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State Boating Law Administrators

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March 5, 2013

Senator Edward Meyer and Representative Linda M. Gentile, Co-Chairs
Environment Committee
Room 3200, Legislative Office Building
Hartford, CT 06106

Senator Meyer and Representative Gentile,

We are writing to express support of H.B. No. 6541 (RAISED) AN ACT CONCERNING ON-LINE EDUCATION OPTIONS FOR BOATING AND HUNTING SAFETY. We specifically wish to support consideration of recognizing certain online boating courses as meeting Connecticut requirements for boat operators.

The National Association of State Boating Law Administrators (NASBLA) is a national, nonprofit 501(c)(3) organization comprised of state and territorial recreational boating authorities. NASBLA's mission is to strengthen the ability of the state and territorial boating authorities to reduce death, injury and property damage associated with recreational boating and ensure a safe, secure and enjoyable boating environment.

NASBLA addresses its mission by fostering partnerships among and between the states, the Coast Guard and others, crafting model boating laws, maintaining national education and training standards, providing members with critical knowledge and skills, assisting in the homeland security challenges on our waterways, and advocating the needs of the state boating programs before Congress and federal agencies.

Since 1999, NASBLA has worked directly with U.S. states and territories to review and approve state courses which meet the National Boating Safety Education Standards. In 2011 alone, over 459,000 students across the U.S. and its territories successfully completed a NASBLA-approved course, earning a boating education certificate recognized in most states.

In 2012, NASBLA, with grant funding provided through the Sport Fish Restoration and Boating Trust Fund, completed a research project to answer this question: *Are there differences between the retention of learning after completing either classroom (i.e., face-to-face) or online boating safety training?* The study built upon previous research (Deatz, Gossman, Kulp, & Trippe, 2010) addressing variables of knowledge retention among participants completing boating safety training in a classroom based on age, gender, level of boating experience and geographic area.

The research team worked with seven states: Illinois, Iowa, Oregon, Pennsylvania, Virginia, West Virginia, and Wisconsin. Data used for analysis included participant initial and retention test scores, in addition to responses from survey questionnaires regarding age, gender, and various boating experiences.

The results indicated, while some slight and statistically significant differences in mean difference scores between online and classroom training exist, that if the scores are converted to the percent correct grading scale, the difference is only about 2%. Further, the study indicated that change to course content, structure, or delivery is not warranted to favor one type of course delivery (classroom vs. online) over the other and that the differences level out further over time. A copy of the full report is included with this letter.

NASBLA recognizes that across the U.S., boaters are completing more and more courses online. Online boating courses are readily available on a 24/7 basis, 365 days a year. These courses are relatively inexpensive and are sometimes available for free. The majority of U.S. states and territories recognize and accept boating education certificates from online courses. NASBLA supports Connecticut's efforts toward providing this option for your state's boaters and visitors.

Thank you for this opportunity to provide input. Please let us know if we can additional information on this matter.

Sincerely,

John M. Johnson, CAE, CEO

Attachment: *Assessing Knowledge Retention for Online and Classroom Boating Safety Courses*
Author: Richard C. Deatz, D. Matthew Trippe, HumRRO (Human Resources Research Organization) under contract with the National Association of State Boating Law Administrators (USCG Grant No. 1002.17)

Assessing Knowledge Retention for Online And Classroom Boating Safety Courses

Final Grant Report

Submitted January 31, 2012

HumRRO

Human Resources Research Organization:

Richard C. Deatz

D. Matthew Trippe

Produced under a grant from the Sport Fish Restoration and Boating Trust Fund, administered by the U.S. Coast Guard.

Executive Summary

The National Association of State Boating Law Administrators (NASBLA) is the professional association that represents the recreational boating authorities in each of the 56 U.S. states and territories and supports those authorities through the establishment of standards for boating safety and education. The NASBLA-approved courses, which meet the National Boating Education Standards, are designed to provide recreational boaters with the information necessary to make them safer boaters, while at the same time providing the mechanism for boat operator certification in those states that require it.

Background

In 2008, NASBLA identified a need to investigate the efficacy of online boating safety courses that have been approved by NASBLA and a grant proposal on this topic was funded by the U.S. Coast Guard. The research question asked if there are differences between classroom and online courses with regard to knowledge retention after a four-month time period.

However, due to changing requirements within the online courses, NASBLA, the United States Coast Guard, and HumRRO research staff agreed to revise the study to investigate participant retention rates for the classroom training condition only. The original research question was replaced by the following two research questions: (a) What is the level of knowledge retention among participants completing the boating safety training in a classroom environment and (b) Is knowledge retention differentially related to variables such as age, gender, level of boating experience, and geographic area (secondary question)? Data collection was conducted in 2009 (Deatz, Gossman, Kulp, & Trippe, 2010).

Study Design

The current study (conducted in 2011) is a follow-on effort to investigate the original research question: Are there differences between the retention of learning after completing either classroom (i.e., face-to-face) or online boating safety training? The study design is pre-test post-test, where participants completed a 25-item knowledge test immediately after classroom or online training and again 4 months later. They also completed a short demographic questionnaire for both iterations. Participants in this study were volunteers, recruited from a population of those seeking boating certifications and training from agencies in selected states. After successfully completing the course, participants received information regarding this study to decide whether or not to participate. Having Internet access and an active email account (to be notified 4 months later to complete the questionnaire and test online) were the two requirements for participating in the study.

Incentives provided encouragement for participation in both studies. The incentives included a $10 gift card for everyone completing the study and automatic entry into a drawing for 20 inflatable life jackets ($100 value) and one $500 grand prize. Data collection lasted for 4 weeks starting the second week of July 2011 through the first week of August 2011.

The NASBLA and HumRRO research team selected states for the study based on two factors. First, states had to offer both classroom and timed online courses and second, participation was voluntary. The result was an initial list of ten states, of which the following seven agreed to support this effort: Illinois, Iowa, Oregon, Pennsylvania, Virginia, West Virginia, and Wisconsin. Timed online training is a type of training design that requires a minimum period of time a webpage containing training content is open before the next webpage is available to view. This style of online training was recently adopted by NASBLA for all courses. At the time of the study, two online providers offered timed courses in the seven states.

Data used for analysis included participant initial and retention test scores, in addition to responses from survey questionnaires regarding age, gender, and various boating experiences.

Research Findings

For the current study, 306 of the 562 participants initially recruited (92 classroom and 470 online) completed the study, producing a response rate of 54%. Of the 306, the classroom group included 46 people while the online group included 260. Combining the 192 individuals from the 2009 study increased the classroom participants to 238, for an overall sample of 498[1].

The primary research objective was to identify if differences exist in the knowledge retained after classroom or online boating safety training. We first looked for differences between online and classroom training at the time of the pre-test and again for the post-test. Two-sample *t*-tests indicate no statistically significant difference between the two training conditions for the pre-test, $t(494) = 1.29$, $p = .20$ and post-test, $t(488) = -1.81$, $p = .07$. However, the two-sample *t*-test on mean difference scores (the difference between individual scores on the pre- and post-tests) indicates a statistically significant difference between the online and classroom training conditions, $t(486) = 3.19$, $p = .002$. The mean difference score for the online condition was 2.44, while the classroom mean difference score was 1.62, where positive differences indicate a decline from the initial to retention test.

Summary

The results indicated statistically significant differences in mean difference scores between online and classroom training, such that the online participants fared slightly worse with regard to retention that their classroom counterparts. Online participants' scores declined an average of 2.5 questions from the first test after training to the retention test 4 months later while the classroom group declined an average of 1.5 questions. Another way to look at the results is to first think about where the two groups started and ended up, using the more familiar percentage grading scale used in many schools. Both groups performed about as well after receiving training, the online participant's mean score equates to a score of 83% while the classroom group received an 81%. Four months later, without reviewing content the online group's average mean score equates to a 71%, while the classroom group is 73%. Again, the difference in retention between the groups was found to be statistically significant, but the practical significance (if the

[1] Note that because of missing responses, the total sample size in any given analysis is not necessarily 498.

difference is meaningful enough to spur change in training content or delivery) appears minor and both groups retained much of the training content.

Differences in retention were found to vary by other boater characteristics (e.g., state requirement for course, boating frequency, role while boating, boat ownership) as well. For example, the participants taking the boating safety course voluntarily had higher post-test scores than the group taking the course as a state requirement. However, if the scores are converted to the percent correct grading scale, the difference is only about 2% (i.e., 73% and 75%). Again, differences exist, but those differences are slight.

In light of the findings of this study, change to course content, structure, or delivery is not warranted. Those changes would be spurred more appropriately based on the recommendations of the training participants, being the addition of training content for waterway navigation and consequences of alcohol usage while providing more interactive or scenario- and performance-based training opportunities.

ASSESSING KNOWLEDGE RETENTION FOR ONLINE AND CLASSROOM BOATING SAFETY COURSES

Table of Contents

Introduction **1**

Study Description **1**

Task 1: Develop a Comprehensive Work Plan and Conduct Kick-Off Meeting 2

Task 2: Review Content Knowledge Test and Questionnaires 2

Task 3: Conduct Data Collection 3

Task 4: Conduct Data Analysis and Interpretation 3

Task 5: Report Findings and Discussion 4

Research Findings **4**

Discussion and Summary **9**

References **10**

Appendix A. Initial Questionnaire and Retention Questionnaire **A-1**

Appendix B. Questions Used in Initial and Retention Tests **B-1**

List of Tables

Table 1. Participants' Ages 4

Table 2. Boating Frequency, Role, Skill, and Ownership 5

Table 3. Distribution of Participants by Certifying State 6

Table 4. Pre- and Post-Test* Average Mean Scores 6

Table 5. State Requirement for Boating Safety Course Average Mean Scores 7

Table 6. Number of Days Boating 8

Table 7. Boating Ownership Average Mean Difference Scores 8

ASSESSING KNOWLEDGE RETENTION FOR ONLINE AND CLASSROOM BOATING SAFETY COURSES

Introduction

The National Association of State Boating Law Administrators (NASBLA) is the professional association that represents the recreational boating authorities in each of the 56 U.S. states and territories and supports those authorities through the establishment of standards for boating safety and education. The NASBLA-approved courses, which meet the National Boating Education Standards, are designed to provide recreational boaters with the information necessary to make them safer boaters, while at the same time providing the mechanism for boat operator certification in those states that require it. The instruction includes content on seven boating safety standards that are common across all states, in addition to information that is unique to each state (e.g., tow line length, regulations for reporting accidents). The boating safety classes are offered by a variety of providers as either face-to-face classroom involving 6-8 hours of content delivery or online training opportunities of three or more hours.

Background

In 2008, NASBLA identified a need to investigate the efficacy of online boating safety courses that have been approved by NASBLA and a grant proposal on this topic was funded by the U.S. Coast Guard. The research question asked if there are differences between classroom and online courses with regard to knowledge retention after a four-month time period. However, due to changing delivery and presentation techniques within the online courses, the study was revised to investigate participant retention rates for the classroom training condition only in order to gather necessary baseline data (Deatz, Gossman, Kulp, & Trippe, 2010).

NASBLA, the United States Coast Guard, and HumRRO research staff agreed to revise the initial research question as follows: What is the level of knowledge retention among participants completing the boating safety training in a classroom environment (primary) and is knowledge retention differentially related to variables such as age, gender, level of boating experience, and geographic area (secondary)? Data collection was conducted in 2009.

Study Description

This current 2011 study is a follow-on effort to investigate the original research question: Are there differences between the retention of learning after completing either classroom (i.e., face-to-face) or online boating safety training?

The study design is pre-test post-test, where participants completed a 25-item knowledge test immediately after classroom or online training and again 4 months later. They also completed a short demographic questionnaire for both iterations. Participants in this study are volunteers, recruited from a population of those seeking boating certifications and training from agencies in selected states. After successfully completing the course, participants received information regarding this study and decided whether or not they would participate. Having

Internet access and an active email account (to be notified 4 months later to complete the questionnaire and test online) were the two requirements for participating in the study.

Incentives provided encouragement for participation in both studies. The incentives included a $10 gift card for everyone completing the study and automatic entry into a drawing for 20 inflatable life jackets ($100 value) and one $500 grand prize. Data collection lasted for 4 weeks starting the second week of July 2011 through the first week of August 2011.

The NASBLA and HumRRO research team selected states for the study based on two factors. First, states had to offer both classroom and timed online courses and second, participation was voluntary. The result was an initial list of ten states, of which the following seven agreed to support this effort: Illinois, Iowa, Oregon, Pennsylvania, Virginia, West Virginia, and Wisconsin. Timed online training is a type of training design that requires a minimum period of time a webpage containing training content is open before the next webpage is available to view. This style of online training was recently adopted by NASBLA for all courses. At this time, two online providers offered timed courses in the seven states.

Data used for analysis included participant initial and retention test scores, in addition to responses from survey questionnaires regarding age, gender, and various boating experiences.

Task 1: Develop a Comprehensive Work Plan and Conduct Kick-Off Meeting

The work plan consisted of two sections, the Technical Plan and Management Plan, and described how each task is accomplished, the project timeline, deliverables, and the collaborative effort between HumRRO, NASBLA, state agencies, and online course providers. HumRRO presented the plan and it was approved by NASBLA during the kick-off meeting between the two organizations in fall 2010.

Task 2: Review Content Knowledge Test and Questionnaires

This current 2011 study used the same test questions as the original 2009 study. NASBLA verified that the standards and training content remained unchanged and that the items were still part of the approved test item pool. This is an important consideration because it enables classroom data collected in 2009 to be used in this study. Additionally, several demographic questions remained the same, such as age, sex, reason for taking the boating safety course, boating accidents or citations, frequency of boating, and satisfaction with training. New demographic questions provide additional information regarding participant's boating skill, boat ownership, and role when boating.

We updated the HumRRO website with current introductory information and the new or revised demographic questions. Also, HumRRO revised the email text for the first, second, and third emails requesting participants complete the study. As with the original study, HumRRO's certified Institutional Review Board (IRB) reviewed the study design and documents.

Task 3: Conduct Data Collection

HumRRO conducted the data collection in two phases. The first phase lasted 4 weeks starting the second week of July 2011 through the first week of August 2011. The purpose of this phase was two-fold: to recruit volunteers from both the classroom and online training conditions and to administer the initial demographic questionnaire and 25-item content knowledge test immediately after they successfully completed the training course. The classroom volunteers completed a paper and pencil version of the demographic questionnaire and 25-item test. The state agency sent those documents to HumRRO for processing. It is important to note that both studies, 2009 and 2011, used the same process to collect data from the classroom volunteers. For the online training condition, course providers presented information regarding the study on a webpage, with a link to the HumRRO website for volunteers to complete the same initial questionnaire and 25-item test.

The second phase of data collection began approximately four months after participants completed their training by sending an email to the first of four weekly batches of participants requesting they click a link to complete the study and receive their incentive. Non-respondents received two additional reminder emails. HumRRO deactivated the website the morning of 21 December 2011 to begin data analysis and interpretation.

Task 4: Conduct Data Analysis and Interpretation

Data used for analysis included participant test scores from the initial and retention tests, as well as responses provided regarding age, gender, geographic area, and various boating experience characteristics. The data analyses included a mix of descriptive statistics (e.g., frequencies, means) and inferential analyses (e.g., *t*-test, multiple regression). Inferential analyses provide information on the likelihood that observed effects or relationships are due to sample specific characteristics (i.e., sampling error) or reflect true differences in the population. Statistically significant differences indicate that differences are unlikely to be due to chance sampling error.

The classroom data collected in the original 2009 study are merged with the data collected during this study. As described in earlier sections, the participants responded to the same 25-item test, the course standards and content remained the same, and the data collection process was the same. Differences between the two data collection periods are limited to the states that participated and time (2009 vs. 2011). The rationale for combining data is based on the fact that using 2011 data alone would result in analyses ill-suited to detect differences due to the small number of data points available for the classroom condition.

Prior to conducting data analyses, we cleaned the data file by examining the number of missing responses in both the initial and retention tests. If an examinee omitted more than five items, his or her score was set to missing. In addition, we set one participant's age to a missing value because the reported age was implausible and likely a typographical error.

A subscale analysis of test items was conducted in the first study to uncover any differences in scores based on participant responses related to the National Boating Education

Standards for test content. Since the test items and standards are the same for both studies, and the test items continue to be part of the approved item pool, this analysis was not repeated.

Task 5: Report Findings and Discussion

This section of this research report contains the research findings. The HumRRO project staff will present the study results at the Boating Law Administrator workshop in March 2012.

Research Findings

For the current study, 306 of the 562 initially recruited (92 classroom and 470 online) completed the study; resulting in a response rate of 54%. Of the 306, the classroom group contained 46 people and the online group contained 260. By combining the two studies (2009 and 2011), the classroom participants increased by 192 to 238, for an overall sample of 498[2].

Of the 498 participants in the sample, approximately 67% were male, which is similarly distributed within both training conditions. The overall average age is 37 with a wide range from 9 years to 82 years. Table 1 presents descriptive statistics on age by training condition. Regarding accidents or citations, no one reported having an accident in 2011 (2009 included two non-injury accidents) and only one person (in Virginia) received a citation, which was for an underage boat operator not having a boating safety certificate onboard.

Table 1. Participants' Ages

Training Condition	N	Mean	Standard Deviation	Range 9 – 82 years	
Classroom	238	40. 30	18.80	9	82
Online	257	33.77	15.52	10	72

Participants provided responses (multiple responses permitted) to questions asking why they took the boating safety course and what type of watercrafts they used. The results are reported in Table 2. In addition to the type of watercrafts participants used while boating, participants indicated how many days they boated since taking the course. Also included in Table 2 are the responses to three new questions asked in 2011 to improve our understanding of the participant's boating experience. The questions asked if the participants are typically a passenger or boat operator, what level best describes about their boating skill (novice, intermediate, expert), and if they use a boat they own, rent a boat, borrow a boat, or boat with someone who owns a boat.

[2] Note that because of missing responses, the total sample size in any given analysis is not necessarily 498.

Table 2. Boating Frequency, Role, Skill, and Ownership

Item	Responses	Frequency	%
Reasons for taking the course*	To become a safer boater	295	--
	State requirement	318	--
	Save money on insurance	49	--
	Other (e.g., work, Boy Scout merit badge, boat rental)	69	--
Watercraft used*	Canoe/kayak/raft	100	--
	Sailboat	22	--
	Personal Watercraft (PWC)	157	--
	Powerboats (less than 16')	63	--
	Powerboats (16'-25')	334	--
	Powerboats (26'-39')	55	--
Boating frequency	0 – Days	55	11
	1 – 5 Days	160	32
	6 – 10 Days	98	20
	11 or more Days	183	37
Boating role	Operator	168	55
	Passenger	137	45
Boating skill	Novice	167	55
	Intermediate	123	40
	Expert	16	5
Boating ownership	Boat owner	154	51
	Rents boats	16	05
	Boat w/someone who owns	119	39
	Borrows a boat	12	04

Note. *=Multiple responses permitted

Geographic data are reported in summary form only because the states supporting the study in 2009 and 2011 were different. Additionally, the 2011 classroom sample was too small (n=46) to detect differences between states and subsequently generalize to the population. Table 3 presents the number of participants by the certifying state and includes both 2009 and 2011 data (states are not listed separately with fewer than five participants). Participants indicated if they took the training for certification outside their resident state and if so, which state. Thirteen people indicated they did and are included in the certifying state's total.

Table 3. Distribution of Participants by Certifying State

State	Number of Participants
California**	25
Georgia**	14
Illinois*	15
Oklahoma**	21
Oregon***	63
Pennsylvania***	112
Tennessee**	32
Virginia***	137
Wisconsin*	53
Other (< 5, or missing data)	24

Note. *=2011 only; **=2009 only; ***=both years

The primary research question is to identify if differences exist in the knowledge retained after classroom or online boating safety training. We first looked for differences between online and classroom training at the time of the pre-test and again for the post-test. Two-sample *t*-tests indicate no statistically significant difference between the two training conditions for the pre-test, $t(494) = 1.29$, $p = .198$ and post-test scores, $t(488) = -1.81$, $p = .071$. However, a two-sample *t*-test of mean difference scores (the difference between individual scores on the pre- and post-tests) indicates a statistically significant difference between the online and classroom training conditions, $t(486) = 3.19$, $p = .002$. The mean difference score for the online condition was 2.44 and the classroom mean difference score was 1.62, where positive differences indicate a decline from the initial to retention test. Table 4 displays the average mean scores for participants in both groups and indicates that they scored nearly the same on the test administered immediately after training (20.64 vs. 20.29), or in other words, they both missed approximately 4.5 questions on average. When the test was administered after 4 months, the groups differed slightly more (18.21 vs. 18.72), although the difference was not statistically significant. The two-sample *t*-test on the difference scores did indicate significant differences between the online (at 2.44) and classroom (at 1.62). Although, the difference is small (less than one question) and may not be practically meaningful, it does encourage additional analysis to explain that difference.

Table 4. Pre- and Post-Test* Average Mean Scores

	Pre-Test	Post-Test
Online training	20.64	18.21
Classroom training	20.29	18.72

Note. *same 25 test items

The present study does not represent a true experimental design because we did not randomly assign individuals to either classroom or online course settings. Therefore, we cannot conclusively say that the observed statistically significant effects are due solely to the course setting because extraneous factors are not properly controlled. Nevertheless, we can implement statistical control of measured covariates to partially overcome this limitation. One factor that may be of some influence is the ages of participants who participate in online vs. classroom courses. Those who participated in the online course were significantly younger (M=33.8) than those who participated in the classroom course (M=40.3; $t(493)$=-4.30, p<.001). Additionally, we found a statistically significant relationship between age and retention as measured by the difference between initial and retention tests (r=-.11, p = .01). This correlation suggests that retention is slightly worse for younger participants[3]. Nevertheless, we found that course type continues to have a statistically significant effect (β = .12, p = .008) on retention when added to a regression model that contains age. Stated differently, statistically significant differences in mean retention exist between those who took the online and classroom courses even after controlling for the effect of age. Despite their statistical significance, these effects are practically very small and account for very little variance in difference scores.

Although two-sample t-tests indicate statistically significant gender differences for the post-test, $t(488)$ =-2.18, p = .030; there are no significant gender differences indicated for the pre-test scores, $t(494)$ =-1.18, p = .237) or difference scores, $t(486)$ = 1.04, p = .298.

Participants indicated that the most common reason for taking the course is because it is a state requirement. We examined potential differences between those mandated to take the course and those who were not. Two-sample t-tests indicate a statistically significant difference on the post-test scores between the mandated or not mandated group, $t(488)$ = 2.28, p = .023; however, the pre-test score, $t(494)$ = .78, p = .436 and the difference score, $t(486)$ = -1.64, p = .102, reflected no significant differences. The group voluntarily taking the course (no state requirement) had slightly higher scores and better retention than the group taking the course because of a state requirement (see Table 5).

Table 5. State Requirement for Boating Safety Course Average Mean Scores

	Pre-Test Score	Post-Test Score	Difference Score
No state requirement (voluntary)	20.60	18.85	1.79
State requirement (mandatory)	20.39	18.19	2.23

Participants selected one of four categories of boating frequency that best describes how many days they have boated since taking the boating safety training (see Table 6). We conducted an analysis of variance (ANOVA) to examine potential differences retention by boating frequency. A one-way ANOVA indicated significant differences among the four groups, F(3,

[3] Recall that positive difference scores indicate a decline from the initial to retention test.

484) = 3.04, p = .029. Post hoc tests determined the difference was found between Groups 2 and 4 (those who boated 1-5 days and those who boated 11 or more days) $F(1, 484) = 8.90$, p = .003.

Table 6. Number of Days Boating

Frequency of Boating	Group ID	Number of Responses
None	1	55
1 – 5 days	2	162
6 – 10 days	3	98
11 or more days	4	183

With regard to participants' role while boating (passenger or operator) a two-sample t-test indicated no significant differences for the pre-test, $t(303) = 1.14$, p = .257; post-test, $t(299) = 1.77$, p = .078; or difference scores, $t(299) = -0.56$, p = .574. A one-way ANOVA indicated no significant differences in retention by participants' boating skill (novice, intermediate, expert), $F(2,299) = 1.30$, p = .275. Another survey question involved the ownership of boats used by the participants since taking the boating safety course (see Table 2). A one-way ANOVA indicated significant differences in retention among groups, $F(3,297) = 4.52$, p = .004. Post hoc comparisons revealed significant differences between Groups 1 and 3 (boating with someone who owns a boat and boat owner, respectively), $F(1,297)=7.24$, p = .008 and between Groups 3 and 4 (boat owner and a boat renter, respectively), $F(1,297) = 8.69$, p = .004. See Table 7 for average mean difference scores.

Table 7. Boating Ownership Average Mean Difference Scores

	Average Mean Difference Score
Boat owner	1.76
Rents boats	3.81
Boat w/someone who owns	2.63
Borrows a boat	2.67

Finally, satisfaction with the boating safety course was very positive, with 96% responding with either the "satisfied" or the "somewhat satisfied" rating options. Only two people (one classroom and one online) responded with the "dissatisfied" rating and both provided a similar comment, that the training was too long. Participants responded to a question asking if training should include more emphasis on age related issues (e.g., youth, seniors), most indicated "no." Of the 61 indicating "yes," comments suggested age-focused content on waterway navigation and courtesy, alcohol consumption, and speeding. Other suggestions to improve training in general include rescue and first aid, more interactive or hands-on opportunities (e.g., using a fire extinguisher, navigating near locks or dams, fueling and pumping out), anchoring in the wind, and receiving a reference manual at the end of the course.

Discussion and Summary

The results indicated statistically significant differences in mean difference scores between online and classroom training, such that the online participants fared slightly worse with regard to retention that their classroom counterparts. Online participants' scores declined an average of 2.5 questions from the first test after training to the retention test 4 months later while the classroom group declined an average of 1.5 questions. Another way to look at the results is to first think about where the two groups started and ended up using the more familiar percent correct grading scale used in many schools. Both groups performed about as well after receiving training, the online participant's mean score equates to a score of 83% while the classroom group received an 81%. Four months later, without reviewing content, the online group's average mean score equates to a 71% while the classroom group is 73%. Again, statistical significance was found, but the practical significance (if the difference is meaningful enough to spur change in training content or delivery) appears minor and both groups retained much of the training content.

Differences in retention were found to vary by other boater characteristics (e.g., state requirement for course, boating frequency, role while boating, boat ownership) as well. For example, the participants taking the boating safety course voluntarily had higher post-test scores than the group taking the course as a state requirement. However, if the scores are converted to the percent correct grading scale, the difference is only about 2% (i.e., 73% and 75%). Again, differences exist, but those differences are slight.

As mentioned in earlier sections, the design of the present study must be kept in mind when interpreting the results. A true experimental design, in which a relatively large number of participants are randomly assigned to either online or classroom courses, would ensure that extraneous factors (e.g., age, race, socioeconomic status, education) are properly balanced in the comparison groups. Implications of the design are that we cannot *conclusively* rule out the fact that other factors related to the manner in which participants are distributed across course conditions are responsible for the findings presented here. However, factors that can reasonably be controlled (e.g., the similarity between course design and content, the study offer or requirements, assessments) were comparable between the online and classroom conditions.

That said, and in light of the findings of this study, no change to course content, structure, or delivery is warranted. Any such changes would be spurred more appropriately based on the recommendations of the training participants: the addition of training content for waterway navigation and consequences of alcohol usage while providing more interactive or scenario- and performance-based training opportunities.

References

Deatz, R. C., Gossman, J. R., Kulp, G. R., & Trippe, D. M. (2010). *Efficacy of Online Boating Safety Courses: Retention Study* (FR-10-23). Alexandria, VA: Human Resources Research Organization.

Appendix A.
Initial Questionnaire and Retention Questionnaire

This appendix includes two questionnaires: The Initial Questionnaire and the Retention Questionnaire.

Initial Questionnaire (Questionnaire 1)

Name: _____

Mailing Address: _____

Phone Number: _____

Email Address: _____

Age: _____ Sex: Male ___ Female ___

Boating Skill? Novice __ Intermediate__ Expert __

Is this the first time you have taken this boating safety course? Yes ___ No ___

Did the course cover the information you need to be a safe boater?
Yes___ Somewhat ___ No___

Why did you choose to take this course? (Check all that apply)

- ❑ To become a safer boater
- ❑ State requirement
- ❑ Save money on insurance
- ❑ Other _____

Retention Questionnaire (Questionnaire 2)

1. Four months ago you took a Boating Safety course either online or in a classroom. Did you take the test in the state where you live?

    a. Yes, I took the boating safety course in the state where I live.
    b. No, I took the boating safety course in this state _____.

2. How many days have you been boating since you took your boating safety course?
    a. None
    b. 1-5 days
    c. 6-10 days
    d. 11-15 days
    e. 16-20 days
    f. 21-30 days
    g. More than 31 days

3. Which of the following do you do the most when you are boating?
    a. Operate the boat
    b. Passenger while someone else operates the boat

4. Indicate the type(s) of boat(s) that you have used since you took your boating safety course. Select all that apply.
    a. Canoe or Kayak
    b. Personal Water Craft (PWC)
    c. Sailboat
    d. Bass Boat
    e. Ski Boat
    f. Pontoon
    g. House Boat
    h. Other (If Other, *"Please describe."*)

5. Which of the following best describes your situation when you are boating? Select only one.
    a. Own the boat
    b. Rent the boat
    c. Boat with someone who owns a boat
    d. Borrow someone's boat

6. Have you been involved in a boating accident since you took your boating safety course?
    a. No
    b. Yes (If Yes, *"Please provide additional details such as the cause, if you were a passenger or operator, any injuries or fatalities, and damage to boat."*)

7. Have you been issued any boating citations/violations since you took your boating safety course?
    a. No
    b. Yes (If Yes, "*Please describe what it was for and if you were a passenger or operator.")*

8. How satisfied were you with the boating safety course that you took?
    a. Satisfied
    b. Somewhat satisfied
    c. Neither satisfied or dissatisfied
    d. Somewhat dissatisfied
    e. Dissatisfied
        (If answer is "d" or "e", "*Please tell us why.")*

9. Should information be included, or receive more emphasis, in the boating safety course that targets issues unique to age groups such as youth (teens), young adults, or seniors?
    a. No
    b. Yes (If Yes, "*Please tell us what information is missing or should have more emphasis during training.*")

10. Please list any other topics, information, or presentation methods that you would want included in future boating safety courses. (open ended)

Appendix B.
Questions Used in Initial and Retention Tests

This appendix contains the questions (from the NASBLA-approved item pool) used in the initial and retention tests.

Directions: Please circle the correct option for each question. If you make a mistake, please erase or scratch completely through your incorrect answer so that only the correct answer is circled.

1. Registration numbers on the forward half of the boat must be at least how many inches high?

a. two
b. three
c. four
d. five

2. When selecting a PFD, what should be the most important consideration?

a. size
b. price
c. color
d. uniformity

3. A float plan should contain what information?

a. a pre-departure checklist
b. a national weather service storm listing
c. Coast Guard emergency radio frequencies
d. a date and time to contact the authorities

4. What is the USCG-approved meaning of "serviceable condition" for PFDs?

a. straps and zippers work
b. proper size and fit
c. the ability to turn a person face up
d. must be within easy reach

5. How many fire extinguishers are required aboard an 18-foot powerboat with installed fuel tank(s)?

a. none
b. one
c. two
d. three

6. What does the letter "B" on a B-1 fire extinguisher indicate?

a. the type of fire it is designed to extinguish
b. the size of the extinguisher
c. the capacity of the extinguisher
d. the type of extinguisher mount to be used

7. What is the minimum number of minutes you should run the blower after refueling?

a. one
b. two
c. three
d. four

8. In what part of the boat are gasoline fumes most likely to accumulate?

a. bow
b. stern
c. bilge
d. cockpit

9. What safety precaution should you take while filling the fuel tank of a gasoline-powered boat?

a. open all doors, windows, and portholes
b. keep engines, motors, and fans turned off
c. keep a water hose running to flush away any spills
d. only allow smoking downwind of the fueling

10. When can a Navigation Rule be overlooked?

a. when operating in less than 50-feet off shore
b. in good visibility during the day
c. if necessary to avoid immediate danger
d. in calm waters and clear weather

11. To stop the spread of aquatic nuisance species, when is the best time to clean your boat?

a. before you leave home
b. when you get back home
c. before leaving the ramp area after boating
d. prior to launching at a different waterway

12. What is the proper technique for anchoring?

a. over the stern.
b. from the bow.
c. over the port side.
d. from the starboard quarter.

13. A boat operating in a narrow channel is required to keep as close as is safe to what side of the channel?

a. starboard side
b. port side
c. leeward side
d. windward side

14. The USCG requires which type of fire extinguisher to be on-board a PWC?

a. Type A
b. Type B
c. Type C
d. Type D

15. What is the purpose of the safety lanyard on a PWC?

a. to keep a throwable PFD from falling overboard
b. to keep the operator from falling overboard
c. to secure the PWC to its trailer to prevent theft
d. to shut off the engine if the operator falls overboard

16. Which is a characteristic of low head dams?

a. They pose hazards both above and below dams.
b. They pose few hazards to inboard-powered boats.
c. They may be crossed safely at a 45-degree angle.
d. They usually have strong currents just above them.

17. Regulatory and informational markers are easily identified through which features?

a. vertical black and white striping
b. triangular shape and red lettering
c. yellow square or triangular symbol
d. white color with orange geometric shapes

18. Under which conditions do most boating accidents occur?

a. during late evening or nighttime rain
b. during sudden lightning or thunderstorms
c. during calm, clear weather with light winds
d. during rough water with strong winds

19. If you are in a boating accident involving an injury requiring medical attention, whom must you notify?

a. your marina owner
b. your insurance agent
c. the U.S. Coast Guard
d. the state boating authority

20. What should you do if your boat capsizes?

a. swim for shore
b. stay with the boat
c. swim toward the last vessel you passed
d. tread water to reduce the risk of hypothermia

21. According to the Navigation Rules, what factor should be considered in determining a safe speed?

a. the amount of fuel
b. the state of visibility
c. the maximum speed of the vessel
d. the number of passengers

22. Which of the following is the major cause of fatalities involving small boats?

a. being run over by large boats
b. being swamped by waves and sinking
c. falling overboard and drowning
d. loading the boat with too many people

23. Where should you aim a fire extinguisher's stream when extinguishing a fire?

a. At the top of the fire and use little motion.
b. At the center of the fire and use a circular motion.
c. At the edge of the fire and use a rapid motion.
d. At the base of the fire and use a sweeping motion.

24. According to the Navigation Rules, what is the give-way vessel's responsibility?

a. to maintain course and speed
b. to take early and substantial action to keep well clear
c. to use hand signals to communicate to the passing vessel
d. to keep astern of the other vessel

25. While water skiing, what is the preferred form of communication between the skier and the observer?

a. hand signals
b. verbal commands
c. rope signals
d. water ski positions