

## Instrumentation

Two different quantitative instruments were utilized in pre and post treatment settings. A researcher created rubric was used to evaluate student products. Qualitative data was obtained through content analysis of interviews.

### *Web-Based Learning Environment Inventory*

In order to assess students' attitudes and beliefs concerning their learning and experiences during an online course, the Web-Based Learning Environment Inventory (WEBLEI) (Chang & Fisher, 2001) was given pre and post treatment. This instrument was developed and used to assess students' perceptions of online learning (see Appendix A). This instrument incorporates students' usage pattern (for example, students' access, convenience of materials), students' learning attitudes (for example, students' participation and enjoyment), students' learning process (for example, level of activity and interactivity between student to student and student to lecturer) and academic factors (for example, scope, layout, presentation, and links of the web-based learning materials) (Chang & Fisher, 2001).

The WEBLEI instrument was designed to capture students' perceptions of web-based learning environments. The instrument assesses those perceptions according to four scales. The first three scales are adapted from Tobin's work on Connecting Communities Learning (CCL) and the final scale focuses on information structure and the design aspect of the web-based material (Chang & Fisher, 2001). The WEBLEI considers Web-based learning effectiveness in terms of a cycle that includes access to materials, interaction, students' perceptions of the environment, and students' determinations of

what they have learned. Chang & Fisher (2001) describe these four scales as and the characteristics of the learning environment they measure as:

Access	convenience, efficiency, autonomy
Interaction	flexibility, reflection, interaction, feedback, collaboration
Response	enjoyment, confidence, accomplishment, success, frustration, tedium
Results	clear objectives, planned activities, appropriate content, material design and layout, logical structure

The instrument itself consists of 31 questions related to the participant's learning in a web-based environment. Participants are asked to respond to how often the factor in each question takes place. Participants answer each statement on a Likert scale with the following choices: 5 – Always; 4 – Often; 3 – Sometimes; 2 – Seldom; 1 – Never. The survey is divided into four sections – each addressing a different scale. Thus, data concerning the participants' responses for each of the scales can be tallied. Sample questions from each of the four scales include:

Access	“I can access the learning activities at times convenient to me.” “I decide how much I want to learn in a given period.”
Interaction	“In this environment, I have to be self-disciplined to learn.” “I regularly participate in self-evaluations.”
Response	“I enjoy learning in this environment.” “I felt a sense of satisfaction and achievement about this learning environment.”
Results	“The organization of each lesson is easy to follow.”

“The subject content is appropriate for delivery on the Web.”

### *Leadership Practices Inventory*

In order to assess the participants’ perceptions of the roles and responsibilities of leaders, the Leadership Practices Inventory (Pozner and Kouzes, 2001) was given prior to and at the conclusion of the treatment. The Leadership Practices Inventory (LPI) was developed in the early 1980s with a focus on non-managerial leaders. Their belief that leadership can be taught has resulted in the LPI instrument (see Appendix B). Research by Kouzes and Pozner (2001) has consistently indicated that increased demonstration of the behaviors included in the LPI result in the greater likelihood of the subject being viewed as an effective leader.

Kouzes and Pozner’s (2001) research into the characteristics of leadership lead them to define five practices engaged in by leaders:

Challenging the Process	the search for opportunities to change the status quo; seeking ways to improve the organization
Inspiring a Shared Vision	the degree to which the future is envisioned and how that vision is imparted to others
Enabling others to Act	how leaders promote collaboration
Modeling the way	demonstrating standards; setting and achieving goals
Encouraging the Heart	how leaders reward contributions, celebrate accomplishments, and maintain enthusiasm

The LPI measures these five practices demonstrated by leaders. The instrument itself consists of thirty items with a 10-point Likert scale ranging from "Almost Never" to

"Almost Always". This instrument was designed to measure the participant's evaluation of his or her own leadership practices. Sample questions for each subsection include:

Challenging the Process:

"I seek out challenging opportunities that test my own skills and abilities"

"I challenge people to try out new and innovative approaches to their work."

"I ask 'What can we learn?' when things do not go as expected"

Inspiring a Shared Vision:

"I talk about future trends that will influence how our work gets done."

"I describe a compelling image of what our future could be like."

"I appeal to others to share in my dream of future possibilities."

Enabling Others to Act:

"I develop cooperative relationships with the people I work with."

"I actively listen to diverse points of view."

"I treat people with dignity and respect."

Modeling the Way:

"I set a personal example of what I expect from others."

"I follow through on the promises and commitments that I make."

"I am clear with others about what it means to do one's best."

Encouraging the Heart:

"I praise people for a job well done."

"I find ways to celebrate accomplishments with my team."

“I give the members of the team lots of appreciation and support for their contributions.”

Scoring the LPI involves combining the responses to specific questions to obtain a score for each subsection.

### *Instructor and Course Appraisal*

Every semester, students are asked to complete forms to evaluate the faculty for the courses in which they are enrolled. The Instructor and Course Appraisal survey (see Appendix C) is produced by the University and is routinely given at the conclusion of the course to assess students' satisfaction with the course and the instructor. Along with demographic data, the survey consists of six questions. Sample questions from the survey include: “Overall, I rate my instructor's preparation for the class as...” and “Overall, I rate organization of the course material as...” The students respond to each question on a six-point Likert scale. The Likert scale responses range from 1 – Poor to 5 – Excellent with 6 – Not Applicable. At the end of the treatment, all participants completed the survey. For research purposes, the participants were also asked to include the last four digits of their Social Security number for grouping and data analysis.

### *Rubric*

During the Leadership course, the students created a Personal Leadership Plan (PLP). This PLP is designed to be a reflective paper that promotes thoughtful application of teacher leadership to the student's own context and environment. Prompts given during each module (see Appendix D) encourage the student's thinking in various areas of leadership. A researcher created rubric (see Appendix E) was developed to assess the

completed Personal Leadership Plans. Data collected from the rubric scores was used to answer the research question - “Is there a difference in the individual final course product (PLPs) developed by each learner - constructing knowledge with peers and a facilitator, constructing knowledge one-on-one with an expert mentor, or constructing knowledge with peers alone?” The prompts and guiding questions for the PLP were prescribed for the participants. The rubric assessed the quality of response by the participants.

### *Interviews*

Interviews were conducted with six of the participants. The researcher interviewed two participants from each of the three groups at the end of the treatment period. The participants were selected at random and asked if they would be willing to participate in the interview process. The interviews were conducted online using synchronous chat software (DigiChat or AOL Instant Messenger). An interview guide was used to conduct these interviews (see Appendix F). Transcripts of the online interviews were downloaded to the researcher’s computer for analysis.

### Independent and Dependent Variables

The independent variables for this study were the three designs of the leadership course. The dependent variables are the results of the LPI, WEBLEI, and the content analysis of the PLPs and interview transcripts. This resulted in data collected for the variables depicted in Table 3.

Table 3

## Variables for the Study

Independent Variables	Dependent Variables	Instrument/Measure
Leadership Course	Perceptions of leadership	LPI
	Satisfaction with Online Learning	WEBLEI
	Satisfaction with Course	Instructor and Course Appraisal
Personal Leadership Plans	Quality of PLP	Rubric
Interactions	Quality of Interactions	Interview Analysis
Peer Mentor Facilitator	Confidence in Leadership Abilities	Interview Analysis
Demographic Information		
Gender		Survey
Age		Survey
Teaching Experience		Survey
Grade Currently Teaching		Survey

## Ethics

Approval for this study was applied for and obtained in the summer of 2004 from the university's Human Subjects Review Board (HSRB). On the first night of the face-to-face class, participants were given information about the study, informed about the processes, and participation was requested. While students received grades and credit for the leadership course, participation in the study was not required. Students who wished to

participate in the study were given consent forms to sign and submit to the researcher (see Appendix G).

Every reasonable effort was made to protect the privacy of the participants. Surveys completed and submitted by the participants were anonymous. Participants were asked to include the last four digits of their social security number on each survey so that pre and post survey results could be matched.

During the treatment phase of the study, students participated in online discussions either via email with mentors or via discussion boards with peers and facilitators. It is conceivable that participants in the Facilitated or Instructor groups found it necessary to communicate with facilitators or instructors via email though that is not part of the design for those groups. Archives of these communications were downloaded to the researcher's personal computer, archived, and then erased from publicly accessible areas. While it is understood that no computer communication can be perfectly secure, students were assured that all reasonable steps would be taken to protect the confidentiality of electronic communications.

At the conclusion of the treatment phase of the study, students were interviewed to gather information about their views of the course design and online interactions. In order to gain a greater insight into the quality of interactions, six students were selected to be interviewed - two each from three groups. These interviews were conducted online using a synchronous chat program. An electronic transcript of chat interviews was kept by the researcher for analysis and then deleted.

Subsequent to the initial application and approval from HSRB, the researcher determined that it would be advantageous to conceal the identities of the mentors, facilitators, and instructors. Inasmuch as the research is focused on the quality of online communication, it was felt that prior relationships between the mentors, facilitators, instructors and the participants could conceivably influence the interactions with the participants. Thus, fictitious online personas were used in conducting this course. The mentors, facilitators, and instructors were, in reality, university professors and PhD students contracted to conduct the course and the participants were told at the outset that they were university professors and PhD students. Thus, this might constitute a deception only in the identity of the online facilitators. As such, the researcher applied for an amendment to the initial HSRB application. Approval was given for the amendment.

#### Data Analysis Procedures

The purpose of the study was to determine the effect of three designs for online learning on participants' attitudes, beliefs, and knowledge outcomes. In order to quantitatively assess the effect of the different designs, the WEBLEI and the LPI surveys were given prior to the beginning of the treatment and then again at the conclusion.

The initial comparability of the three groups was tested using the analysis of variance technique (ANOVA). The survey responses from the pre-treatment administration of the LPI were tallied by the researcher according to the instructions. Each treatment group's mean total score for each of the five subtests were calculated using SPSS software. This procedure was used to interpret the variance of the mean scores of the three research groups in each of the five leadership practice areas.

The same procedure was used to test the comparability of the groups on the Web-Based Learning Environment Instrument. The mean total scores for each of the groups were computed and an ANOVA procedure was used to interpret the variance for each of the four subtests in the instrument.

In order to answer the first three questions of the study, “Is there a difference in learner attitudes concerning the efficacy of their online experience?”, “Is there a difference in learner perception of the roles and responsibilities of a leader between the three groups - constructing knowledge with peers and a facilitator, constructing knowledge one-on-one with an expert mentor, or constructing knowledge with peers alone - as measured by the LPI?”, and “Do learner’s perceptions of the roles and responsibilities of a leader change after completion of the leadership course?”, the two quantitative instruments were used. The results of the LPI and WEBLEI were analyzed using statistical techniques to discover differences, if any, between the scores on the two instruments. Once comparability of the three groups at the outset of the treatment was verified, differences in scores at the conclusion of the treatment were compared using statistical methods.

The fourth question of the study was, “Is there a difference in the individual final course product, PLP, developed by each learner?” To answer this question, the participants' PLPs were scored using a researcher-created rubric (see Appendix E). The rubric provided a numeric score, which was then used to compare the quality of the final products between participants in each of the three groups.

The fifth question of the study is, “Is there a difference in overall course satisfaction between the three groups - constructing knowledge with peers and a

facilitator, constructing knowledge one-on-one with an expert mentor, or constructing knowledge with peers alone - as measured by course evaluation?” To answer this question, the results of the University’s Course Evaluation Survey were collected and analyzed statistically to discover differences in the means for the three groups.

The final question of the study is, “Is there a difference in learner reflections on their online learning experiences between the three groups?” To answer this question, a select group of participants was interviewed after the end of the treatment period. The transcripts of these interviews provided insight into the reflections on the online learning process of the participants. Again, conceptual content analysis was used to discover recurring themes.

#### Reliability, Validity, and Limitations

Reliability refers to the degree to which the repeated use of an instrument results in differing scores for reasons unrelated to the subjects (measurement errors). The greater the number and magnitude of measurement errors are the less reliable the instrument. The quantitative instruments used in this study have been examined a number of times and have a high degree of reliability according to empirical studies.

Validity is the extent to which an instrument measures what it is supposed to measure. The researchers who created the WEBLEI and the LPI have compared their instruments against others and claim a high level of validity.

A review of the LPI by Pearson (2001) indicates that this instrument is reliable and valid, is grounded in solid conceptual framework, has good psychometric properties, and has demonstrated utility in multiple settings. Internal reliability on the LPI has been

found to be high at generally about .80 consistently, and the test-test reliability has yielded a greater than .90 correlation. The LPI's validity has been challenged and established empirically. Subjective evaluation yields face validity as the instrument questions correlate to statements past participants have made about themselves or colleagues as leaders (Pozner and Kouzes, 2001).

The authors of the WEBLEI, in tests to assess the reliability of their instrument, confirmed that there were indeed four scales in the WEBLEI. The Cronbach alpha reliability coefficients ranged from 0.65 to 0.88. The discriminate validity showed that the mean correlations ranged from 0.38 to 0.52 indicating that the four scales of the WEBLEI measure distinct and somewhat overlapping aspects of the on-line learning environment (Chang & Fisher, 2001).

