evolved into debating whether accident/rescue insurance should be required of wilderness visitors, or the feasibility of establishing 'no-rescue' zones in wilderness.

Question 6 in the mailed questionnaire asked students to “Describe your understanding of wilderness after having taken RECM 495D.” Table 7 reflects the responses:

Table 7. Students' evaluation of their own understanding concerning wilderness issues.

<table>
<thead>
<tr>
<th>Likert-scale integer</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>( \bar{y} )</th>
<th>( s )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Of wilderness use and users</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>4.2</td>
<td>1.23</td>
</tr>
<tr>
<td>Of managing impacts</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>6</td>
<td>4.6</td>
<td>0.52</td>
</tr>
<tr>
<td>Of educating wilderness visitors</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>4</td>
<td>4.4</td>
<td>0.52</td>
</tr>
<tr>
<td>Of search and rescue/ law enforcement</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>3.8</td>
<td>0.79</td>
</tr>
</tbody>
</table>

Again, although the results of the questionnaire may not reflect the assessment of the Crookston students generally, it does provide an indication that these ten increased their understanding of these and other wilderness management issues. While it is difficult to gauge "deep understanding" of the students, there were signs that it did occur for some. One class
period was spent reviewing the exam that had just been graded and returned to the students. An excerpt of the discussion illustrates how a student’s query regarding a missed question is answered by another student:

Excerpt of Discussion Transcript (2/13/97)

Student 1:
Date: Thu, 13 Feb 1997 16:22:54 -0600
Subject: Re: question # 10
Why erosion? If trails are properly built erosion will be minimized, but compaction occurs on all trails. Trails that are level will be compacted where erosion may not occur.

Instructor:
Well, it can't be 'b' because soil compaction is supposed to occur on a trail. That's what makes it a trail in the first place. Trail location and trail maintenance are not impacts—they're management actions, so it can't be 'd' or 'e'. Trail widening is not generally a common impact problem. most people are herd animals and tend to stay in place except when trails are wet or impassable. that help?

Student 2:
Trail location is all to do with impacts. The area where trails are located, determine how much impact the trail will receive. Trails located on soil, or hills??????

Instructor:
I think you're analyzing the question too deeply, [student's name]. what I think it's asking is what IMPACT problem is most common. The answer should be erosion. Trail location and maintenance are extremely important considerations in how a trail will perform, but they are not impacts—they are what management does when they build or maintain the trail. Does that help?

Student 3:
Isn't soil compaction one of the primary causes of erosion? The break down of the soil aggregate into a small soil structure which is more easily transported by wind or water. Or am I just reading into the question too far?

In another instance, we asked students to design a floor plan for a visitor center. As part of the assignment, they were to consider what they had learned about educating and communicating with the public. The purpose of the exercise was to have them apply the principles and demonstrate they understood them by giving a justification for their design. The following floor plans illustrate how two students accomplished this task.
In the plan above I can see bringing in the people and having someone to greet them and then send them around the room counter clockwise. If the guests have any questions they can talk to this informative greeter. Then the first area that they come to has the refreshments and the natural history of the area. Giving the guests a background for their walk through and possibly their stay. After this is the wildlife room and library. The area opens the eyes of the guests and shows them a likeness of what can be found in the region or area. Also it is a relaxing room in the way that the books would be placed around the room in cases.

Right near this is the patio doors in which this serves as to show the outside from the inside sometimes picturesque or not. From this area they are transferred to the camping education tables and information on the prospective things that visitors may use and where they are located in the area. After this is done and they are educated on the area in an easy simple manner they are then able to leave into the gift shop for a source of revenue and or out to start or end their stay in the area.

I put the layout the way I did so that it was using the space well and yet leaving them an easy way to walk around the area of the visitor center. I put the background info first in the tour and the education of the wilderness next and then the education on the wilderness survival through education on the camping procedures. Last but not least a source of revenue for the office.
To make the visitor aware of their impacts on the environment, I believe you need to first make your visitor conscience of the environment, if they are not yet. Some of the visitors maybe there to learn more about the natural world. I would therefore start by making this building very open, trying to mesh the outside and inside together, so that when they step outside to start their adventure there won't be such a big change. I would do this with may windows and skylights. With a possible, unobtrusive sound system that played recordings made from the very wilderness they are visiting.

The blue colored areas are for information that provides a history of the area. How the area was formed (geologically), who were the first inhabitants and discoverers to the area, and how the area was given its present day status as a Wilderness Area. A would be a display case containing artifacts and fossils. B would be a partition with old photos of the area. B would also include a map of the general area before it was “settled”.

The green area, C, would be for information and education about the environment of the area, plant species, wildlife, rivers and streams, etc. This would also include special displays for any species that were special, threatened, or endangered. Here I would put mounts, pictures, skulls, and if possible things that the people could touch and examine.

D would be a large picture window looking out onto the area that the visitor will be appreciating soon.

E is the area where the information about how visitors can reduce their impacts would be. This would be in the forms of pictures of others people doing low impact camping and traveling, and displays of low-impact equipment.

All of the displays would also be orientated toward the families, including the children and youth. Displays would be accessible to the children. Area F would be a children’s area, where they can look and read books about wildlife, trees, camping etc. They can do this while their parents are in the bookstore, which carries environmentally oriented materials, low-impact camping guides and other pertinent material. The main purpose of the bookstore would not be to make money, but to provide information by giving the visitor the material that best fits their needs.
It should be apparent from these two examples that the students had to consider what features to include in the floor space and how they should be arranged. To do so required them to think spatially in order to apply what they had been exposed to regarding educating wilderness visitors. They needed to think about direct and indirect approaches, the amount and content of information, characteristics of the clientele, in addition to practical considerations. Watching them present their floor plans before the class, we were especially interested in hearing each student’s justification for his/her design. Their descriptions of the reasoning that went into each project demonstrated to us that they were not just processing the information at a superficial level. We also felt that the critiques of one another’s designs by the rest of the class confirmed this observation.
Table 8. Evaluation and comparison of RECM 495D.

<table>
<thead>
<tr>
<th>Function</th>
<th>Traditional Classroom</th>
<th>Distance Education</th>
<th>Paradigm Shift</th>
<th>RECM 495D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to information</td>
<td>Poor to moderate</td>
<td>Moderate to good</td>
<td>Should be open, create a global classroom</td>
<td>Good access to information, instructor when technology functioned properly</td>
</tr>
<tr>
<td>Relevance, currency of information</td>
<td>Poor to moderate</td>
<td>Fair to moderate</td>
<td>Information should be most current, state-of-art, include outside sources</td>
<td>Moderate to good. Internet format allows material to be updated easily, quickly</td>
</tr>
<tr>
<td>Role of the instructor</td>
<td>Teacher, lecturer</td>
<td>Instructor, facilitator</td>
<td>Facilitator, mentor, collaborator</td>
<td>Technical facilitator Pedagogical collaborator</td>
</tr>
<tr>
<td>Control over learning environment, format</td>
<td>Poor: little control over either within classroom setting</td>
<td>Moderate control over environment. Poor: little control over format</td>
<td>Learner demand, learner-centered,</td>
<td>Good control over learning environment, moderate to good control over format</td>
</tr>
<tr>
<td>Interactivity, collaboration, engagement</td>
<td>Poor to moderate interactivity, collaboration. Fair to moderate engagement</td>
<td>Poor to fair interactivity, poor collaboration. Poor to moderate engagement</td>
<td>High degree of interactivity, collaboration, engagement</td>
<td>Good interactivity, fair to moderate collaboration, moderate to good engagement</td>
</tr>
<tr>
<td>Knowledge creation, problem-solving ability, higher cognitive domains</td>
<td>Poor to moderate knowledge creation, higher cognitive domains</td>
<td>Poor to moderate knowledge creation, higher cognitive domains</td>
<td>Constructivism, mutual learning, problem-solving, highest cognitive domains</td>
<td>Good knowledge creation, good to very good problem solving ability, synthetic and evaluative cognitive domains</td>
</tr>
</tbody>
</table>
CONCLUSION AND RECOMMENDATIONS
Evaluating RECM 495D’s Performance:
The Six Functions Revisited

Table 8 reproduces the characteristics of the six functions of an effective learning environment introduced earlier, with the addition of one column: RECM 495D. It includes our assessment of how the Crookston class performed with respect to each function, based on information derived from the students’ reports and our own observations. Generally, access to the material and the instructor was better in the Crookston class than in a traditional classroom setting. In some respects, it was an improvement over correspondence distance education as well. The advantage of online distance education with respect to access appears to be that it allows students contact with the instructor. The disadvantage of online distance education in terms of access is that successful operation requires a significant amount of technical infrastructure on the delivery end, reliable network connections, and student access to a personal computer and modem.

The online version of RECM 495D provided students with improved control over the learning environment, compared to that of a traditional classroom. They were able to log in from home, work, or any place that provided Internet access. To some extent, they were also able to influence the amount and content of the lesson material covered in class—although not necessarily more so than in a classroom, it was certainly improved compared to a correspondence-delivered course. To the degree the Internet and online technology was part of the learning environment, students were able to manipulate information within that domain rather extensively. This was especially noticeable during the last weeks of the class, as the students apparently became more comfortable with the technology.

The instructors assisted in this process as technical consultants or facilitators. A more important instructor role however, may have been to direct the students to relevant and timely
information and help them understand the meaning of those concepts. Instead of top-down, lecture-style lessons, the course centered around discussions of real-life wilderness issues. The point of the discussions was to introduce the students to selected wilderness management principles and, using the scenarios, have them apply their knowledge. To a lesser extent, the classes were to allow the students to explore their own, personal wilderness values as well.

Perhaps the most notable accomplishments of the Crookston course occurred in three areas: student control, interactivity and the creation of knowledge. Feedback from the Crookston students and our own experience indicate that the capabilities built in to the online format provided effective opportunities for student-student, student-instructor, and student-material interaction. Using multimedia resources such as photos and maps helped students to conceptualize the principles being discussed. Problem-solving scenarios effectively engaged their interest in applying new knowledge and experiencing its operation in authentic situations. As a result, students often operated in the higher cognitive domains of learning. They demonstrated attention, curiosity, perception, reasoning, and understanding. Overall, the Crookston course successfully incorporated many of the principles described in the new paradigm of education.

Recommendations for further refinement of this and other online courses within the WMDEP include the following:

1. **Incorporate more problem-solving scenarios as part of class discussion.**

   An issue-oriented problem-solving approach was very effective in helping the Crookston students understand the material. When asked to name class activities that were particularly useful, students mentioned the problem-solving scenarios most often. Surprisingly, students also recommended that they be used to a greater extent than they were. They reported that they enjoyed the challenge of being able to think through the logic and significance of the principles taught in the class. The scenarios required them to think critically and creatively, as evidenced in
their conversations during the discussions. Our limited experience with teaching in an online environment influenced us to use scenario discussions cautiously, until we had determined how effective they might be. Obviously we underestimated their benefits.

2. **Be more thoughtful in the creation of small-group assignments and discussion areas to maximize student control.**

   Our experience with classroom instruction motivated us to include group assignments in the Crookston course. Our objective was to capitalize on the group dynamic and let the students wrestle with problems together. Our investigation of the on-line distance education literature confirmed the usefulness of small-group exercises. This was the purpose of the District Office discussion groups—to provide a forum for group members to collaborate. The actual result was much different than our expectation however. Students reported that they were frustrated with the difficulty of getting group members together and that not all members of each group participated equally. We saw an early indication of this when District Office newsgroup activity decreased dramatically after the second week. Students began turning in group assignments individually—indicating they preferred completing the assignment on their own rather than confronting the difficulties encountered in the groups.

   The problem with the group assignments at Crookston may originate in a lack of forethought on our part, especially while developing the course. In hindsight, many of the functions we intended for the small-group work were provided for in other activities. For instance, the previously mentioned discussions allowed collaborative problem solving among the larger group. The visitor center presentations also provided students to introduce their own ideas and critique one another—essentially what we had envisioned for the group activities. In hindsight, the issue of District Office groups should have provided us a way of involving the students in ‘fixing it.’ This would have given the students an opportunity to exercise their problem solving abilities not solely on the material but on the format of the course as well.
3. *Ensure that the instructors in both locations are adequately trained in the technology used in the operation of the course.*

Although the three instructors at both locations were conversant with basic user-driven computer applications, we lacked expertise in web creation and hosting and other related technical aspects necessary to the course. In retrospect, the course would have been easier to facilitate and perhaps suffered less from technical difficulties if we had more experience in the capabilities of the Internet. Additionally, students should have the same benefit. In the Crookston course, students exhibited a wide range of computing abilities and know-how. It would have been productive to spend one of the first class periods instructing the students in the basic computer skills ultimately used in the course. This would have ensured that all students at least had the minimum level of computer skills necessary to participate in the class.

4. *Concentrate course material to reflect the timeline of the course.*

We constructed the syllabus to reflect our idea of how RECM 495D should progress. As we neared the end of the academic term, it became clear that we could not adequately cover all the material, consequently one segment was cut from the curriculum. The problem however was not an outcome of poor planning, but the result of extraordinary natural events. It is unclear how we could have addressed this problem, but as a matter of course we have built some flexibility into subsequent course schedules.

5. *Focus online discussions on the major concepts treated in the course curriculum.*

The tendency in open-forum discussions is to allow the topic to drift. One of our primary roles as instructors for the course was to moderate the discussions—keep them on topic and within the time limits of the class. Nevertheless, there were occasions when class discussions would take an unplanned course. We recognize that this occurs in the classroom as well as in
cyberspace. However, the online format made it somewhat more difficult for us to communicate our desire to keep the classes on track—it was generally an effort to redirect the discussion without being very candid and forthright. In our estimation, this was a characteristic of not being physically present in the room with the Crookston students. Essentially it is a balance of how much control to give the students versus how focused on the material we want them to be. Our response to counter the effect was to post ‘Focus Questions’ or ‘Objectives’ at the beginning of each class discussion and enlist the students as allies in keeping the class ‘on task.’

6. *Involve multimedia to a greater extent in the resources available to the students.*

Although we made a conscious effort to include photos, maps, and other graphics into the lessons, there is much more that could have been done. For instance, we were limited in our ability to illustrate certain wilderness impacts simply because we lacked photographs. The discussion of whether or not to provide pit toilets in national park backcountry, for instance, would have undoubtedly been more effective had the students been able to see the damage to the structure caused by goats. In another instance, we had difficulty illustrating the social impacts of group encounters on a trail because we lacked photographs. In each case, students were left to imagine the situation rather than observe it in person. A suggestion for subsequent classes in the future would be to maintain a library of archived photos illustrating different wilderness management issues.

7. *Engage students more in the class discussions: assign them topics to research and report on, have them give presentations, critique others’ work, etc.*

As instructors, we were surprised and pleased at the students’ ability to actively participate in the online class format. The online discussions were likely the most useful tool for facilitating this interaction. However, we noticed that students were much more likely to respond to a direct question from us than to a question from a fellow classmate. In addition, they were
hesitant early on to respond ‘first.’ Given that an Internet discussion group allows all students to write and post messages concurrently, this was an unexpected phenomenon. In spite of the advantages of online technology, the classroom paradigm was difficult to overcome. Students reported afterwards that it seemed “rude to all ‘speak’ at once.” By the last half of the course, students were engaging one another more frequently, and participating more actively in the discussions. Whether or not this was due to our deliberate efforts or because they had become more comfortable with the class format remains an open question.
Literature Cited:


The text is a list of references, formatted with proper punctuation and citation style. It includes authors, titles, publication years, journals, and page numbers where applicable. The references span a range of topics, from educational technology and psychology to computer science and cognitive science.


## APPENDICES

| Appendix A: Mailed, follow-up questionnaire | A 1-5 |
| Appendix B: E-mail, telephone survey questions | B 1 |
| Appendix C: Summary tables of responses to mailed questionnaire | C 1-7 |
Appendix A. Mailed Follow-up Questionnaire.

RECM 495 D
Educational Evaluation Questionnaire

General

1. Why did you take this course?

<table>
<thead>
<tr>
<th>Reason</th>
<th>Very Important</th>
<th>Not at all Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>To learn more about wilderness</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>To learn more about the Internet</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>It seemed like an interesting way to take a class</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Someone I knew was taking it</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Other (please specify): ___________________</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

2. What are you studying in college? Please mark the response that best applies.

1. Natural/Earth science: geology, forestry, biology, botany, etc.
2. Physical/math science: math, physics, chemistry, etc.
3. Art/humanities: art, literature, drama, etc.
4. Social science
5. Business management: accounting, organizational behavior, finance, etc.
6. Recreation: sports, leisure and tourism, recreation management, etc.
7. Other __________________________

3. How would you characterize your level of experience with wilderness?

| Experience                          | High | Low | NBTJ
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreate in wilderness (visitor)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Work in wilderness (employee)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Advocate of wilderness (activist)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Student of wilderness issues (student)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Interested in wilderness issues (casual)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

1 NBTJ = No basis to judge

Course Content

4. Considering the things you learned about wilderness in RECM 495 D, how helpful were the following class activities/resources?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Very Useful</th>
<th>Not Useful at All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course web page</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>On-line readings</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>On-line assignments</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>On-line audio/video</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>On-line photos, graphics, maps</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>On-line drawing/presentation</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>HQ Discussion Group</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>DO Discussion Group</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>E-mail contact</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
5. How much of the following materials or activities do you think should have been a part of this course?

<table>
<thead>
<tr>
<th></th>
<th>Much Less</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Much More</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual assignments</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Group projects</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Readings</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Study questions</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Exams</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Scenario-based discussion</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>NetMeeting lecture/discussion</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Internet searches for information</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

6. Describe your understanding of Wilderness after having taken RECM 495 D.

<table>
<thead>
<tr>
<th></th>
<th>No Improvement</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Great Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Of how the wilderness ideal emerged</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Of the purpose of wilderness</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Of wilderness use and users</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Of managing impacts</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Of educating wilderness visitors</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Of search and rescue/law enforcement</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

7. In terms of the following characteristics, how would you rate the instructors at Missoula?

<table>
<thead>
<tr>
<th></th>
<th>Excellent</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of the material</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Enthusiasm for the material</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Organization</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Teaching ability</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Responsiveness to students</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Ability to use the technology</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

8. In terms of the following, how would you rate the instructor at Crookston?

<table>
<thead>
<tr>
<th></th>
<th>Excellent</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of the material</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Enthusiasm for the material</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Organization</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Teaching ability</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Responsiveness to students</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Ability to use the technology</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
Course Format

9. Compared to a classroom course, how would you describe this Internet course?

<table>
<thead>
<tr>
<th></th>
<th>Better</th>
<th>Worse</th>
<th>NBTJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>For covering the course material</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encouraging class discussion</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encouraging individual study</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responding to students' questions</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doing and turning in assignments</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking exams</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class presentations</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* NBTJ = No basis to judge

10. How much do you think your computer skills have changed as a result of taking RECM 495 D?

<table>
<thead>
<tr>
<th></th>
<th>No Improvement</th>
<th>Great Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using the computer software¹</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>Using E-mail</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>Using the Internet browsers²</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
</tbody>
</table>

¹ MS Word, Windows, NetMeeting, etc.
² Netscape Navigator, Internet Explorer, etc.

11. What emotion best describes how you felt about the on-line format of this course:

<table>
<thead>
<tr>
<th></th>
<th>Very Confident</th>
<th>Not Confident at All</th>
</tr>
</thead>
<tbody>
<tr>
<td>When enrolling in the course</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>After the first class meeting</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>After the first assignment</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>After the first exam</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>At the end of the term</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
</tbody>
</table>

12. The Internet:

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is a good way to offer this course</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>Made readings, study guide information more accessible</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>Having to become familiar with the computer technology made the course more difficult</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>Ability to transmit graphics, pictures, audio video improved the quality of the course</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>The RECM 495 D website was a useful place to go for class information</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>Hotlinks to other websites helped me understand the material better</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
</tbody>
</table>
13. The Headquarters Discussion Groups:

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were easy to use</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Helped me communicate with the instructor(s)</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Helped me understand the concepts better than just reading the assignment</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Were used as a gimmick, but did not help me understand the concepts any better</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Were a good place to check in with what the class was doing</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Made it easier for a student to catch up with the discussion after an absence</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Made it easier for students to participate in a class discussion</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Was a good substitute for discussion in a classroom environment</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>

14. Which of the following course activities would you recommend be used in future offerings of RECM 495 D?

<table>
<thead>
<tr>
<th>Most Important</th>
<th>Least Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of graphics/visual images</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Use of on-line discussion</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Use of outside Internet resources</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Use of guest lecturers</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>

Personal

15. Sex:
1. Female
2. Male

16. Age:
1. Under 18
2. 18-20
3. 21-23
4. 24-26
5. 27-29
6. 30 or over

17. What grade did you receive in this course?
1. A
2. B
3. C
4. D
5. F
6. Other

18. What is your class standing?
1. Freshman
2. Sophomore
3. Junior
4. Senior
5. Other
19. What is your present cumulative GPA in college? Please mark the response that best applies.

1. Below 2.00
2. 2.01 to 2.50
3. 2.51 to 3.00
4. 3.01 to 3.50
5. Above 3.51
6. Not sure

20. Do you have any other comments or suggestions relating to the course, its format, or the instructors?
Appendix B. E-Mail, Telephone Survey Questions.

RECM 495-D Managing Recreation Resources

1. Why did you take this course?
2. What did you like most about the course?
3. What did you like the least?
4. What things would you have liked to see more of?
5. What things would you have liked to see less of?
6. What skills have you acquired or improved as a result of taking this course?
7. Compared to a classroom course, what were the advantages of using the Internet for this course?
8. Compared to a classroom course, what were the disadvantages of using the Internet for this course?
9. Describe your feelings regarding the technology used in this course?
10. Are they different now than prior to enrolling in the course?
11. Describe how your level of knowledge about wilderness issues has changed (if at all) as a result of taking this course.
12. What is your class standing (Freshman, Sophomore, etc.)?
13. What is your major?
Appendix C. Summary tables of responses to mailed, follow-up questionnaire.

Question 1. Why did you take this course?

<table>
<thead>
<tr>
<th>Response</th>
<th>Not at all important</th>
<th>Very important</th>
<th>y</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likert-scale integer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>To learn more about wilderness</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>To learn more about the Internet</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>It seemed like an interesting way to take a class</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Someone I knew was taking it</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Question 2. What are you studying in college?

<table>
<thead>
<tr>
<th>Category</th>
<th>No. responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural/earth science</td>
<td>10</td>
</tr>
<tr>
<td>Physical/math science</td>
<td>0</td>
</tr>
<tr>
<td>Art/humanities</td>
<td>0</td>
</tr>
<tr>
<td>Social science</td>
<td>0</td>
</tr>
<tr>
<td>Business management</td>
<td>0</td>
</tr>
<tr>
<td>Recreation</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
</tr>
</tbody>
</table>

Question 3. How would you characterize your level of experience with wilderness?

<table>
<thead>
<tr>
<th>Description</th>
<th>Low</th>
<th>High</th>
<th>y</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likert-scale integer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Recreate in wilderness</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Work in wilderness</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Advocate of wilderness issues</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Student of wilderness issues</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Interested in wilderness issues</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>6</td>
</tr>
</tbody>
</table>
Question 4. Considering the things you have learned about wilderness in RECM 495D, how helpful were the following class activities/resources?

<table>
<thead>
<tr>
<th>Activity/resource</th>
<th>Not useful at all</th>
<th>Very useful</th>
<th>y</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likert-scale integer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Course web page</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Online readings</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Online assignments</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Online audio/video</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Online photos, graphics, maps</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Online drawing/presentation</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Headquarters discussion group</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>District Office discussion group</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>E-mail contact</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

Question 5. How much of the following materials or activities do you think should have been a part of this course?

<table>
<thead>
<tr>
<th>Material/activity</th>
<th>Much less</th>
<th>Much more</th>
<th>y</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likert-scale integer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Individual assignments</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Group projects</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Readings</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Study questions</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Exams</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Scenario-based discussion</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>NetMeeting lecture/discussion</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Internet searches for information</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>
Question 6. Describe your understanding of Wilderness after having taken RECM 495D.

<table>
<thead>
<tr>
<th>Segment</th>
<th>No improvement</th>
<th>Great improvement</th>
<th>y</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Of how the wilderness ideal emerged</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Of the purpose of wilderness</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Of wilderness use and users</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Of managing impacts</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Of educating wilderness visitors</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Of search and rescue/law enforcement</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

Question 7. In terms of the following characteristics, how would you rate the instructors at Missoula?

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Poor</th>
<th>Excellent</th>
<th>y</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likert-scale integer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Knowledge of the material</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Enthusiasm for the material</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Organization</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Teaching ability</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Responsiveness to students</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Ability to use the technology</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>
Question 8. In terms of the following characteristics, how would you rate the instructor at Crookston?

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Poor</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>y</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likert-scale integer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of the material</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>4.3</td>
<td>0.82</td>
</tr>
<tr>
<td>Enthusiasm for the material</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>9</td>
<td>4.9</td>
<td>0.32</td>
</tr>
<tr>
<td>Organization</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>4.4</td>
<td>0.70</td>
</tr>
<tr>
<td>Teaching ability</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>6</td>
<td>4.6</td>
<td>0.52</td>
</tr>
<tr>
<td>Responsiveness to students</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>8</td>
<td>4.8</td>
<td>0.42</td>
</tr>
<tr>
<td>Ability to use the technology</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>4.6</td>
<td>0.70</td>
</tr>
</tbody>
</table>

Question 9. Compared to a classroom course, how would you describe this Internet course?

<table>
<thead>
<tr>
<th>Function</th>
<th>Worse</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>y</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likert-scale integer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For covering the course material</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>0</td>
<td>3</td>
<td>3.5</td>
<td>1.08</td>
</tr>
<tr>
<td>Encouraging class discussion</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>7</td>
<td>4.7</td>
<td>0.48</td>
</tr>
<tr>
<td>Encouraging individual study</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>3.6</td>
<td>1.26</td>
</tr>
<tr>
<td>Responding to students' questions</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3.9</td>
<td>0.88</td>
</tr>
<tr>
<td>Doing and turning in assignments</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>3.3</td>
<td>0.82</td>
</tr>
<tr>
<td>Taking exams</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>3.3</td>
<td>0.82</td>
</tr>
<tr>
<td>Class presentations</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>3.1</td>
<td>0.74</td>
</tr>
</tbody>
</table>

Question 10. How much do you think your computer skills have changed as a result of taking RECM 495D?

<table>
<thead>
<tr>
<th>Computer skill</th>
<th>No improvement</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>y</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likert-scale integer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using the computer software</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>5</td>
<td>2</td>
<td>3.4</td>
<td>1.51</td>
</tr>
<tr>
<td>Using E-mail</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>3.2</td>
<td>1.62</td>
</tr>
<tr>
<td>Using the Internet browsers</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3.3</td>
<td>1.42</td>
</tr>
</tbody>
</table>
Question 11. What emotion best describes how you felt about the online format of this course?

<table>
<thead>
<tr>
<th>Stage</th>
<th>Not confident at all</th>
<th>Very confident</th>
<th>y</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likert-scale integer</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When enrolling in the course</td>
<td>1 2 5 1 1</td>
<td>2.9 1.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After the first class meeting</td>
<td>1 2 5 2 0</td>
<td>2.8 0.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After the first assignment</td>
<td>0 0 5 5 0</td>
<td>3.5 0.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After the first exam</td>
<td>0 0 2 6 2</td>
<td>4.0 0.67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At the end of the term</td>
<td>0 0 0 4 6</td>
<td>4.6 0.52</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Question 12. The Internet:

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Strongly disagree</th>
<th>Strongly agree</th>
<th>y</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likert-scale integer</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is a good way to offer this course</td>
<td>0 0 2 6 2</td>
<td>4.0 0.67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Made readings, study guide information more accessible</td>
<td>0 0 0 9 1</td>
<td>4.1 0.32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Having to become familiar with the computer technology made the course more difficult</td>
<td>2 3 2 2 1</td>
<td>2.7 1.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to transmit graphics, pictures, etc. improved the quality of the course</td>
<td>0 1 5 1 3</td>
<td>3.6 1.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The RECM 495D website was a useful place to go for class information</td>
<td>0 0 0 6 4</td>
<td>4.4 0.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotlinks to other websites helped me understand the material better</td>
<td>0 0 2 5 3</td>
<td>4.1 0.74</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Question 13. The Headquarters discussion groups:

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Strongly disagree</th>
<th>Strongly agree</th>
<th>y</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likert-scale integer</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Were easy to use</td>
<td>0 0 0 8 2</td>
<td>4.2 0.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helped me communicate with the instructor(s)</td>
<td>0 0 0 4 6</td>
<td>4.6 0.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helped me understand the concepts better than just reading the assignment</td>
<td>0 0 0 7 3</td>
<td>4.3 0.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Were used as a gimmick, but did not help me understand the concepts any better</td>
<td>5 4 1 0 0</td>
<td>1.6 0.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Were a good place to check in with what the class was doing</td>
<td>0 0 1 3 6</td>
<td>4.5 0.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Made it easier for a student to catch up with the discussion after an absence</td>
<td>0 1 0 2 7</td>
<td>4.5 0.97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Made it easier for students to participate in a class discussion</td>
<td>0 0 0 2 8</td>
<td>4.8 0.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Was a good substitute for discussion in a classroom environment</td>
<td>0 0 2 4 4</td>
<td>4.2 0.79</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Question 14. Which of the following course activities would you recommend be used in future offerings of RECM 495D?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Least important</th>
<th>Most important</th>
<th>y</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likert-scale integer</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of graphics, visual images</td>
<td>0 0 4 4 2</td>
<td>3.8 0.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of online discussion</td>
<td>0 0 1 2 7</td>
<td>4.6 0.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of outside Internet resources</td>
<td>2 0 2 5 1</td>
<td>3.3 1.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of guest lecturers</td>
<td>0 0 5 2 3</td>
<td>3.8 0.92</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15. Sex:

<table>
<thead>
<tr>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>7</td>
</tr>
</tbody>
</table>
16. Age:

<table>
<thead>
<tr>
<th>Under 18</th>
<th>18-20</th>
<th>21-23</th>
<th>24-26</th>
<th>27-29</th>
<th>30 or over</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

17. What grade did you receive in this course?

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

18. What is your class standing?

<table>
<thead>
<tr>
<th>Fresh</th>
<th>Soph.</th>
<th>Junior</th>
<th>Senior</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

19. What is your cumulative GPA in college?

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<th>2.01 to 2.50</th>
<th>2.51 to 3.00</th>
<th>3.01 to 3.50</th>
<th>Above 3.50</th>
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</thead>
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