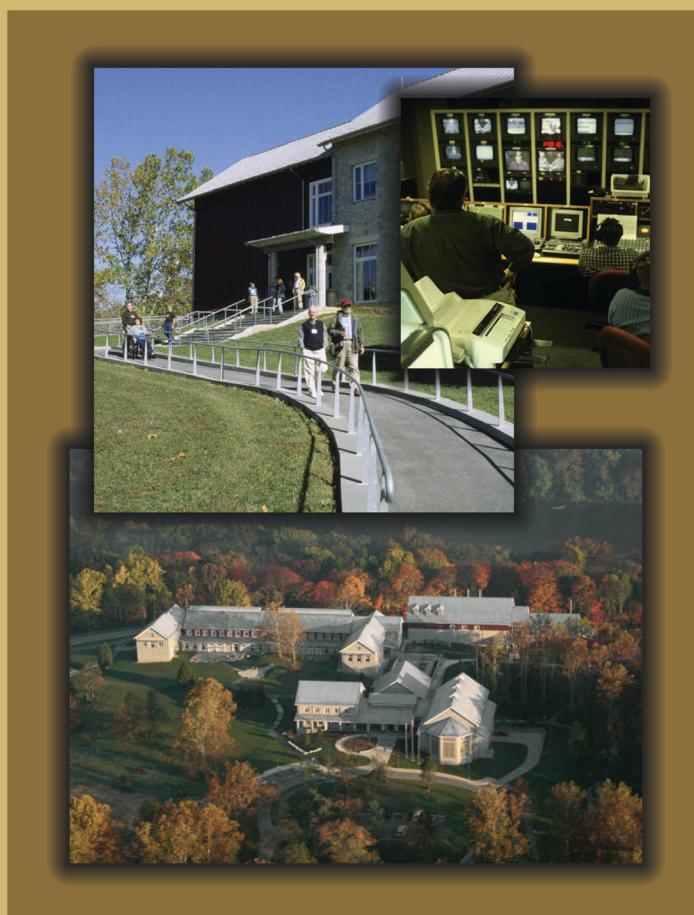




The Effect of Offering Distance Education on Enrollment in Onsite Training at the National Conservation Training Center

By Joan M. Ratz, Rudy M. Schuster, and Ann H. Marcy



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The Effect of Offering Distance Education on Enrollment in Onsite Training at the National Conservation Training Center

By Joan M. Ratz, Rudy M. Schuster, and Ann H. Marcy

Executive Summary

This study was requested by the Division of Education Outreach (DEO) at the National Conservation Training Center (NCTC) of the U.S. Fish and Wildlife Service (FWS). To complete this study, the DEO partnered with the Policy Analysis and Science Assistance Branch (PASA) of the U.S. Geological Survey. The objective of the study was to explore the effect that providing training courses through use of distance education technology would have on the enrollment in courses offered on the campus at NCTC. The study includes two components: analysis of existing training enrollment data for the time period October 1, 2007 to June 24, 2009, and a survey of FWS employees regarding their preferences for onsite training and distance education.

We were provided a dataset which included data for a sample of FWS employees that included number of training courses in which each individual had enrolled, both onsite at NCTC and through several distance education options, and excluded enrollment data for the Department of the Interior (DOI) mandatory training courses. Using this dataset, we created a database that included for each individual in the sample their region, supervisory status, number of enrollments in online training (OLT), instructor-led web-based classes (WEB), correspondence courses (CORR), courses onsite at NCTC (NCTC), and instructor-led courses offsite at a location other than NCTC (OFF). We created composite variables to account for all distance education options (DISTANCE), and for training type: instructor led or independent. The training records for 2,823 FWS employees were included in the database.

Our analyses focused on differences between enrollment in distance education and onsite courses with a focus on the effects of regional affiliation, supervisory status, and course format. While this study was restricted by the limited time frame and available information, we were able to describe patterns in the dataset but were unable to provide much explanation for the effects we detected. There were regional differences in enrollment in distance education as opposed to onsite training. Generally, the regions closest to the NCTC campus had higher enrollment in onsite training and regions farther away had higher enrollment in distance education. Of the distance education options, the offsite training demonstrated higher enrollment rates than the other options. Nonsupervisors were more likely to enroll in training at NCTC and supervisors were more likely to enroll in instructor-led training offsite. Enrollment in instructor-led courses was higher than in independent courses, although this may result from fewer offerings of independent courses. Overall, the results seem to depict a supplemental relationship between distance education and onsite training rather than a competitive relationship.

The second component of the study involved a survey of FWS employees regarding their preferences for distance education and onsite training. The survey was conducted in conjunction with another survey of FWS employees on training topics that FWS employees would be interested in

receiving via distance education technologies. The questions included on the survey were developed based on existing literature on training and distance education. The survey was administered online and 911 FWS employees responded. The focal issues addressed on the survey included experience with distance education and onsite courses at NCTC, preference for distance education and onsite courses, and intention to enroll in distance education or onsite courses. The survey also included a checklist of reasons that could influence the decision to take distance education instead of an onsite course and the decision to take an onsite course instead of distance education.

The results indicate that the survey respondents were more experienced with onsite courses at NCTC than they were with distance education. Survey respondents from regions 5 and 9 were more experienced with onsite courses than respondents from most other regions. Overall, survey respondents preferred onsite training and were more likely to enroll in onsite courses than in distance education. However, these differences were not large. When asked to indicate reasons that would lead them to choose one type of training over the other, practical reasons were more frequently indicated as influential in the decision to take distance education and interacting with others was more frequently cited as a reason to take onsite training.

This is an exploratory study and the results should be interpreted as preliminary rather than conclusive. We conclude that the information we assembled and analyzed indicates that distance education currently functions as a supplemental approach to training when participation in training onsite at the NCTC campus is impractical.

Background

The U.S. Fish and Wildlife Service's (FWS) National Conservation Training Center (NCTC) provides training through onsite and distance education classes. The provision of both avenues of training is essential to the success of the NCTC, although the onsite training contributes more to the financial health of the center. The NCTC must balance the demands of meeting the needs of their customers—primarily but not exclusively FWS employees—with generating sufficient income to cover operating expenses. As with many organizations providing both onsite and distance education options, the NCTC questions the effect that offering distance education has on onsite course enrollment.

This study was requested and funded by the Division of Education Outreach (DEO) at NCTC. As part of planning future distance education programming, the DEO believed it would be prudent to anticipate the effect that increasing distance education courses would have on onsite training. The DEO partnered with the Policy Analysis and Science Assistance Branch (PASA) of the U.S. Geological Survey to complete this study. We conducted exploratory research to characterize the potential relationship between distance education and onsite enrollment at NCTC.

There are several forms that a relationship between enrollment in distance education and onsite courses could take. The two training processes could be independent of each other, such that enrolling in one type of training does not affect the likelihood of enrolling in the other type of training. Distance education and onsite training could be positively related—this would mean that enrolling in one type of training would increase the likelihood of enrolling in the second type of training. The two training processes could be negatively or inversely related—this would mean that enrolling in one type of training would decrease the likelihood of enrolling in the second type of training. The nature of the relationship between onsite and distance education may depend on which type of training an individual took first. For example, taking a distance education course first may make an individual more likely to enroll in onsite training at NCTC. If this is the case, then the distance education program is in some manner functioning as a marketing tool for the onsite training. This may be an undetected benefit of distance education.

In higher education, over the last several years, online enrollments have grown at a faster rate than enrollments overall (Allen and Seaman, 2007). This could indicate an increasing preference for distance education. Some individuals value the convenience with which distance education can be obtained more than other considerations in choosing to take a course via distance education or in a traditional classroom setting (Roblyer, 1999). This convenience arises from the flexibility provided by many technologies used in distance education. A lecture viewed online can be started and stopped at the employee's convenience. Alternatively, the increasing rate in online enrollments could indicate the increased practicality of providing and acquiring training through distance education. Improvements in accessibility and functionality of technology have in turn improved the quality of training that can be provided via technology. In the past, the state of technology limited the degree of interaction between trainer and trainee. With the advent of web-based training, trainers and trainees can interact in real time. Use of technology in the workplace is increasingly widespread and results in more individuals having access to training through distance education technologies. Individuals may have reasons that make it less likely that they can participate in training that requires travel to a specific location. When deciding what type of training in which to enroll, individuals may weigh their preferences against what may be most practical given their circumstances.

Organizations and educational institutions offering courses via distance education and traditional onsite classroom courses are concerned about the effect of the distance education option on onsite enrollment. Offering distance education could potentially draw enrollment away from onsite courses. In this case, the total number of individuals receiving training would stay about the same but would be distributed differently between the two options. Alternatively, distance education could create opportunities for some people to participate in training who could not participate in onsite training. In this case, overall enrollment in training would increase. Olsgaard (1987) compared onsite class size with distance education enrollment over time. He concluded that onsite class size benefitted from the provision of distance education offerings, with the onsite class size increasing over time. Without longitudinal data collection, the relationship between distance education and onsite enrollment can be a difficult one to characterize.

Ridley and others (1997) conducted a multimethod study to evaluate the effect that online course offerings had on enrollments in traditional on campus courses. The purpose of their study was to determine if the option of online classes drew students away from regular courses. They used three methods to address their concerns. First, they conducted a survey of students regarding the reasons why they would enroll in an online class rather than a traditional class. Second, they analyzed existing data on credit hours earned and online course enrollment. Finally, they compared archival data of credit hours and commuting distance before and after the online courses were available. Based upon their multi-method approach, Ridley and others (1997) concluded that online courses did not compete with on campus courses but had an additive effect on overall enrollment.

Similar to the multimethod approach used by Ridley and others (1997), we used existing training enrollment data and a survey to describe the relationship between distance education course and onsite course enrollments at the NCTC campus in Shepherdstown, West Virginia.

Part I: Analysis of Training Data

Staff at NCTC provided a set of data on training registration (course enrollment) that had been downloaded from DOI Learn. DOI Learn is an online platform used to manage training for employees of Department of the Interior (DOI) agencies. The data we received reported the training enrollment for FWS employees who had taken onsite and distance training through NCTC during the time period from

October 1, 2007 to June 24, 2009. The training courses included in this dataset did not include the mandatory training required for all DOI employees.

Method

The original dataset we received included 5,616 records. Each record reported an enrollment in a course. In some cases, there were multiple records for a single individual. For example, Employee A may have enrolled in a diversity seminar held at a location other than NCTC, a webinar on climate change, and an onsite course on habitat conservation. Employee A would have three records in the database. The original database included the following information for each record: employee email address, identification as a supervisor according to the Federal Personnel Payroll System (FPPS), class name, course name (each course may include multiple classes), and course type (“ILT” indicated instructor-led training, “OLT” indicated online training).

It was necessary to format and recode the information in the original dataset to make the data suitable for analysis. We used the employee email addresses to identify which records should be combined so that, in the final dataset, each record would represent all course enrollments for a single employee. Email addresses were also used to identify the regional affiliation of each employee. Once we had identified the region and finished combining the records, we deleted the email addresses from the database. Using class name, course name, and course type we created a more specific coding for course enrollment. We created separate variables for online training (OLT), instructor-led web-based courses (WEB), correspondence courses (CORR), instructor-led onsite training (NCTC), and instructor-led courses at locations other than the NCTC campus (OFF). We created composite variables to represent all distance education courses (DISTANCE), instructor-led courses (INSTRUCT), self-paced independent courses (INDEPEND), and categorical variables to represent training location (LOCATION) and instructional format (FORMAT). Courses provided through distance education can be formatted either as instructor-led or as independent, self-paced courses. Onsite courses are assumed to be instructor-led. In table 1, we list each variable and a description of the coding.

Table 1. Variables and coding descriptions.

Variable	Description
Region	Number = Region of FWS
FPPS_Supervisor	No = not a formal supervisor Yes = a formal supervisor
OLT	Number of Online classes
WEB	Number of Instructor-led web-based classes
CORR	Number of Correspondence classes
NCTC	Number of Instructor-led classes at NCTC
OFF	Number of Instructor-led classes offsite
DISTANCE	Number of all types of classes NOT taken onsite at NCTC = OLT + WEB + CORR + OFF
INSTRUCT	Number of classes taken that were instructor led (regardless of mode of distribution) = WEB + NCTC + OFF
INDEPEND	Number of classes taken that were independent and self-paced = OLT + CORR
LOCATION	NCTC = Onsite at NCTC only DIST = Distance courses only BOTH = Both onsite and offsite courses
FORMAT	INST = Instructor led only INDEP = Independent courses only BOTH = Both types of courses

The variables OLT, WEB, CORR, NCTC, and OFF are mutually exclusive. The instructor-led web-based classes are not included in the number of online classes. The final dataset includes condensed training records for 2,823 FWS employees who took training between October 1, 2007 and June 24, 2009.

We attempted to determine the dates of training in order to classify employees based upon whether they had taken distance education or onsite training first. The process was cumbersome and required an additional dataset. Because we did not have the entire training-enrollment history for all FWS employees, we would not have known the extent to which the training in this sample was representative of an employee's training history. For example, based on the data for this limited time period, it may appear that Employee B had taken a distance education course in December 2007 and an onsite course in February 2008. We would have classified Employee B as "distance education first". However if Employee B had taken only onsite training prior to October 2007—the time period not included in our dataset—then our classification would have been in error. The possibility of misclassification was substantial and therefore we decided against including this information in our dataset and analyses.

All statistical analyses reported in this report were conducted using PASW 18, a statistical software package from IBM SPSS Statistics.

Results

Descriptive Statistics for Variables

For each variable, we report the frequency of each possible code for the records available in the dataset. The dataset includes training records for employees in all of the FWS regions. In table 2, we report the number of records from each region, the percent of all records in the database represented by each region, the percent of all FWS employees in each region from the FWS' Management Directive 715 (an online, service-wide plans report for fiscal year [FY] 2008 for the Equal Employment Opportunity Commission [EEOC]; U.S. Fish and Wildlife Service, 2008), and the percent of the regional workforce who enrolled in training during the specified time period. Percents are rounded to the nearest whole number and may not sum to 100 percent.

The majority of employees who participated in training during the time period covered by the dataset were not supervisors. Formal FPPS supervisory status was held by 760 (27 percent) of employees in the dataset.

Most employees included in the dataset had not taken any online training (2,755; 98 percent). Sixty seven employees (2 percent) had enrolled in one online course. Only one employee had enrolled

Table 2. Frequency and percents of regional affiliation.

Region	Frequency	Percent in dataset	Percent of FWS	Percent of region enrolled in training
1 (Pacific)	276	10%	12%	28%
2 (Southwest)	431	15%	10%	53%
3 (Midwest)	288	10%	11%	32%
4 (Southeast)	405	14%	15%	33%
5 (Northeast)	297	11%	9%	41%
6 (Mountain-Prairie)	262	9%	11%	30%
7 (Alaska)	263	9%	6%	51%
8 (Pacific Southwest)	351	12%	9%	46%
9 (Headquarters)	250	9%	16%	19%

in two online courses. Most employees had not enrolled in any webinars (2,461; 87 percent). Three hundred twenty-nine employees (12 percent) had enrolled in one webinar, twenty-six (1 percent) had enrolled in two webinars, and 4 (less than 1 percent) employees had enrolled in three webinars. A single record of enrollment occurred for each of the levels of 4, 5, and 6 webinars. Most employees had not enrolled in any correspondence courses (2,817, 100 percent). One correspondence course enrollment was recorded for 5 employees (less than 1 percent) and enrollment in two correspondence courses was recorded for 1 employee. Because of the low enrollment in correspondence courses, we did not conduct any separate analyses on the variable CORR.

Nearly half of the records indicated no enrollment in onsite courses at NCTC. For those records that do indicate enrollment in onsite courses, the number of onsite courses ranges from one to seven. The frequency of the number of onsite courses and respective percents are provided in table 3.

Table 3. Enrollments in courses onsite.

Number of enrollments	Frequency	Percent
0	1,255	45%
1	1,174	42%
2	273	10%
3	94	3%
4	19	1%
5	6	<1%
6	2	<1%
7	1	<1%

Slightly over half of the records indicated no enrollment in instructor-led courses held offsite at a location other than the NCTC campus. The frequency of the number of offsite courses and respective percents are provided in table 4.

Table 4. Enrollments in instructor-led courses offsite.

Number of enrollments	Frequency	Percent
0	1,482	53%
1	1,096	39%
2	161	6%
3	44	2%
4	12	<1%
5	8	<1%
6	8	<1%
7	4	<1%
9	4	<1%
13	2	<1%
14	2	<1%

We created a combined variable, DISTANCE, that included all enrollments other than instructor-led courses at NCTC. To determine the value of DISTANCE for each record, we added OLT, WEB, CORR, and OFF. The records of almost half of the employees included in the dataset indicate enrollment in at least one type of distance training. Table 5 includes the number of distance course enrollments, frequency of those values in the dataset, and percents.

Table 5. Enrollments in all types of distance courses.

Number of enrollments	Frequency	Percent
0	1,154	41%
1	1,315	47%
2	245	9%
3	58	2%
4	19	1%
5	10	<1%
6	7	<1%
7	6	<1%
8	1	<1%
9	4	<1%
13	2	<1%
14	1	<1%
15	1	<1%

We created a categorical variable, LOCATION, with three classes. The record for each employee was categorized as “distance only” if the record included enrollments only for distance education courses; 1,255 records (45 percent) were included in this category. The record was categorized as “NCTC only” if the record included enrollments only for onsite courses at NCTC; 1,154 records (41 percent) were included in this category. The record was categorized as “both” if the record included enrollments for distance education and onsite courses; 414 records (15 percent) were included in this category.

Onsite courses are assumed to be instructor led. We created variables based on the number of enrollments in courses that were instructor led and in courses that were independent. The majority of records (99 percent) indicate enrollment in at least one instructor-led course. The breakdown in number of enrollments in instructor-led courses is provided in table 6, with respective frequencies and percents.

The majority of records (2,750, 98 percent) indicate no enrollment in independent self-paced courses such as correspondence courses. Seventy one records (3 percent) indicate enrollment in one independent course. One record indicates enrollment in two independent courses, and one record indicates enrollment in three independent courses.

Table 6. Enrollments in instructor-led courses.

Number of enrollments	Frequency	Percent
0	31	1%
1	1,857	66%
2	596	21%
3	216	8%
4	65	2%
5	28	1%
6	12	<1%
7	8	<1%
8	2	<1%
9	3	<1%
12	1	<1%
13	2	<1%
14	1	<1%
15	1	<1%

We created a categorical variable, FORMAT, with three classes. The classes were “Instructor,” “Independent,” and “Both.” Employees who had only taken courses that were instructor led, either at NCTC or as an instructor-led webinar, were classified as “Instructor”; 2,750 employees (97 percent) fit this classification. In a similar manner, employees who had only taken independent courses were classified as “Independent”; 31 employees (1 percent) were included in this category. Those who had taken at least one instructor-led and at least one independent course were classified as “Both”; 42 employees (2 percent) were included in this category.

Based upon the frequencies of the variables in the available records, 56 percent of the FWS employees who enrolled in training at NCTC within the time period from October 1, 2007 to June 24, 2009 were enrolled in onsite training at the NCTC campus. Forty-seven percent enrolled in instructor-led training at an offsite location and 59 percent enrolled in some type of distance education. Roughly equal proportions of employees have taken distance education only (45 percent) or onsite training only (41 percent) and a smaller proportion (15 percent) has enrolled in both types of training. A striking majority of employees (97 percent) have only taken training that was instructor led, either onsite or via distance education.

This is only a summary description of the variables. In order to fully understand how the options of onsite and distance education relate to one another, we analyzed relationships among the variables included in the dataset.

Relationships among Variables

If practical concerns such as travel time and cost are issues that influence enrollment in distance education or onsite courses, then we would expect the geographically defined regions of the FWS to relate to enrollment in distance courses, enrollment in onsite courses, and the LOCATION variable (NCTC only, distance only, both).

We conducted an analysis of variance (ANOVA) to determine if enrollment in distance courses, as represented by the combined variable DISTANCE, was related to region. The results indicated a significant regional difference: $F(8, 2,814) = 45.29, p = .00, R^2 = .11$. According to standard interpretation (Morgan and others, 2001), this is a medium effect size. However, upon examination of the averages and standard deviations of DISTANCE for each region, we discovered that the standard deviation for region 2 (1.96) was much larger than the next largest standard deviation—the standard deviation for region 9 was .82. The frequency data reported as part of the descriptive statistics for the dataset indicate that there may be some extreme values (also known as outliers) in the data. A few records indicated that individuals had enrolled for up to 15 courses for some types of training. We defined outliers as any value 10 or above for any of the training type variables. All subsequent analyses were conducted with the outliers removed. We reanalyzed the relationship between enrollment in distance courses and region. The results were similar to the previous analysis and indicated a significant regional difference: $F(8, 2,810) = 47.13, p = .00, R^2 = .12$. There were several statistically significant differences among regions. The average enrollment in distance courses for region 2 was higher than for all other regions. The average enrollment in distance courses for region 5 was lower than for all other regions. Although NCTC is organizationally located in region 9, it is physically located within the geographic boundaries of region 5 which may make onsite courses more accessible, and distance courses less necessary or attractive, to employees in region 5. The average distance course enrollment for region 7 was higher than enrollments for regions 1, 3, 6, and 9. The average enrollment in distance courses for region 6 was lower than for regions 4 and 8.

To determine if enrollment in onsite courses at NCTC was related to region, we conducted an ANOVA. The results indicated a significant regional difference: $F(8, 2,814) = 33.07, p = .00, R^2 = .09$.

This is considered an effect of medium size. The statistically significant differences among regions are as follows. The average enrollment in NCTC courses was higher for region 5 than for all other regions. The average enrollment in NCTC courses was higher for region 9 than for regions 1, 2, 4, 7, and 8. The average enrollment for region 3 was higher than for regions 2 and 7. The average enrollment in NCTC courses for region 6 was higher than for region 2. The average enrollment in distance education and NCTC courses for each region are plotted in figure 1.

We conducted a series of within-region paired t-tests to compare the average enrollment in distance courses to the average enrollment in NCTC courses. Regions 2 and 7 had average enrollments in distance courses that were different at a statistically significant level ($p < .01$) and higher than their average enrollments in NCTC courses. Regions 3, 5, 6, and 9 had average enrollments in NCTC courses that were different at a statistically significant level ($p < .01$) and higher than their average enrollments in distance courses. The enrollments in distance and NCTC courses were not different in regions 1, 4 and 8. Details of these analyses are provided in table 1-1 in appendix 1.

We conducted analyses to determine if employees enrolled in onsite NCTC courses only, distance education courses only, or both as indicated by the categorical variable of LOCATION differed by region. We used a nonparametric test, Cramer's V, to determine if there was a relationship between LOCATION and region or if the two variables were independent of each other. The results were significant: $V = .24$, $p < .01$. This indicates the presence of a moderately strong relationship between region and the location of training courses. The frequencies for each level in the LOCATION variable are provided for each region in figure 2.

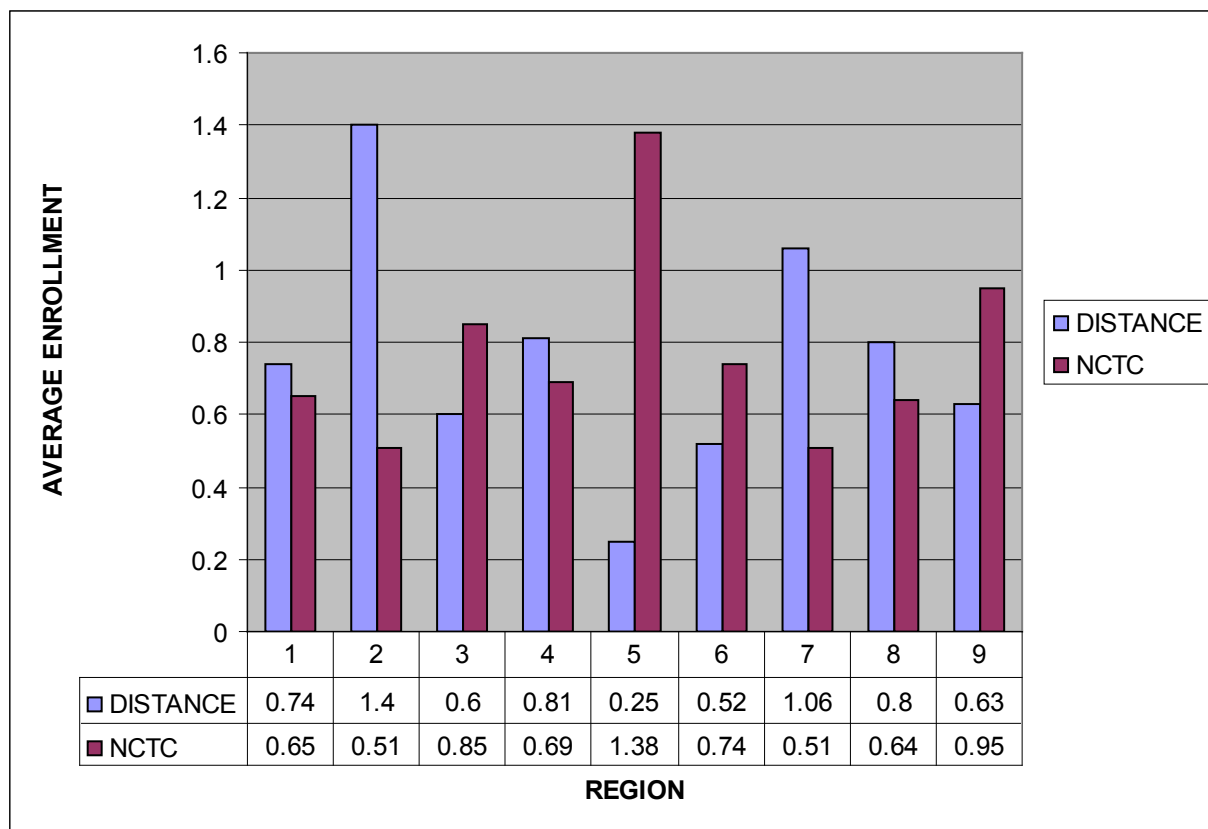


Figure 1. Average enrollments in distance education and NCTC courses by region. [NCTC, instructor-led onsite training at the National Conservation Training Center]

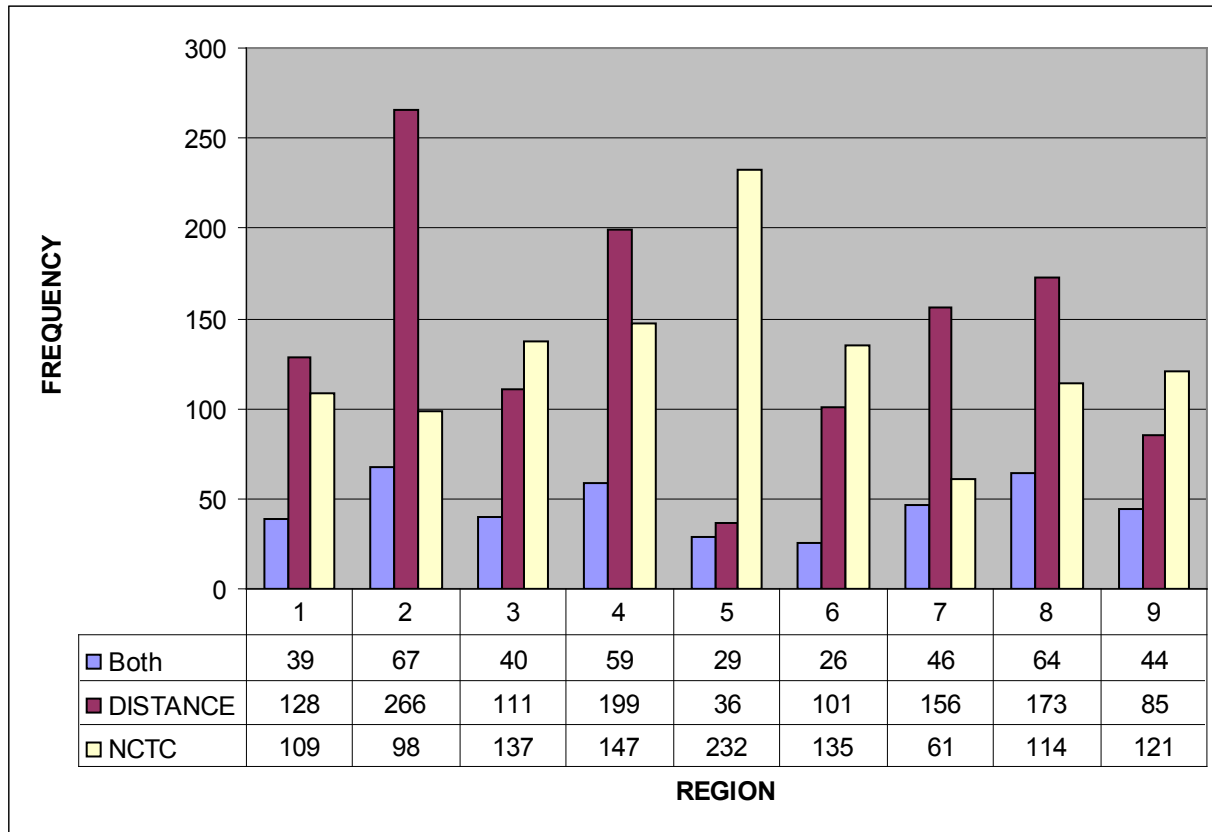


Figure 2. Course location by region. [NCTC, instructor-led onsite training at the National Conservation Training Center]

It is apparent from figure 2, that most employees have either taken training only through distance education or only at NCTC. Fewer employees have taken training via both options. We used the composite variable DISTANCE for these analyses. We used the individual type of training variables for online, web-based, onsite, and instructor-led offsite in additional analyses to determine if enrollment in specific types of training was related to region.

We used a repeated-measures ANOVA with a Greenhouse-Geisser adjustment to the degrees of freedom. The type of training (OLT, WEB, NCTC, OFF; these variables are defined in table 1.) was the repeated measure and region was a between-subjects factor. The results indicated a significant effect for type of training: $F(1.86, 5,229.29) = 787.34, p < .01, \eta^2 = .20$ (eta squared [η^2] is a measure of effect size used with ANOVA), and a significant interaction between type of training and region: $F(14.89, 5,229.29) = 47.91, p < .01, \eta^2 = .10$. The effect for type of training is considered a medium to large effect by conventional standards (Morgan and others, 2001), and the effect for the interaction is considered medium sized. The effect for region was significant but with a small effect size: $F(8, 2,810) = 11.69, p < .01, \eta^2 = .03$. We followed up on the significant interaction by analyzing the types of training for each region separately. We used a Bonferroni adjustment to the significance level for the multiple comparisons.

In figure 3, we provide a depiction of the average number of each type of course by region. Significant differences among training types within regions are indicated in figure 3. Detailed results of

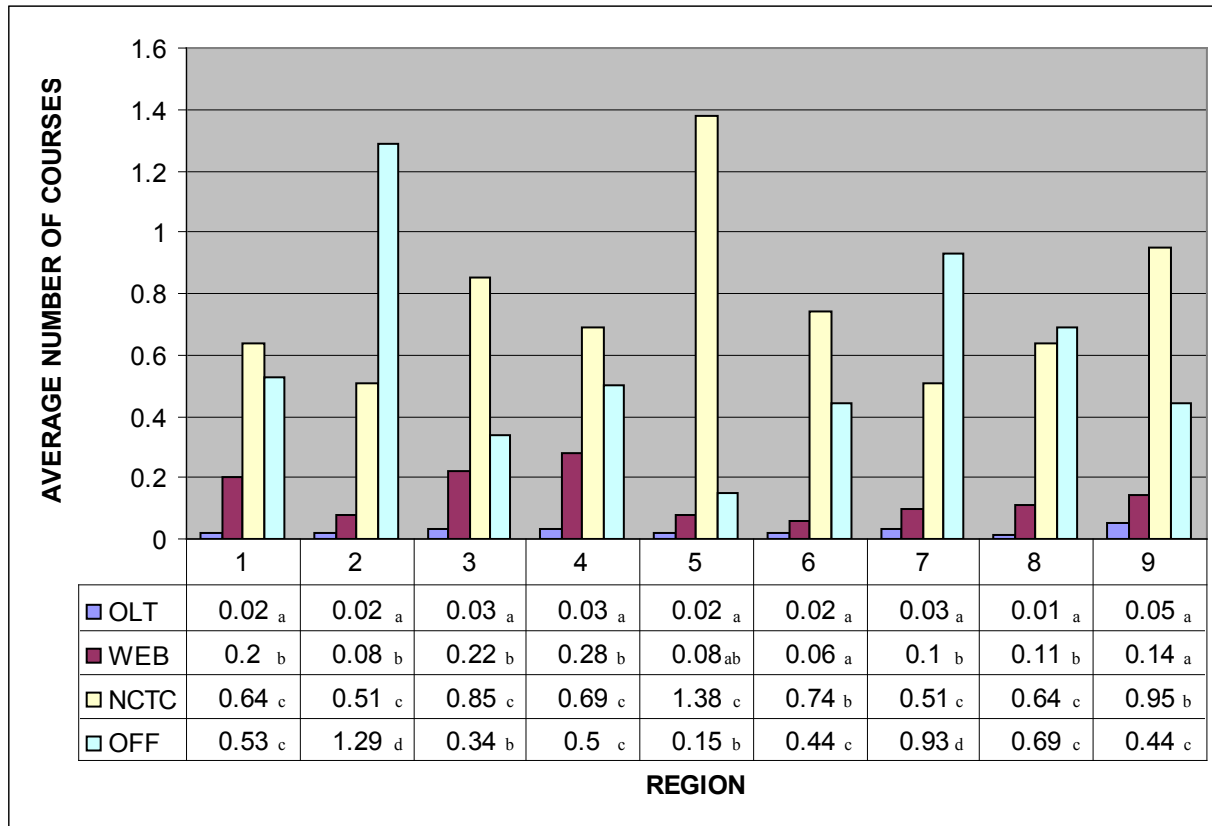


Figure 3. Average number of courses by type for each region. Averages in the same column that do not share subscripts are significantly different from each other at $p < .01$. [OLT, online training; WEB, instructor-led web-based courses; NCTC, instructor-led onsite training at the National Conservation Training Center; OFF, instructor-led courses offsite]

the analyses are reported in table 1-2 in appendix 1. The effect sizes for all of these analyses were medium to large in size and are reported in table 1-2.

The results of these analyses suggest regional differences in enrollment in the types of training. Average enrollments are lower in OLT and WEB courses than in the other types of training courses in most regions. However, regions differ in whether courses at NCTC and offsite differ from each other and in which direction. There are no differences between NCTC and offsite average course enrollment for regions 1, 4, and 8. Average enrollments in NCTC and offsite courses are different from each other in the remaining regions. In regions 3, 5, 6, and 9, average enrollment in NCTC courses is higher than in offsite courses. Average enrollment is higher in offsite courses than in NCTC courses within regions 2 and 7.

Another characteristic of employees that may affect which type of training they enroll in is supervisory status. Differences between supervisors and nonsupervisors in enrollment rates could result from several situations. Because supervisors approve training, they may approve certain types of training for themselves and other supervisors and approve different types of training for nonsupervisors. Another scenario may be that topics that are more relevant to supervisors are provided in particular training formats and not in others. Certain events, such as regional reorganization, could have placed additional burden on supervisors during the time period covered by the dataset that would have made

supervisors less likely to take training than nonsupervisors. Finally, there may be an organizational culture present in FWS or within regions that promotes training differentially for supervisors and nonsupervisors. We investigated regional differences in supervisory status in the training dataset and the effects of supervisory status on training type.

To determine if any relationship existed between regional affiliation and supervisory status, we first calculated a measure of association for categorical variables, Cramer's V. The results of the analysis were significant: $V = .19$, $p < .01$, and indicative of a weak association between the two variables. We conducted follow-up analyses in order to pinpoint the nature of the relationship between supervisory status and region. If supervisory status and region were independent, we would expect roughly the same proportion of supervisors in each region. Supervisors make up 27 percent of the dataset. We would expect that 27 percent of employees in each region would be supervisors. We used this percent to determine an expected number of supervisors in each region. For example, 276 employees from region 1 were in the database. We would expect that 27 percent of them (75) would be supervisors. In table 7 we provide the expected number, the actual number and the actual percent of supervisors for each region. Figure 4 depicts the percent of supervisors in each region in the training database relative to the expected percent.

Table 7. Number and proportion of supervisors in each region.

Region	Total number	Expected number of supervisors	Actual number of supervisors	Actual percent
1	276	75	79	29%
2	431	116	109	25%
3	288	78	52	18%
4	405	109	78	19%
5	297	80	71	23%
6	262	71	46	18%
7	263	71	120	45%
8	351	95	129	37%
9	250	68	76	30%

Regions 1, 7, 8, and 9 have actual percents of supervisors that exceed the expected values, although the values for regions 1 and 9 do not exceed the expected value of 27 percent by much. This comparison is based on the percent of supervisors in the training database. A better analysis would compare the actual percent of supervisors participating in training against the actual percent of supervisors in the FWS workforce. For example, if the actual percent of supervisors in the FWS workforce was 15 percent, then all regions would be demonstrating that supervisors participated in training more than would be expected. On the other hand, if the actual percent of supervisors in the FWS was 40 percent, then most regions would be demonstrating that supervisors participated in training less than would be expected. However, we lack that information and are therefore unable to make that comparison.

We conducted a repeated-measures ANOVA, with a Greenhouse-Geisser adjustment to degrees of freedom and a Bonferroni adjustment for multiple comparisons, to determine if supervisory status was related to enrollment in different types of training. The interaction between supervisory status and training type indicated a small but significant effect: $F(1.80, 5,076.63) = 66.14$, $p < .01$, $\eta^2 = .02$. We conducted follow-up ANOVAs for each training type to isolate the interactive effect. There was no difference in enrollment in web-based courses for supervisors and nonsupervisors. There were

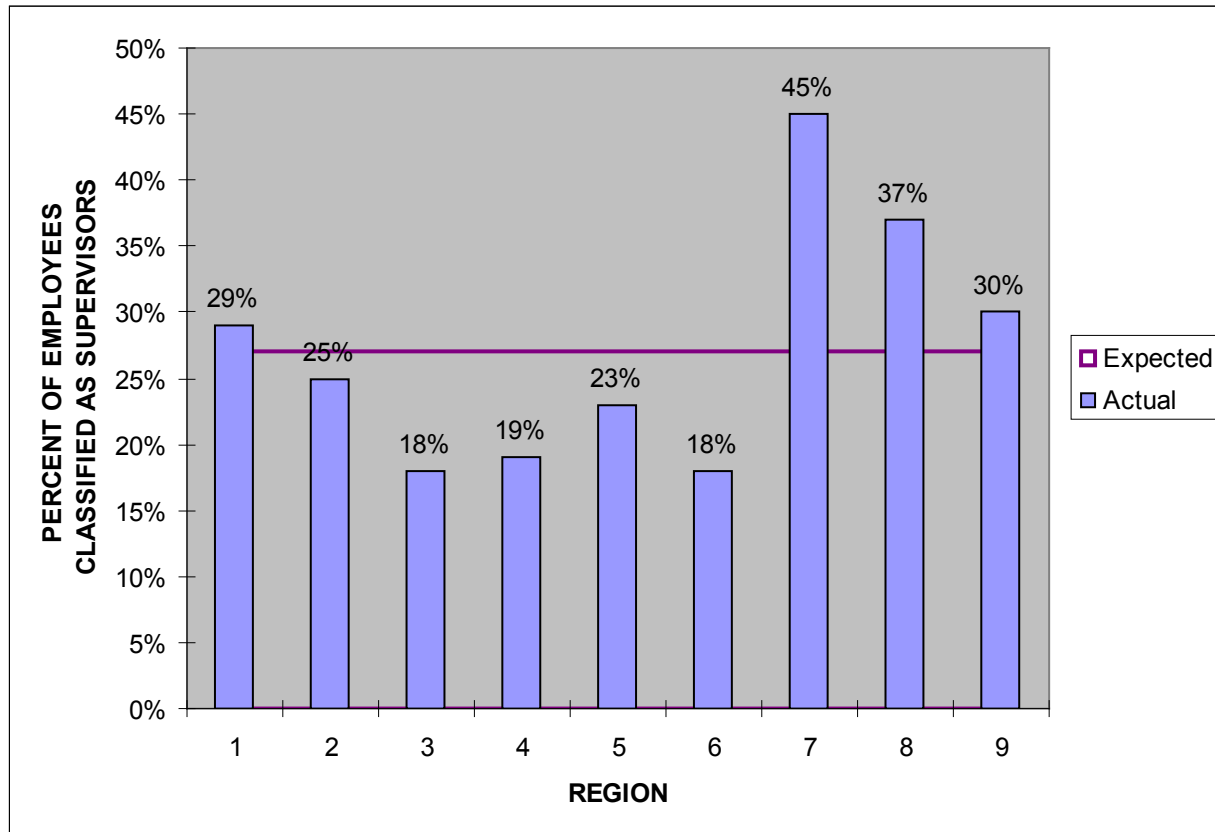


Figure 4. Percent of supervisors in each region compared to the expected percent.

significant differences in average number of enrollments for online training, NCTC courses, and offsite courses. The effect sizes were all small. The analysis for online training yielded significant results but with a very small effect size: $F(1, 2,821) = 9.85, p < .01, \eta^2 = .003$. Nonsupervisors had a higher average enrollment in online courses than supervisors. There was a significant difference in enrollment in courses at NCTC between supervisors and nonsupervisors: $F(1, 2,821) = 67.89, p < .01, \eta^2 = .02$. Nonsupervisors had a higher average enrollment in courses at NCTC than did supervisors. The analysis for instructor-led courses offsite indicated a significant difference between average enrollments between supervisory groups: $F(1, 2,821) = 59.11, p < .01, \eta^2 = .02$. The average number of offsite course enrollments was higher for supervisors than for nonsupervisors. The average enrollments for supervisors and nonsupervisors are provided in figure 5.

Supervisory status does appear related to type of training in which employees enroll. As noted, we did not have available information to determine why these differences exist. For example, we noticed that some of the instructor-led offsite courses were diversity seminars. Diversity seminars may be viewed as more appropriate for supervisors and that may, in part, explain why supervisors have a higher average enrollment in offsite courses. Based on the information included in the training dataset, we cannot identify the underlying reasons for the differences with any degree of certainty.

One striking feature of figure 5 is that the average enrollments in NCTC and in offsite courses appear much higher than the online and web-based courses. In turn, average enrollment in web-based courses seems higher than enrollments in online training. The NCTC, offsite, and web-based courses are all instructor led, but only the NCTC and offsite courses are characterized by face-to-face interaction

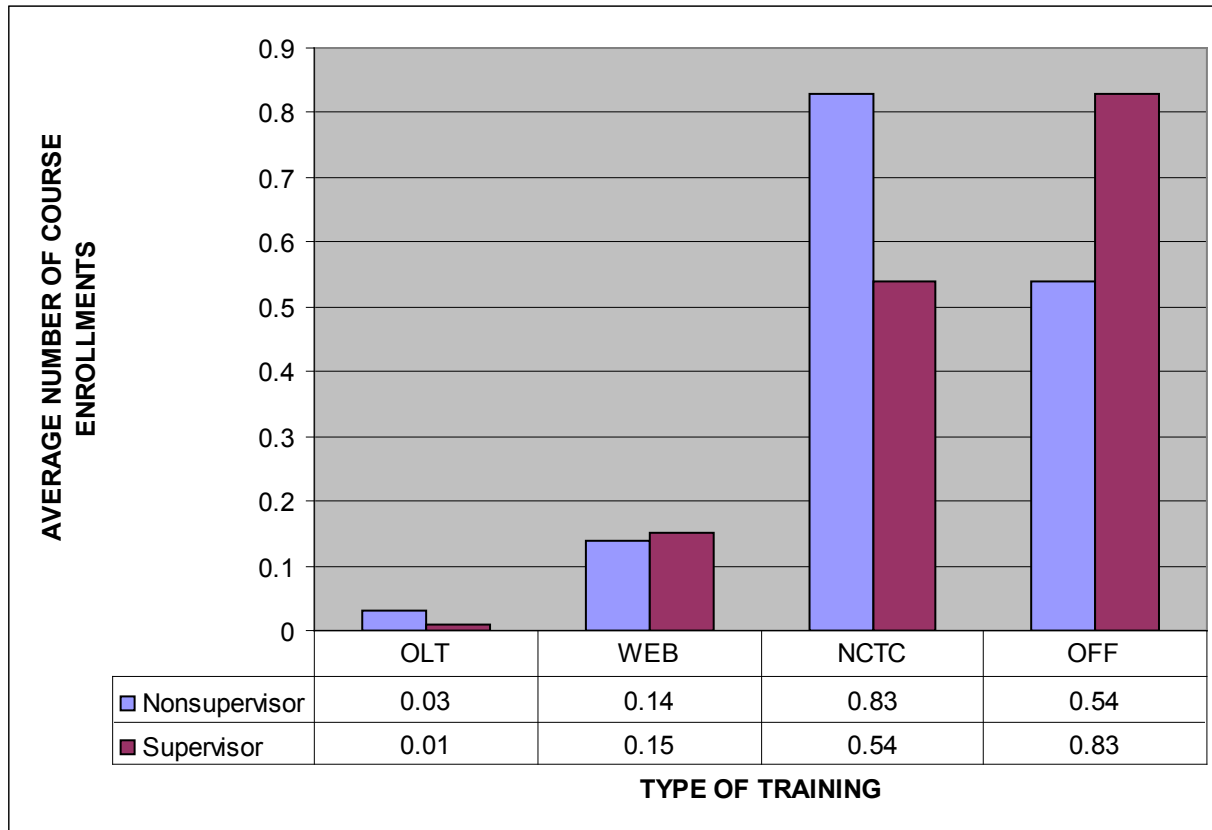


Figure 5. Average enrollment for supervisors and nonsupervisors in four types of training. [OLT, online training; WEB, instructor-led web-based courses; NCTC, instructor-led onsite training at the National Conservation Training Center; OFF, instructor-led courses offsite]

among students and teachers. We investigated the effect of course format on enrollment by analyzing differences in enrollment rates for the four training types, correlating enrollment rates between instructor-led and independent courses, analyzing regional and supervisory status differences for instructor-led and independent course enrollment, and determining if regional and supervisory differences exist among categories of the FORMAT variable—instructor-led only, independent only, or enrollment in both types.

The results of a prior analysis provide information about the differences in enrollment rates for the four training types. The repeated-measures ANOVA we conducted to determine if supervisory status was related to enrollment in different types of training also indicated a significant main effect for type of training: $F(1.80, 5,076.63) = 569.23$, $p < .01$, with a medium to large effect size: $\eta^2 = .16$. The average enrollments for the four training types are provided in figure 6.

The multiple comparisons indicated that average enrollment for NCTC and offsite courses do not differ from each other. All other comparisons are significantly different at $p < .01$ with a Bonferroni adjustment for multiple comparisons.

We had created two composite variables, INSTRUCT and INDEPEND, that represent different course formats regardless of delivery medium. The variable INSTRUCT is the sum of enrollments in instructor-led training delivered in web-based, offsite, and NCTC courses. The variable INDEPEND is

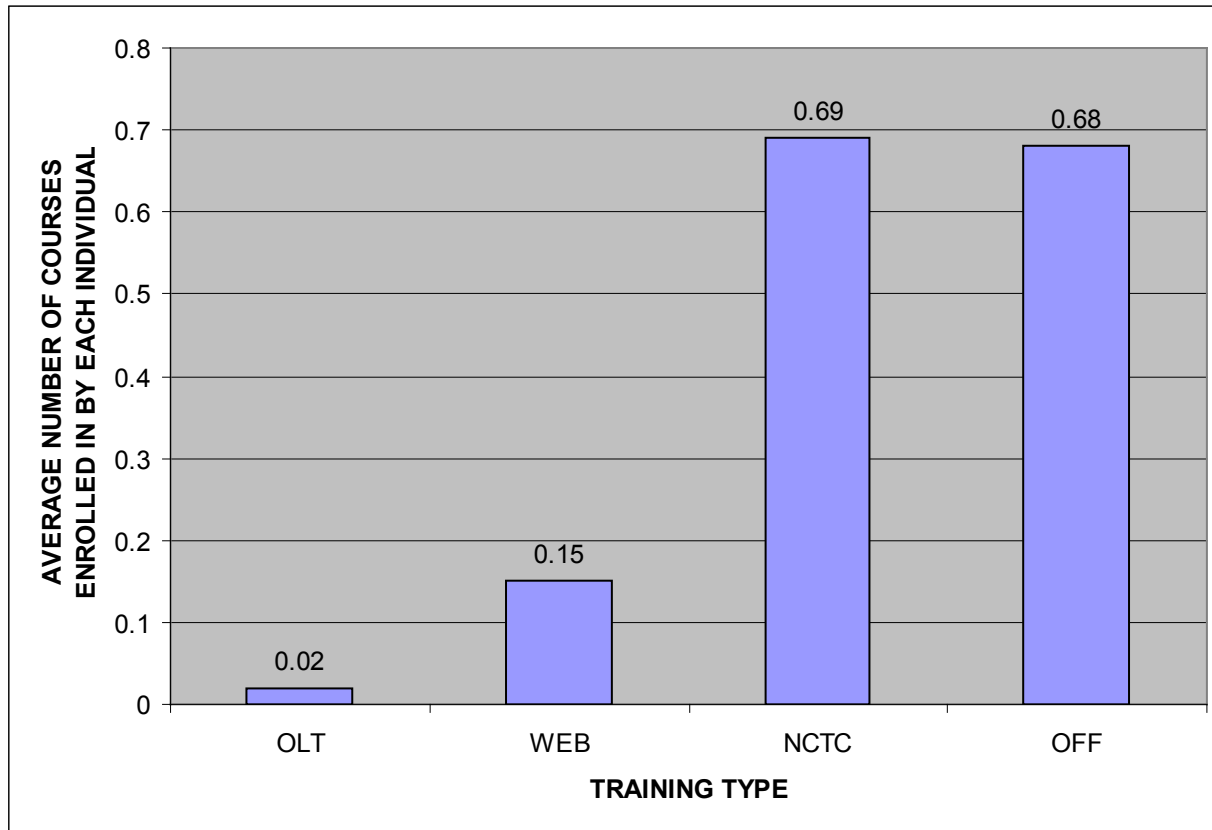


Figure 6. Average enrollments for training types. [OLT, online training; WEB, instructor-led web-based courses; NCTC, instructor-led onsite training at the National Conservation Training Center; OFF, instructor-led courses offsite]

the sum of enrollments in self-paced courses: online training and correspondence courses. When we calculated the correlation between these two variables to determine the degree to which they were related, we found that the correlation was nonsignificant: $r = .00$, $p = .99$. However, this result may be due to the low variability of values for the variable INDEPEND. Only 3 percent of records in the dataset have a nonzero value for INDEPEND. This, in effect, renders the variable of INDEPEND a constant value that lacks the variability necessary to detect a correlational relationship.

We analyzed regional and supervisory status differences for instructor-led and independent course enrollment. We conducted four ANOVAs with the variables INSTRUCT and INDEPEND as dependent variables and regional affiliation and supervisory status as factors. The analyses using INSTRUCT as the dependent variable demonstrated a small regional effect: $F(8, 2,809) = 11.79$, $p < .01$, $\eta^2 = .03$, but no effect for supervisory status; $F(1, 2,816) = .03$, n.s. (non-significant). The follow-up comparisons with $p = .01$ and a Bonferroni adjustment for multiple comparisons indicated that region 2 had a higher average enrollment in instructor-led courses than all other regions except region 5. Region 5 differed only from region 6; it had a higher average enrollment than region 6. The average enrollment in instructor-led courses for each region are provided in figure 7.

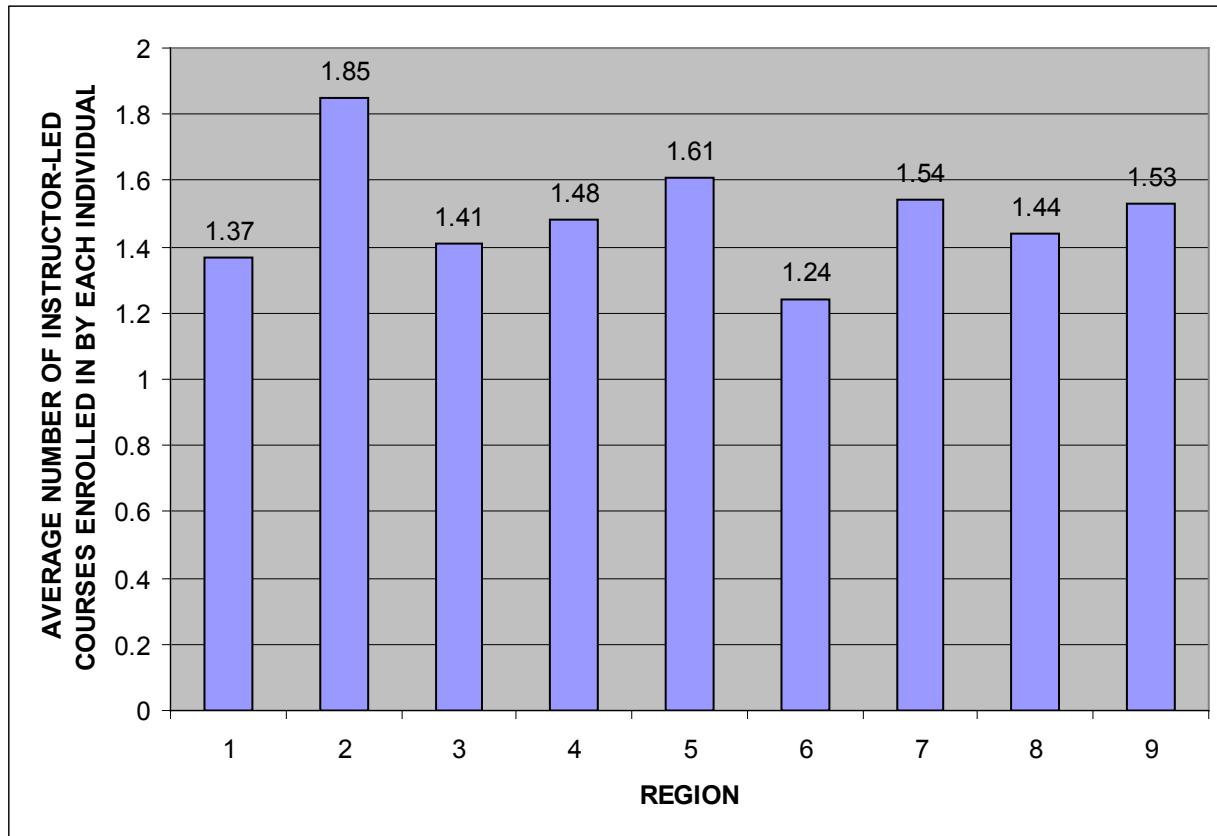


Figure 7. Average enrollment in instructor-led courses in each region.

The analyses using INDEPEND as the dependent variable demonstrated no regional effect: $F(8, 2,814) = 1.68$, n.s., but a very small effect for supervisory status: $F(1, 2,821) = 9.66$, $p < .01$, $\eta^2 = .003$. The average enrollment in independent courses was higher for nonsupervisors (.03) than for supervisors (.01).

We classified whether employees had taken training that was all instructor led, all independent or a mix of both for the categorical variable FORMAT. We used a nonparametric measure, Cramer's V , to analyze the relationships between FORMAT and the variables of region and supervisory status. The analysis comparing FORMAT and region yielded a small but significant effect: $V = .10$, $p < .01$. However, the contingency table for these two variables was rather sparse and the results of this analysis may be less reliable than if the table were not sparse. The sparseness was due to the low number of employees who took either only independent courses or courses of both types. The frequency for each category of FORMAT by region is provided in figure 8.

The analysis comparing FORMAT and supervisory status also resulted in a small but significant effect: $V = .07$, $p < .01$. The frequency for each category of FORMAT by supervisory status is provided in figure 9.

It is clear that there are more employees in the training database who have taken only instructor-led courses. This pattern is apparent in the breakdown of the FORMAT variable by region and by supervisory status.

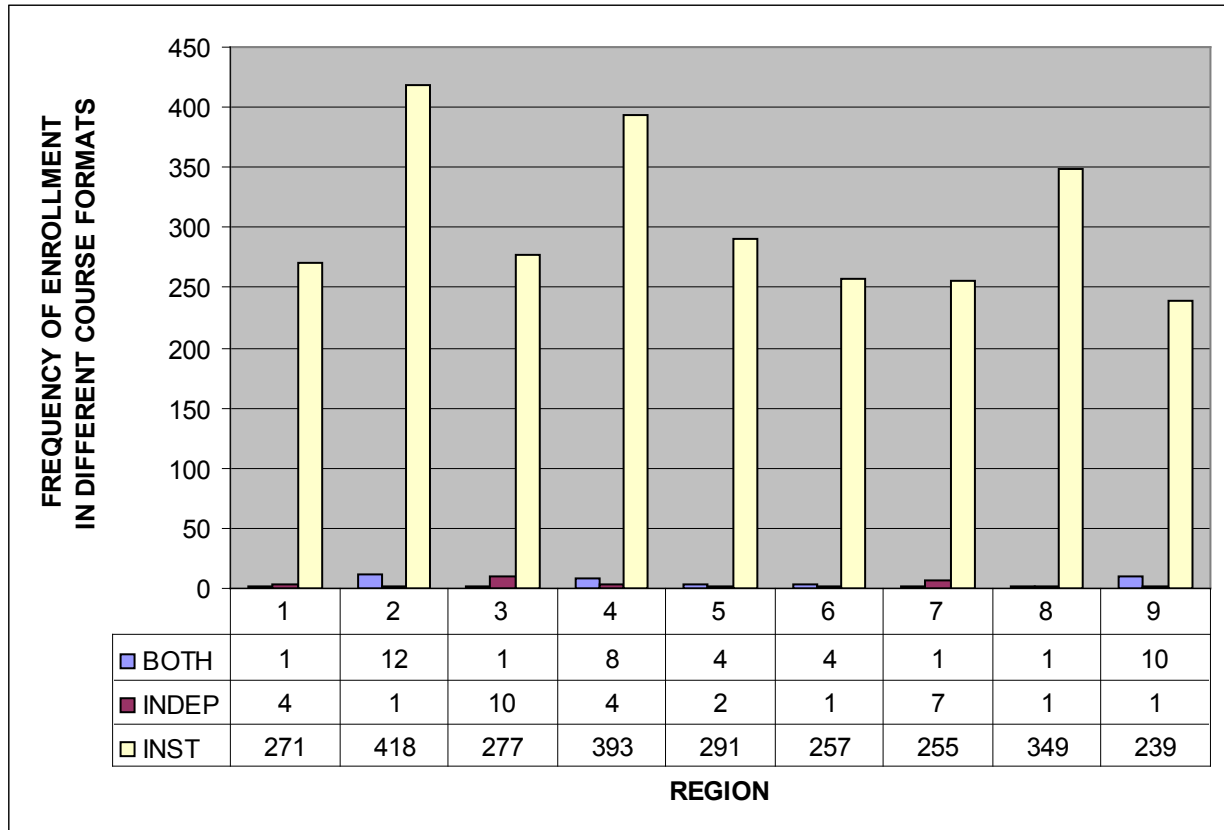


Figure 8. Course format by region. [INDEP, independent, self-paced classes; INST, instructor-led classes]

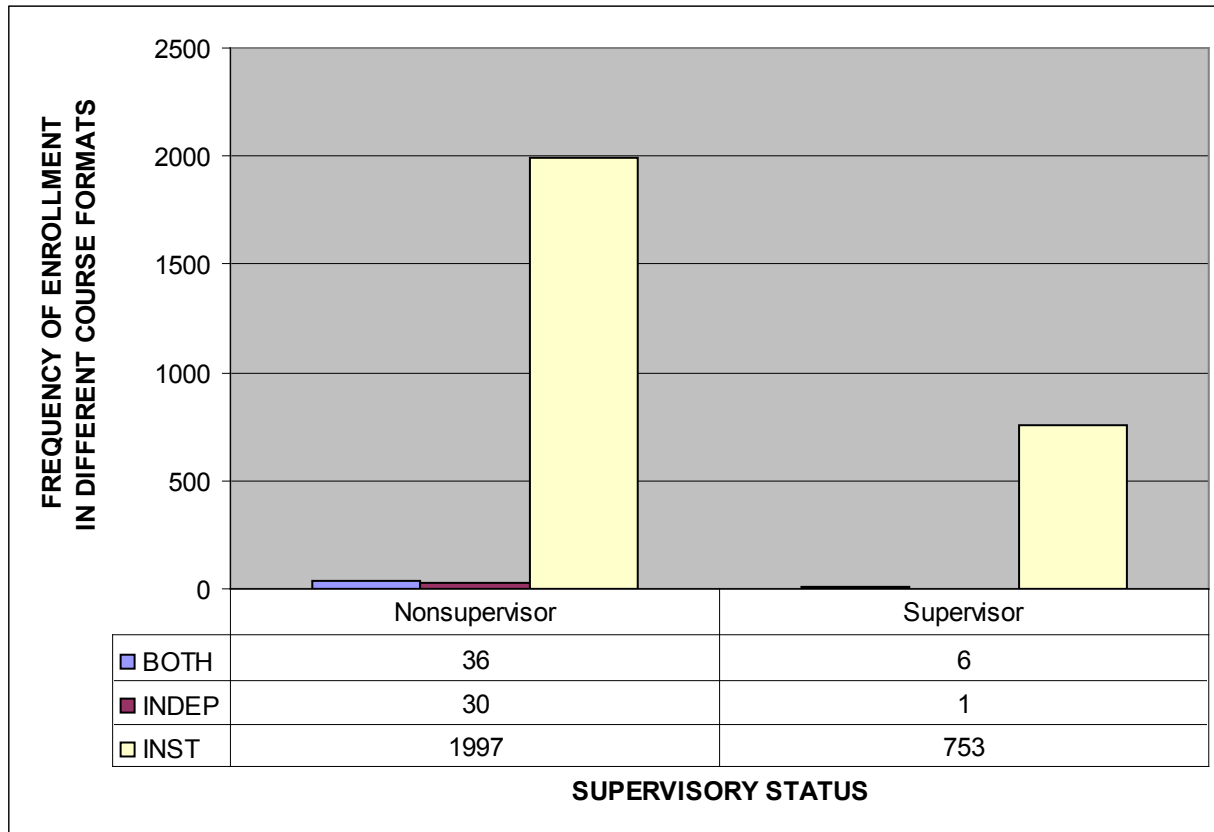


Figure 9. Frequency of enrollment in course formats by supervisory status. [INDEP, independent, self-paced classes; INST, instructor-led classes]

Discussion

The results of the analyses of the training database can be summarized around three focal issues: regional differences, differences based on supervisory status, and implications of training format. There are significant regional differences in enrollment rates for courses provided through distance education or onsite at NCTC. The pattern of differences suggests that regions located closer to NCTC (specifically regions 3, 5 and 9) have higher enrollment rates in onsite courses and regions located farther away from NCTC (specifically regions 2, 7, and 8) have higher enrollments in distance education. Region 1, which is far from NCTC, and region 4, which is close to NCTC, do not demonstrate any differences in enrollment between onsite and distance education. Region 6 which is farther away from NCTC does exhibit higher enrollment in onsite courses than distance education courses. We do not know the reason for this. One possibility may be that the organizational culture of region 6 is more supportive of training at NCTC and/or training in general. The regional effects are so consistent that it may be worth considering the regions as different markets for training. Some regions may present a greater market for training via distance education options whereas others are clearly more likely to participate in training onsite at NCTC.

The percent of employees who were identified as supervisors also differed by region. It is difficult to interpret this effect without additional information. We used the percent of supervisors in the dataset overall as a benchmark. However, the percent of supervisors in the workforce for each region would give a better assessment of whether supervisors are participating in more training than would be

expected. Based on the available data, there are differences among the regions in the percent of supervisors participating in training, but we do not know if this effect is due to some regions having higher proportions of supervisors in their workforce or if this difference could indicate a difference across regions in the value placed on training for supervisors.

Another effect of supervisory status occurred in comparisons with enrollment in onsite or distance education. The results of our analyses indicate that nonsupervisors were more likely to enroll in training at NCTC and supervisors were more likely to take training that was offered offsite. As with other effects found in this exploratory study, we do not know the reason underlying this effect. One potential explanation is that the types of training offered at NCTC and offsite differ in content such that the offsite courses are more relevant to supervisors. An alternate explanation may be that supervisors believe that onsite training at NCTC is necessary in order to develop their employees.

When the training formats are compared against each other, the enrollments in NCTC courses and offsite courses are not significantly different from each other. They both differ from enrollment in instructor-led web-based courses and independent online training—which also differ from each other. Enrollment in web-based courses is lower than in either NCTC or offsite courses and enrollment in online training courses is even lower. The offsite training seems to be the most popular distance education format. These differences cannot be interpreted as based on preferences. The different enrollment rates may differ based on the number of courses offered through each option.

We grouped courses into instructor led (NCTC, offsite, and web based) and independent (online training and correspondence courses). Enrollment levels in instructor-led versus independent courses do not seem to be related. Overall, enrollment in instructor-led courses is higher than in independent courses; perhaps not as many independent courses are offered. We did observe a regional difference in enrollment in instructor-led courses: region 2 had a higher enrollment rate in these courses than most other regions. Region 2 also had a higher enrollment rate in distance education than onsite at NCTC. More specifically, region 2 had a higher rate of enrollment in offsite courses than in other training options. Enrollment in independent courses does not seem to be affected by region. There is an effect of supervisory status on enrollment in independent courses such that nonsupervisors are more likely to enroll in independent courses than are supervisors.

The primary limitation of this study was the limitations of the data set. Specifically, the limited time covered and limited information included in the dataset prohibited more in-depth analyses. Due to the limited time period covered in the data set, we could not fully assess the relationship between distance education and onsite training. It would have been useful in characterizing the relationship if we knew which type of training employees had experienced first. The training dataset used for these analyses did not include any measure of organizational tenure. Employees who are close to retirement may be less likely to invest time into pursuing training and may take training that is easiest to access. Additionally, it is difficult to draw firm conclusions regarding the differences between onsite and distance education without including the content of the courses offered through these different modes. The results indicated that supervisory status was related to type of training and we noticed that some of the instructor-led offsite courses were diversity seminars. These seminars may be more appropriate for supervisors. Differences in the specific courses offered through onsite and distance education training could explain some of the differences in enrollment between these modes of training.

This study was exploratory and provides some preliminary answers to the question of how providing distance education courses will affect enrollment in onsite courses. Early in discussions regarding the development of this project, the question was posed as to whether or not distance education could function as a gateway to onsite education. At this time, with the currently available data, we cannot offer a definitive answer to that question. This dataset of training enrollments suggests

that distance education and onsite education operate independently. When the records of employees were categorized as having taking classes at NCTC only, through distance education only, or through both options, most employees had taken courses through only one option. If distance education were currently operating as a gateway, we would expect to see more individuals who had taken training through both options. Distance education and onsite training appear at this time to be complementary means to provide training.

Part II: Survey

The analysis of the existing training data provides information regarding enrollment behavior. A survey was included in the study to provide information regarding employee preference for distance education or onsite training. We conducted another survey of FWS employees on a similar topic. The other survey addressed specific topics for potential training that would be of interest to FWS employees who engage in education and outreach activities and specific modes of distance education such as video conferencing, computer-mediated training, and satellite television. The intent of that survey was to provide information to the DEO regarding training on which topics could be effectively provided through which means of distance education. Because of the similarities in the objectives of that study and this study, and because some questions worked for both, we combined the questions into a single survey questionnaire. This approach was more efficient in terms of cost and time and it reduced the burden on FWS employees. In this report, we summarize the survey development and administration processes. More detail is provided in the completion report for the study of topics for distance education (Ratz and others, 2011a).

Method

Survey Development

We reviewed the published literature on distance education technology and training to determine what questions should be asked in this survey. We determined that we needed to include questions on past training experience, preferences for training type, reasons for enrolling in distance education or in onsite training, and behavioral intentions. We developed questions relating to distance education and then developed parallel questions relating to onsite training. Survey questions were reviewed by DEO personnel prior to the finalization of the survey. The questions are provided in table 2-1 in appendix 2. The survey questions, the corresponding response scales, and frequency data are provided in the report to respondents for the survey (Ratz and others, 2011b).

Past Training Experience

Experience with distance education technologies can be measured by the number of prior courses taken with each type of distance education technology (Arbaugh, 2005; DeBourgh, 2003). Individuals who have taken distance education in the past are more likely to be more comfortable with distance education (Jedlicka and others, 2002) and report a preference for distance education (Harris and Gibson, 2006). We asked respondents about their previous experience with distance education and with onsite training.

Preferences for Mode of Training

Several of the learning models that have been proposed to explain attitudes and behavior toward online learning note that the learners' beliefs and attitudes relate to their intent to use and actual use of

online technology for learning (Saade and others, 2007). Research studies have found support for the link between attitudes toward technology and learning outcomes when using technology (Daley and others, 2001; Klein and others, 2006). Preference is an attitude related to intent. Preference for a type of distance education technology is predictive of the intent to use the same distance education technology. Thompson and Lynch (2003) and Harris and Gibson (2006) provided example questions to measure preferences from their studies of distance education and we adapted these questions as our measures of preferences.

Reasons for Enrolling

Roblyer (1999) developed a four-factor description of characteristics for choosing either distance education or traditional classroom education. Logistical factors include practical issues in participating in a course such as the distance to course site; control factors include when and how long to complete course activities; personal interaction factors include preferences for interacting with the instructor and other students; and technology perspectives include attitudes regarding and prior experiences with technology and distance education. Employees can choose distance education or onsite training for different reasons.

Wallace (1996) conducted a study to identify the reasons why university students chose to enroll in distance education courses rather than traditional courses on campus. Wallace developed a questionnaire with a listing of reasons that were grouped into the following five categories: situational (work and family issues), institutional (availability of on-campus courses), psychosocial (lack of academic confidence), learning preference (preference for independence), and goals (personal and academic goals). The students in the study were asked to rate the importance of each reason. The categories that most related to choice to enroll in distance education were goals, psychosocial, and learning preference. Situational and institutional reasons related to choice to enroll in distance education but not to the same extent as the other reasons.

We created a list of reasons based upon literature and upon characteristics of the FWS that could influence the type of training chosen by employees. We asked respondents to indicate all of the reasons on the list that would influence them to take training via distance education instead of onsite and to indicate all reasons that would influence them to take onsite training rather than distance education. Data derived from checklists such as these can be difficult to analyze statistically (Bilder and Loughin, 2004) so we treated these questions as qualitative rather than quantitative measures.

Behavioral Intention

Attitudes toward distance education are predictive of the intention to enroll in online courses (Robinson and Doverspike, 2006). As part of this survey, we incorporated a measure of behavioral intention to enroll in distance education from NCTC and a measure of behavioral intention to enroll in onsite training at NCTC. Our questions were based on the behavioral intent measure used in research by Robinson and Doverspike (2006).

Demographics

We included two questions that appeared early in the survey and functioned as screening questions. One question asked about the percent of time on the job that involved conservation and/or environmental education or outreach programming. The second question asked if the respondent's job involved supervising anyone whose job involved those tasks.

We included questions regarding age and organizational tenure. There were three organizational tenure questions: how long the respondents had been with the FWS, how long they had been at their

current duty station, and how long they had been in their particular position. To help us determine the representativeness of our sample, we asked respondents about their employment status with FWS (permanent or term/temporary), the region in which their duty station is located, their WG/GS/GM level, and the numerical code for their Job Series.

Sampling Strategy

We used a convenience sample that was stratified by region, not a random sample. We designed our stratified-sampling strategy to include individuals from each region proportional to the number of employees in each region. We believed it was important to ensure input from all regions because issues can vary across regions. We used the information about employment from the FWS EEOC FY2008 plan (U.S. Fish and Wildlife Service, 2008) to calculate percentages for the sampling protocol. To determine the total number of employees to sample and number within each region, we started by identifying the smallest region (region 7) and determining the minimum number of responses from that region necessary for a sufficient regional sample size. Based upon that number, we then extrapolated sample sizes for the remaining regions. According to the FWS EEOC FY2008 plan (U. S. Fish and Wildlife Service, 2008), the employees in region 7 represent six percent of the FWS workforce. We aimed for a minimum of 45 respondents within region 7 and we assumed that our survey would have a minimum 50 percent response rate; therefore, in order to have 45 respondents from region 7, we needed to send the survey to 90 employees in region 7. The 90 employees in the sample from region 7 should compose six percent of the total survey sample. We determined that our overall sample size should be 1,488. Given the data in the FY08 report (U. S. Fish and Wildlife Service, 2008); a sample of 1,488 is approximately 18 percent of the employees of the FWS.

To identify specific employees to include in the sample, we selected employees based upon information provided in two lists: FWS employees subscribed to the Visitor Outreach, Interpretation, Communications, and Education Services (VOICES) electronic distribution list (for employees engaged in environmental education) and FWS employees who had taken training through NCTC during the time period from October 1, 2007 to June 24, 2009. The second list was created from the data provided in the database used in the first part of this study on the relationship between enrollment in distance education and in onsite training. In selecting the sample for this survey, we gave preference to those on the VOICES distribution list because this strategy was more suitable for the primary survey on distance education.

Data-Collection Process

A letter written by Janet Carrier Ady, the Chief of the DEO, was emailed to the individuals in the survey sample to introduce the survey. Even though the message was from the DEO Chief, it was sent by PASA personnel to maintain the privacy and identity of those in the survey sample. No personnel at NCTC know the names of those included in the survey sample. A few days after the introductory email was sent, we emailed a message including a link to the survey to the FWS employees in the survey sample. The survey was administered online by using KeySurvey© software. We emailed a reminder to those who had not yet completed the survey about one week after the initial survey distribution. A final reminder was sent to those who had not submitted a complete survey on the last day survey data were being collected.

Results

Frequencies of responses to all questions are provided in a report to respondents for the survey (Ratz and others, 2011b) so we do not reiterate them here. We provide some summary information regarding the response rate and other quality indicators which are discussed in detail in Ratz and others (2011a). We describe the analyses for the questions from the survey that are most pertinent to the relationship between enrollment in distance education and in onsite training.

Survey Quality

Response Rate

Of the 1,488 surveys sent, 48 were undeliverable because either the individual was no longer with the FWS or the recipient's mail box was filled over its quota. Four individuals requested to be removed from the survey sample. There were 98 individuals in the survey sample who were out of the office at some point during the data collection. Eight of those individuals were out of the office for the duration of the data collection period. This left us with a potential sample size of 1,428. Eight hundred sixty-four individuals submitted a completed survey in the survey software. Partial responses were received from 47 individuals who started but did not finish the survey online. We reviewed their responses and determined that most of them had answered more than half of the survey questions when they exited the survey. We included these partial responses for a total of 911 respondents. Our overall adjusted response rate was 64 percent. Every region had a regional response rate of at least 50 percent.

Other Quality Indicators

When using a survey to collect information, five characteristics of the survey research project must be considered to judge the quality of the survey and determine to what extent the information from the survey can be used. The five characteristics are survey reliability, survey validity, statistical power, sample representativeness, and nonresponse bias. These characteristics are discussed in detail in Ratz and others (2011a) and we summarize the results here.

Reliability is an indication of the consistency of measurement (for more detail, see Murphy and Davidshofer, 1998). For any measurement instrument—such as a survey—to be useful, it must be reliable. There is no method to determine the reliability of single item measures and the questions included in the enrollment survey were all single item measures. This means that we used single questions to measure each characteristic. The questions included in the larger survey comprised several subscales that demonstrated adequate levels of reliability as determined by a measure of internal consistency (Cronbach's alpha).

When evaluating the validity of a survey, we are interested in evidence that the survey is measuring the characteristics that we intended it to measure. Construct validity addresses whether a survey measures a specific characteristic of interest (Murphy and Davidshofer, 1998). In order to demonstrate the evidence for construct validity, there must be known relationships among the characteristics being measured. Based upon the published literature, we expected that the questions regarding experience with, preference for, and intention to take distance education would correlate positively with each other and that the questions regarding experience with, preference for, and intention to take onsite training would correlate positively with each other. Questions referencing different training types, such as the question about experience with onsite training and the question about intention to enroll in distance education, would either exhibit no correlational relationship or a negative (inverse) correlation. We found this pattern in our data. The correlations are provided in table 2-2 in appendix 2. Another approach to establishing evidence for construct validity, is to correlate a subscale

score with some external measure (Murphy and Davidshofer, 1998). In this case we used the screening question that asked what percentage of the job was involved in conservation and environmental education as an external measure. Because there is no underlying reason why the “percentage of the job” should relate to experience, preference, or behavioral intention to enroll in either distance education or onsite training, we expect that none of these questions will correlate with this screening question. As reported in table 2-2, none of these correlations were significantly different from zero. We believe the available correlational evidence supports the conclusion that this survey measures experience with, preferences for, and behavioral intentions toward distance education and onsite training.

Statistical power is a characteristic of individual statistical tests and is highly influenced by how a survey research project is conducted. Statistical power is essentially the probability that a statistical test will lead to a correct conclusion (Murphy and Myers, 1998). The power of a statistical test is affected by the size of the effect anticipated in the population of interest. The size of the effect in the population cannot be altered to increase the power of statistical tests in the study. One of the primary methods to influence statistical power is through the size of the sample. More data mean more powerful analyses. The dataset for this study is based on the responses of 911 respondents. A dataset of this size ensures high power in analyses. We clearly have sufficient power for the statistical analyses to yield results that can be used for decisionmaking.

In addition to needing a sufficient number of respondents to provide adequate statistical power, the respondents need to be representative of the population of interest. Representativeness means that the sample is similar in type and distribution of characteristics to the population of interest. The primary approach to achieving data from a representative sample is a careful sampling strategy. We designed our stratified sampling strategy to include individuals from each region proportional to the number of employees in each region. As described in Ratz and others, 2011a, we compared our sample with the population distribution of the FWS workforce and determined that our sample was proportionally representative. However, the sample for the overall survey was done with the intent to include employees who were involved in conservation and environmental education. Our interest in this smaller survey is to compare preferences and intentions with respect to distance education versus onsite education. This issue is not limited to employees whose work involves conservation and environmental education. Our sample and therefore our results may not be as representative of employees in the FWS whose work does not directly involve education and outreach.

Nonresponse occurs when individuals to whom the survey is sent do not respond to the survey (Burkell, 2003; Dillman and others, 2002). Nonresponse bias refers to bias in survey results from differences in demographics or attitudes between those who do and do not respond to a survey (Burkell, 2003; Hudson and others, 2004; Sax and others, 2003). The critical issue to address is whether the nonresponse bias influences the outcome and interpretation of survey results. While a high response rate can minimize the likelihood of nonresponse bias, it does not guarantee the absence of bias (Groves and Peytcheva, 2008). However, nonresponse is not necessarily an indicator of bias (Burkell, 2003; Rogelberg and Luong, 1998; Sax and others 2003). According to Moore and Tarnai (2002, p. 198), “...if there are no differences between respondents and nonrespondents, then there is no nonresponse error regardless of the response rate.” We used the method of comparing the survey responses of early and later responders to assess nonresponse bias and found no evidence to indicate the presence of bias. Our approach to evaluating nonresponse bias is described in detail in the survey completion report (Ratz and others, 2011a).

Onsite versus Distance Education: Experience, Preferences, and Intentions

We examined the characteristics of past training experience, preference for mode of training, and behavioral intentions to enroll in training to see if they differed for onsite versus distance education options. Because region appears to have an effect on training options based on the results of our analysis of the training dataset, we also examined regional effects. To accomplish this, we conducted a series of repeated-measures ANOVAs, with a significance cutoff equal to .01 and with a Bonferroni adjustment for multiple comparisons when necessary. We included region as a between-subjects factor.

Experience

The repeated-measures ANOVA comparing experience with distance education and experience with onsite training yielded several significant effects. There was a main effect for training type, a main effect for region, and an interaction between training type and region. The analysis comparing the experience values between training type was significant with a large effect size: $n = 911$, $F(1, 902) = 575.95$, $p < .01$, $\eta^2 = .37$. This indicates an overall difference in the sample between experience with distance education and experience with onsite training. The average score for experience with distance education was 2.25; this corresponds to a survey-scale value between one distance education course (score = 2) and two distance education courses (score = 3). The average score for experience with onsite education was 3.91 which corresponds to a survey scale value just under three courses taken onsite (score = 4). On average, survey respondents have taken slightly more than one distance education course and almost four onsite courses.

The interaction between experience and regional affiliation was significant but with a small effect size: $F(8, 902) = 8.56$, $p < .01$, $\eta^2 = .04$. We conducted follow-up univariate ANOVAs separately for each type of training, with region as a factor in the analysis. The analysis for experience with onsite education indicated significant differences among regions; the size of the difference was moderate: $F(8, 902) = 10.68$, $p < .01$, $\eta^2 = .09$. Comparisons between regions indicated that regions 5 and 9 reported more onsite course experience than regions 1, 2, 6, 7, and 8. Regions 3 and 4 were not different from any other regions. The analysis for experience with distance education indicated significant differences in values for experience between regions, but the size of the difference was very small: $F(8, 902) = 3.10$, $p < .01$, $\eta^2 = .03$. The follow-up multiple comparisons did not indicate any significant differences between regions on experience with distance education. This may be due to the conservative significance cutoff we used ($p = .01$) and the adjustment to significance for the multiple comparisons, which makes the significance level even more conservative. The average scores for experience with distance education and with onsite training for each region are provided in figure 10.

There are distinct differences between experience with having taken distance education courses and onsite courses at NCTC. In all regions, the survey respondents reported having taken more onsite courses than distance courses on average. We cannot conclude that this reflects a preference for onsite courses; it may indicate that more courses are offered onsite and therefore are available to more employees. We did ask survey respondents to indicate their preference for distance education and onsite training.

Preferences

The repeated-measures ANOVA comparing the values of preference for distance education with the preference for onsite training indicated a significant main effect for training type. The analysis comparing preferences between training types was significant with a medium effect size: $n = 856$, $F(1, 847) = 91.30$, $p < .01$, $\eta^2 = .10$. The average scores for preferences for both onsite and distance education fall between the survey scale values of 3 (Neither agree nor disagree) and 4 (Slightly agree).

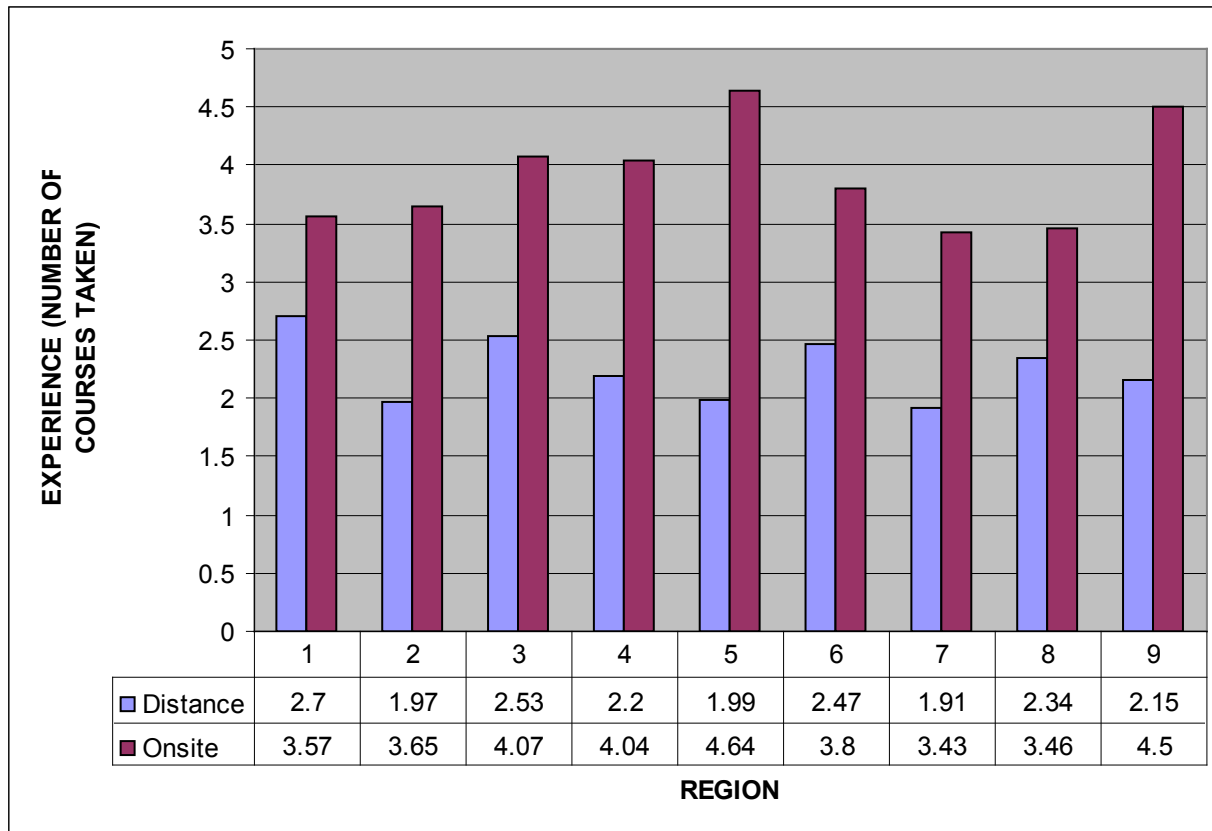


Figure 10. Experience with distance education and onsite training.

The average score for preference for onsite training was 3.88 and the average score for preference for distance education was 3.24. The main effect for region and the interaction effect between training type and region on preferences were not significant.

Behavioral Intention

The repeated-measures ANOVA comparing the values of intention to enroll in distance education and intention to enroll in onsite training resulted in a significant main effect for training type but no effect for the interaction between training type and region. The main effect for region was not significant. The analysis comparing the intention values between training type was significant with a very small effect size: $n = 858$, $F(1, 849) = 11.37$, $p < .01$, $\eta^2 = .003$. The average scores for intention to enroll in onsite and distance education fall between the survey scale values of 4 (Neither likely nor unlikely) and 5 (Slightly likely). The average score for intention to enroll for onsite training was 4.96 and the average score for intention to enroll for distance education was 4.64.

Overall, the survey respondents reported more experience with onsite than distance education, greater preference for onsite than distance education, and a slightly greater intention to enroll in onsite than in distance education. On the survey, we asked respondents to indicate using a checklist what factors would influence them to take training via distance education rather than onsite, and to indicate

using the same checklist what factors would influence them to take training onsite rather than through distance education.

Reasons for Enrolling: Checklist Results

We treated the responses to the two checklists—reasons why respondents would select distance education instead of onsite training and why they would select onsite training instead of distance education—as qualitative data. These checklists fall into the category of multiple-response variables which are difficult to analyze (Bilder and Loughin, 2004). One of the concerns with checklists is that it cannot be determined if the lack of a check mark means that data is missing (a respondent skipped the question) or if it is a negative response indicating the respondent is not influenced by this factor. In table 8 we provide the top ten reasons from each checklist with the number of respondents selecting that reason.

Table 8. Ten most frequent reasons for selecting type of training.

Distance education instead of onsite		Onsite instead of distance education	
Scheduling with commitments in my work life	n=696	Interaction with instructor	n=765
Scheduling with commitments in my personal life	n=648	Interaction with other students	n=745
Cost issues	n=500	Meeting others	n=670
Freedom to complete training when I can fit it in	n=459	It's easier for me to learn this way	n=492
Travel time	n=457	Level of interest in the topic	n=465
Transportation issues	n=355	It's efficient to learn this way	n=265
Level of interest in the topic	n=342	Scheduling with commitments in my work life	n=141
Independent pace of learning	n=247	Scheduling with commitments in my personal life	n=113
It's efficient to learn this way	n=172	Travel time	n=63
Needing permission from supervisor	n=164	Transportation issues*	n=59
		Cost issues*	

* These two reasons received equal numbers of marks on the checklist.

Although no analyses can be done on the checklist data, we can make some general observations based on the frequency with which each reason was selected under each training type. It appears that the practical issues of scheduling, cost, and travel time were more frequently perceived as being influential in the decision to take distance education instead of onsite. Personal interaction issues seem to be more frequently cited as influential in the decision to take onsite courses instead of distance education.

Discussion

We conducted a survey of FWS employees to obtain information regarding preferences with respect to participating in training through distance education and onsite at the NCTC campus. The survey was designed based on the existing literature on distance education and traditional classroom training preferences. The primary characteristics measured were: experience with distance education provided by NCTC and onsite training at NCTC, level of preference for distance education and onsite training, and intention to enroll in either distance education or onsite training. The data were collected using online survey software. The survey demonstrated adequate quality and the sample size was sufficient to detect even small effects in the analyses.

In terms of experience as measured by numbers of courses taken in the past, FWS employees in the survey sample indicated that they were more experienced with onsite training at NCTC and less experienced with distance education provided by NCTC. Onsite courses have been offered for a longer period of time than the relatively new program of distance education. A larger number of courses are offered through onsite training than are offered through distance education. If a FWS employee has

taken a course from NCTC, it is more likely to have been an onsite course rather than a distance education course. The number of onsite courses taken in the past differed based upon region. Region 5, the region in which NCTC is geographically located, and region 9, the region in which NCTC is organizationally located, had higher reported rates of enrollment in onsite courses than most of the other regions. This result seems to indicate that practical issues such as distance, time, and travel affect the propensity to enroll in onsite courses. There were no regional differences in enrollment in distance education courses, perhaps these courses are more equally accessible, or inaccessible, to all regions.

The measures of preferences and behavioral intentions favored onsite training. Preferences and intentions appeared to be more consistent across regions. When asked to indicate why they would choose to take distance education courses over onsite courses, the respondents tended to endorse practical issues as influential in that decision. Scheduling with work commitments and home commitments were the most frequently identified reasons for taking distance education. Cost, travel time, and transportation issues were included in the 10 most frequent reasons to take distance education. When asked to indicate why they would take onsite training over distance education courses, the influences that reflected interpersonal interaction were the most frequently endorsed. Interactions with the instructor, interactions with other students, and meeting others were the three most frequently cited reasons for taking onsite training at NCTC instead of through distance education.

Conclusion

The published literature on the effect that distance education options have on traditional course enrollments is limited. We conducted an exploratory study to characterize the relationship between enrollment in distance education and in onsite courses at NCTC. We used two methods in order to obtain the most complete understanding of this relationship possible using the available information. We analyzed a time-limited dataset which included enrollment in both onsite and distance education courses. One of the primary pieces of information missing from the training dataset was a measure of individual preference. We conducted a survey of FWS employees to acquire information on preferences with respect to training via onsite or distance education options.

Because this is an exploratory study it is difficult to offer firm conclusions, but we believe the evidence we assembled and analyzed is sufficient to permit a preliminary characterization of the relationship between onsite and distance education enrollment.

A Preliminary Characterization

Perhaps once distance education becomes more established, there may be more competition with onsite training. Right now, onsite training seems to be preferred and distance education may provide a supplemental source for training that is utilized when practical issues make it necessary. Based on the results of these analyses, it appears unlikely that increasing distance education courses will have a substantial adverse impact on onsite course enrollments. This is the way the relationship appears now; this is not necessarily how it will always be.

Distance education is relatively new in comparison to the onsite training. There are two factors that may have an influence on increasing FWS employee preference for distance education. As more options for distance education are provided—either more courses or through more varied media—employees may enroll more frequently in distance education. Second, improvements in distance education methods, technology, and interface may result in increased willingness to participate. As they gain experience with distance education, employees' preference for distance education as a training option may increase.

Over time, distance education may be more competitive with onsite training. At the time the survey data was collected (during the year 2010) most employees in the survey cited interpersonal interactions as reasons they would rather take training onsite at NCTC than distance education. However, these interactions can occur in some distance education media. Employees may be most familiar with interaction face-to-face and prefer to enroll in courses at NCTC to accomplish that face-to-face interaction. In the future, available technology may make interaction easier and as employees acquire more experience with using these distance education media they may feel more comfortable interacting with others using media. This may also occur as the result of a demographic change, as a generation that has never known a world without social media becomes the primary workforce. Nevertheless, we cannot assume that the desire for face-to-face interaction will diminish. Onsite training may always be preferred.

Future Study

Monitoring and periodic analysis of enrollment levels in both onsite courses and distance education courses will provide a more complete depiction of the complementary versus competitive nature of offering training through these two options. The specific type of distance education media would be an important characteristic to consider. For example, in the survey on topics for distance education (Ratz and others, 2011a) that was completed in conjunction with this study, the most preferred distance education option was instructor-led training offsite—at a location other than the NCTC campus. Ongoing monitoring of the preferences and training needs of FWS employees will enable NCTC to strategically offer onsite and distance education courses.

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Appendix 1—Training Data

Supplemental Statistical Reporting

Detailed results of analyses included in the body of the report are included here. In table 1-1, we report the results of the paired t-tests comparing within-region enrollment in distance and NCTC courses. The information reported includes the sample size, degrees of freedom, the value of the t-test statistic, and the value of test significance as indicated by the p-value.

Table 1-1. Paired t-tests comparing average enrollment in distance and NCTC courses within region.

Region	N (Number of cases)	Degrees of freedom	Value of the t-test statistic	Significance level (p)
1	276	275	-1.28	.20
2	427	426	-9.78	.00
3	288	287	3.23	.00
4	405	404	-1.70	.09
5	297	296	15.51	.00
6	262	261	3.09	.00
7	263	262	-6.99	.00
8	351	350	-2.41	.02
9	250	249	3.59	.00

Table 2-2 shows the results of a series of repeated-measure ANOVAs to compare the types of training (OLT, WEB, NCTC, OFF). A separate analysis was conducted for each region.

Table 1-2. Comparison of types of training within region.

[All analyses reported in this table had a p-value of .00.]

Region	N (Number of cases)	Degrees of freedom	F-value	Eta-squared
1	276	1.93, 531.21	69.51	.20
2	427	1.38, 586.23	175.03	.29
3	288	1.82, 521.03	90.31	.24
4	405	1.99, 806.25	76.58	.16
5	297	1.41, 417.96	357.06	.55
6	262	1.45, 378.62	117.22	.31
7	263	1.74, 456.24	122.44	.32
8	351	1.69, 592.90	126.30	.27
9	250	1.84, 457.52	100.48	.29

Appendix 2—Survey

Survey Questions

Table 2-1. Survey content, questions, and question numbers.

Question number	Subscale name	Question text
Experience onsite NCTC		
Q1		How many courses have you taken onsite at NCTC in Shepherdstown, WV?
Experience NCTC distance education		
Q2		How many courses have you taken from NCTC that were offered via distance education?
Screening		
Q3		Considering all of your responsibilities, what percentage of your job involves conservation and/or environmental education or outreach programming?
Q4		In your job, do you supervise anyone (including employees, contractors, and volunteers) whose job involves work in conservation and/or environmental education, outreach programming, visitor services, or partnerships?
Preference for onsite		
Q31a		I prefer onsite classroom training over training by distance education technology.
Preference for distance education		
Q31b		I would take a training course administered by distance education technology instead of a classroom based course.
Checklist for distance education		
Please indicate which of the following reasons would influence you to take training via any type of distance education instead of onsite at the NCTC:		
Q32a		Scheduling with commitments in my personal life.
Q32b		Scheduling with commitments in my work life.
Q32c		Transportation issues.
Q32d		Physical disabilities.
Q32e		Independent pace of learning.
Q32f		Meeting others.
Q32g		Interaction with other students.
Q32h		Interaction with instructor.
Q32i		It’s easier for me to learn this way.
Q32j		Cost issues.
Q32k		Needing permission from supervisor.
Q32l		It’s efficient to learn this way.
Q32m		Freedom to complete training when I can fit it in.

Question number	Subscale name	Question text
Q32n		Travel time.
Q32o		Level of interest in the topic.
Checklist for NCTC		
Please indicate which of the following reasons would influence you to take training onsite at NCTC instead of through distance education:		
Q33a		Scheduling with commitments in my personal life.
Q33b		Scheduling with commitments in my work life.
Q33c		Transportation issues.
Q33d		Physical disabilities.
Q33e		Independent pace of learning.
Q33f		Meeting others.
Q33g		Interaction with other students.
Q33h		Interaction with instructor.
Q33i		It's easier for me to learn this way.
Q33j		Cost issues.
Q33k		Needing permission from supervisor.
Q33l		It's efficient to learn this way.
Q33m		Freedom to complete training when I can fit it in.
Q33n		Travel time.
Q33o		Level of interest in the topic.
Behavioral Intention		
Q34		How likely is it that you would choose to take a course from NCTC via distance education instead of onsite at the NCTC campus?
Q35		How likely is it that you would choose to take an onsite course at the NCTC campus instead of an NCTC course through distance education?
Demographics		
Q37		What is your employment status with the Fish and Wildlife Service?
Q38		What is your age (in years)?
Q39		How long have you worked for the U.S. Fish and Wildlife Service?
Q40		How long have you worked at your current duty station?
Q41		How long have you worked in your current position?
Q42		In which region is your duty station?
Q43		What is your WG/GS/GM level?
Q44		Do you subscribe to the VOICES listserv?
Q45		What is the numerical code for your Job Series?

Table 2-2. Correlations among questions.

["-" indicates a negative correlation. Note: Number of cases used in calculating the correlation are in parentheses.]

	Onsite experience (Q1)	Onsite preference (Q31a)	Onsite intention (Q35)	Distance experience (Q2)	Distance preference (Q31b)	Distance intention (Q34)
Onsite preference (Q31a)	0.10* (858)					
Onsite intention (Q35)	0.23* (859)	0.45* (853)				
Distance experience (Q2)	0.01 (911)	-0.05 (858)	-0.08 (859)			
Distance preference (Q31b)	0.00 (856)	-0.30* (856)	-0.31* (851)	0.07 (856)		
Distance intention (Q34)	-0.14* (860)	-0.39* (854)	-0.41* (858)	0.16* (860)	0.49* (852)	
Screening - percent of job (Q3)	0.04 (911)	-0.01 (858)	0.06 (859)	0.07 (911)	-0.05 (856)	0.01 (860)

* Correlation is significant at the 0.01 level (2-tailed).

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