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COMPARING THE EFFECTIVENESS OF VIRTUAL AND TRADITIONAL FORESTRY FIELD TOURS

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ABSTRACT: Virtual tours are among the many new Internet-based tools with potential applications in natural resource education. While technology exists to create virtual tour Web sites, little is understood about how they meet educational objectives and whether they can be complementary alternatives for traditional field tours. The Sustainable Forestry Partnership and the Forestry Media Center at Oregon State University created parallel

virtual and field tours to compare these teaching techniques. Both tours illustrate the Montreal Process Criteria and Indicators for sustainable forestry and were offered to local members of the Society of American Foresters, family forestland owners, and OSU faculty, staff, and students. Pretour and posttour assessment forms were used to compare the effectiveness of each tour. The results of the evaluation have implications for utilizing virtual tours in university-level natural resource education.

INTRODUCTION

Long-term sustainability of forests is often a topic of discussion in the forestry profession. Members of the Sustainable Forestry Partnership (SFP) at Oregon State University (OSU) identified a need among foresters for a continuing education program about sustainable forestry. They used the OSU McDonald-Dunn Research Forest near Corvallis, Oregon, as the tour setting.

SFP members selected a virtual tour as the mode of instruction for this continuing educational program. Virtual tour Web sites use audio and video technology, text, and graphics to allow viewers to explore remote locations from their home computers. The Internet delivery allows large number of geographically dispersed foresters to update their knowledge about sustainable forestry at their own convenience. The SFP worked with a Web page designer in the Forestry Media Center at OSU to create a virtual tour.

After the virtual tour was complete, the SFP created a field tour that was as similar as possible to the virtual tour. This evaluation compared the two tours based on three specific objectives: (1) to determine how well the virtual and field tours met the established educational objectives; (2) to measure the level of acceptability of the tours; and (3) to explore unanticipated outcomes of the tours. It provided the Sustainable Forestry Partnership, Society of American Foresters, and other natural resource educational organizations with baseline data about how a virtual tour performed as an educational program. The evaluation also identified relative advantages and disadvantages of virtual tours and discussed implications for using virtual tours as continuing forestry educational programs.

We created a logic model diagram, shown in Figures 1 and 2, to describe specific elements of, and provide consistency between, the virtual and field tours (University of Wisconsin, 2001). After creating logic model diagrams for the virtual and field tours, we selected evaluation methods that would provide evaluation stakeholders with a realistic measure of the educational program.

SUSTAINABLE FORESTRY VIRTUAL AND FIELD TOURS
LOGIC MODEL

ASSUMPTIONS:	INPUTS:	OUTPUTS:
Learners will be highly motivated, voluntary	OSU Faculty	Virtual tour
Topic will be timely, relevant for the learners	OSU Staff	Field tour
Learners will naturally prefer one of the two types of tours	SAF	
	GRA	To reach:
	Grant money	Professional foresters
	Sustainable Forestry Resources	Forestry students
	Digital Camera Software	Local family forestland owners

Figure 1. Assumptions, Inputs, and Outputs from the Logic Model for the Virtual and Field Tours

SUSTAINABLE FORESTRY VIRTUAL AND FIELD TOURS
LOGIC MODEL (CONTINUED)

OUTCOMES
Short-term:
(1) Participants will understand the principles of sustainable forestry. They will be able to:
- Define sustainable forestry
- Discuss the 3 elements
- Contrast it with non-sustainable forestry

(2) Participants will understand how the Montreal Criteria and Indicators describe sustainable forestry. They will be able to:
- Describe indicators for the 7 Montreal Criteria
- Identify forest types to which the Montreal Criteria apply
- Describe how the OSU Research Forest met 1 of the 7 Montreal Criteria

Medium-term:
Participants will be able to:
- Apply the concepts of sustainable forestry to specific situations
- Write management plans and discuss the sustainability of them

Long-term:
Participants will be able to:
- Identify issues in their community that relate to sustainable forestry
- Describe relationship between sustainability and forest certification

Environmental Factors:
Field tours have been a long-standing tradition in forestry
Local foresters are familiar with the OSU McDonald-Dunn Research Forest
A learner's PC hardware and Internet connection speed will influence viewing
Sustainability is a broad topic, tough to quantify and qualify
The sustainability of several current forest management practices is debatable
There are two similar tours at Penn State and Auburn

Figure 2. Outcomes and Environmental Factors from the Logic Model for the Tours

EVALUATION DESIGN

Short-term intended and unintended learning outcomes were the focus of the evaluation. It was goal-based, so it measured the actual performance of the educational tours against the short-term outcomes from the logic model diagram. We defined an effective forestry tour as one that meets educational objectives while also being an enjoyable experience for participants. Additionally, our evaluation was comparative in that it compared the performance of the virtual tour to that of the field tour. There was not a control group for the comparison as it was not realistically feasible.

Participants represented a continuing forestry education audience and included members of several local chapters of the SAF, local family forestland owners, and OSU students, faculty and staff. Before the tour, participants filled out assessment forms that consisted of demographic and pretest questions. Immediately following the tour, participants completed posttour assessment forms that consisted of posttest questions and additional questions to record information about what they learned and to measure their opinions about the tour experience.

To assess learning that occurred as a result of the tours, we designed a series of six multiple-choice questions about tour content. They appeared as a pretest on the pretour assessment form and as a posttest on the posttour assessment form. The test questions were specific to the new information presented in the tour since many of the participants were professional foresters with high levels of knowledge about forestry.

Participants also rated statements using a Likert scale of 1-5 to assess the tour experiences. Several of the aspects did not depend on the method of tour delivery. These included tour location, ability to access additional information, amount of interaction with other people, amount of distractions, and amount and quality of information presented. Other evaluative statements addressed how well participants could see, hear and understand what was being presented, how much they learned from the tour, and how much they enjoyed it.

Virtual tour participants rated additional statements that were specific to a virtual tour such as how well they could navigate the Web page, how much they enjoyed the tour being self-guided, and how much they missed asking questions of the tour guides. They also rated the usefulness of the video and audio clips, the text, and the technology. The virtual tour evaluation open-ended questions regarded potential advantages and disadvantages of virtual tours.

DATA ANALYSIS

Frequencies were calculated for all response categories, translated into percentages of total responses, and graphed using histograms. Further analysis depended on patterns that appeared in the histograms and the research question being addressed. To analyze the data from the multiple-choice pretest and posttest questions, we compared gain scores for each set of tests. Experience ratings were divided into two groups using a natural break in the responses. We used nonparametric tests a significance level of $p=0.001$ for all statistical analysis since sample sizes were small. To analyze responses to the open-ended questions and observational notes we used the pattern matching technique (Yin, 1994).

SUMMARY OF RESULTS

A total of 14 people participated in the virtual tour and 22 participated in the field tour. Seven participants volunteered to participate in both tours providing us with additional comparative feedback. Those who viewed both tours completed one pretour assessment and a posttour assessment for each tour.

Results from the pretests and posttests are based on responses from 14 virtual tour participants (seven who only took the virtual tour and seven who took both tours, but took the virtual tour first) and the 15 field tour participants who only viewed the field tour. Pre- and postfield tour assessments from the remaining seven field tour participants, who viewed both tours, were not included in the analysis because they were exposed to the tour information twice. While participants did not achieve all five of the learning outcomes, results of the statistical comparison indicate that an equivalent amount of learning occurred as a result of both tours. Gain scores were distributed across a range that included some decrease, scores that remained constant, and a slight increase.

The next portion of the evaluation gathered participants' ratings for several aspects of the tour experience. Results were based on 14 virtual tour and 21 field tour participants. The majority of the aspects of both tours received favorable ratings of 4 or 5. When overall experience ratings from the virtual and field tours were compared statistically, there was not a significant difference. Participants found equivalent enjoyment from both experiences. Virtual tour participants identified several advantages and disadvantages of virtual tours. Many of the responses to these questions supported advantages and disadvantages identified in previous research.

CONCLUSIONS

From the learning assessment, we concluded that a virtual tour can be a complementary alternative to a forestry field tour as an educational experience. Participants' ratings of several aspects of the virtual and field tour ex-

periences were also equivalent, strengthening our conclusion. While our sample size was small and the scope of the evaluation was limited, we arrived at comparable results to those of similar evaluations. Virtual tours look to be promising additions for continuing natural resource education programs. If constructed well, virtual tours can be effective educational experiences and offer a unique complement to forestry field tours.

LITERATURE CITED

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