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THE EFFECTS OF EXPERIENTIAL LEARNING WITH PLAYFULNESS IN THE ADULT EDUCATION CLASSROOM

A Dissertation in

Adult Education

by

James T. Spaulding

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The dissertation of James T. Spaulding was reviewed and approved* by the following:

Patricia Cranton
Professor of Adult Education
Dissertation Advisor
Chair of Committee

Edward W. Taylor
Associate Professor of Adult Education

Kathryn W. Jablokow
Associate Professor Mechanical Engineering

Roy B. Clariana
Professor of Education, Instructional Systems

Gary W. Kuhne,
Associate Professor of Education, in charge of Graduate Program in Adult Education

* Signatures are on file in the Graduate School
ABSTRACT

Adult learning practices that incorporate experiential learning and playfulness promise greater learner involvement and engagement, produce better results than teaching-to-the-test lectures and presentations, and represent a major opportunity to improve adult learning. The author developed such an adult learning activity for an adult Safe Boating class.

This study used this playful adult learning activity (PALA) to experimentally compare learning experiences between PALA and Control classes with eighty-nine (89) subjects who volunteered from a population of boaters in the North East United States. Using surveys, quizzes, and interviews, this longitudinal mixed-method study spanned three contacts with subjects over an average of 131 days, including transfer of learning to real-world boating experience.

Results show that the PALA is significantly more effective for learning and retention than presentation alone, but it was even more effective for less experienced boaters. This study examined the value of playfulness beyond the classroom, and the subjects testified to outcomes such as greater confidence, improved awareness and perception, and a more safety-conscious attitude, often tied to a more interactive and socially-aware relationship with family, friends, and others. The findings suggest other benefits from PALA for most groups in the population.

This study addresses a lack of experimental studies of playfulness and experiential adult learning in the literature. It suggests a need for changes and extensions to theoretical models along with a need for more research into playful adult learning activities. It recommends that experiential learning with playfulness should be widely adopted for safety, compliance, and certification training.
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CHAPTER ONE: INTRODUCTION

This chapter provides an overview of the significant needs for safety, compliance, and certification training in the 21st century, along with the background of this study. This helps frame the two-fold purpose of the study and the research questions to better understand the role of playfulness in adult learning and the advantages of a Playful Adult learning Activity (PALA) as a classroom technique for promoting boat safety. It discusses the conceptual framework as experiential learning melded with adult playfulness, and provides an overview of the planned mixed-methods longitudinal study. In addition, this section provides a problem statement, the significance of the study as well as definitions, assumptions, strengths and limitations.

Significant growth in adult training and certification programs in the 21st century is likely with the increasing complexity of laws, regulations, processes, technology and interdependencies between disciplines and systems. For example, the International Organization for Standardization lists over 17,000 standards and publishes 1,100 new ones yearly (International Organization for Standardization, 2008). Standards often require training so that organizations can comply, and the level of expertise demanded as an outcome of such training grows with the complexity of systems and procedures. Compliance with a broad range of regulations and standards demands continuous updating of such knowledge for all levels of workers and professionals. This has become such a challenge that most government departments, such as the US Department of Labor (USDOL) have an office and website dedicated to safety, compliance, and certification training (Office of Compliance Assistance Policy, 2008).

The need for more effective training is shown dramatically by growing numbers of errors and accidents in work, home and travel. Since operator error contributes to accidents, transportation, including air, rail, marine, auto, and others is in particular need of better adult
training. Over 40,000 Americans died last year in auto accidents and more than 3,000,000 were injured, while 6,000 died in industrial accidents with 4,000,000 reported injuries (some minor) (Bureau for Labor Statistics, 2008). A website at Occupational Safety and Health Administration (OSHA) indicates the scale of such undertakings in modern society. OSHA lists 184 topics on which they offer at least a trainer-training course. For example, Standards for the Maritime Industry describes twenty-eight scheduled courses at diverse sites in twelve-months.

Even as people try to relax, accidents plague their complex life style. In 1995, over 5,000 boating-related deaths and more than 25,000 injuries were reported in the US (Smith, 1998). Alcohol was involved in 31 percent of boating fatalities, and 84 percent of boating fatalities occurred when the operator had no boating safety course (U.S. Coast Guard, 2006). A key problem is the attitude that safety is 'no big deal' and boating 'is just fun' (Spaulding, 2007). A survey found that unsafe boating practices are probably due to reduced risk perception and poor boater training programs (Bell, Howland, Mangione, & Senier, 2000). They recommended improving boating safety by a change in boaters’ attitudes with higher quality training.

Some training practices tend to be more learner-oriented and encourage learner involvement and engagement. Such techniques may produce better results in retention and transfer to real-world environments, which is a major issue in compliance and safety training. Perkins and Salomon (1988) conclude that, “students often fail to apply knowledge and skills learned in one context to other situations. With well-designed instruction, we can increase the likelihood that they will” (p. 9). The bottom line is that better training, that transfers more effectively to the real-world, will make a difference in all these situations.

This suggests designs for safety training techniques that are tailored to the audience, setting and environment as an experiential learning activity. John Dewey and others assure us
that Experiential Learning (EL) is the most effective learning technique for skills and real-world transfer. According to Smith, (2005) Kolb’s concept of EL is a “direct encounter with the phenomena being studied rather than merely thinking about the encounter, or only considering the possibility of doing something about it” (p. 1). EL describes the sort of learning undertaken to acquire and apply knowledge, skills and feelings in an immediate and relevant setting and to describe “education that occurs as a direct participation in the events of life” (Houle, 1980, p. 221). Classroom activities often fit such adult learning requirements.

It is imperative that learners in safety training classes are sensitized to danger recognition and safety awareness: the ‘change in attitude’ sought by instructors. One response is to use role-playing and simulation for consciousness-raising and transformative experiences (Cranton, 2006). Simulation learning is situated and embodied learning as simple as role-play and as complex as computer simulation with virtual worlds. Simulation training creates vastly improved results in transfer to the real world, and is quite successful in the aircraft and marine industries and the Department of Defense. They developed the technologies and proved its effectiveness, efficaciousness and real-world transfer (Miller, Saxe, & D'Amico, 1985).

Expensive technologies may be impractical for some training, but the principles behind them can be integrated into activities such as role-plays, that are less demanding of resources but use valuable aspects of situatedness and embodiment in the learning environment. As Goodwin and Goodwin (2000) explain “Crucial components of the cognitive activities in progress are located in the setting and in the performed actions of participants' bodies” (p. 8). Wlodkowski (1999) also tells us that “When learners imagine or enact the physical and emotional properties of an idea, the concept becomes more salient and engaging … Using images and the physical senses to experience ideas makes them more directly compelling and enhances their emotional
associations” (p. 236). As we develop simulations or role-plays, we are aware of the physicality of learning, and use that awareness to fully engage the adult in the learning activity.

Playfulness is an attitude or disposition that assists development, promotes work satisfaction and productivity, and is often seen in social groups (Staempfli, 2007). Although it is generally not encouraged in adult teaching, playfulness seems to spark interest, evoke cognitive resources and assist adults to learn better. It may also strengthen the learning process, enhance quality and retention and improve likelihood of transfer (Rieber, 1996). These writers seem to suggest that adult playfulness in conjunction with experiential learning activities strengthens learning, enhances quality and retention, and improves the likelihood of transfer to the real world. Unfortunately, the literature offers little guidance in the conceptualization and design of playful activities for the adult classroom, and indicates a lack of empirical research.

Purpose

The purpose of the study is to investigate the role of playfulness as a factor in instructional design and the efficaciousness of playfulness in outcomes associated with experiential learning in the classroom. The goal is to determine the value of incorporating a Playful Adult Learning Activity (PALA) into a course in lieu of teaching the same content by lecture / presentation alone. This training includes day and night operation of vessels in coastal waters and learning and applying the Rules of the Road, Lights and Nav-Aids. Following the introduction of a PALA into standardized certification courses, this study explores the experiences of learners, evaluates the benefits in the classroom and in transfer to the real world, and examines playfulness as of experiential learning in the classroom.
Research Questions

The hypothesis guiding this study is: *A PALA in a boating safety course affects learner confidence, motivation, and competency during and following the course, and is affected by boating experience after the course.*

Two general questions in this study are: *How does a PALA compare with lecture / presentation in classroom learning?* and *How does a PALA and playfulness affect adult learning during and after class?*

These two questions can be expressed in more specific ways to help design of the inquiry process with a particular interest in the differences between the experiences, reactions, stories, outcomes and survey and quiz results of the participants who used a PALA and those who did not (controls), as we try to answer the following related questions.

1. Does a PALA in a boating safety course have a positive impact on the ability of learners to answer Nav-Rules, Aids and Lights quiz questions after the course?

2. What significant effects does the PALA have on different subjects’ confidence, motivation, and competency during and after a course compared to controls?

3. What personal changes do subjects identify as a result of their learning experiences during and after the course?

4. What outcomes do participants identify from the course and PALA? How long do PALA effects last with and without real-world experience? How well do PALA effects transfer to the real world?

5. How does the effect of the PALA differ for different population?
Conceptual Framework

Accepting a foundation of constructivism and informed by a pragmatic approach to theory, this study uses Experiential Learning (EL) as a conceptual framework. EL is seen as a result of engagement, physical activity and participation as a member of an adult learning group in a situated metaphor of a specific world of interest. The setting incorporates physical and abstract learning objects and procedures needed to support an outcome-based plan to encourage understanding and meaning-making, with knowledge retention and transfer to the real world. The learning experience, whether real or simulated, produces an individual ‘story’ internalized as a memory which may become part of a group story or narrative that can be shared with others as experience and learning.

Kolb (1984a) proposed an experiential learning model that suggests that knowledge is created through grasping and transforming experiences as the basis for observation and reflection, which are assimilated and distilled into abstract concepts from which implications for action and experiences are drawn. As powerful as this model is, it seems that imagination, emotion, and social meaning play a major role in adult learning, and are important because they can impede or assist learning. Bandura (1977) describes social interaction as a key facet of learning by experience, and Dirkx (2001) tells us that “Personally significant and meaningful learning is fundamentally grounded in…the adult’s emotional, imaginative connection with the self and with the broader social world” (p. 65). Wlodkowski (1999) tells us that “emotion is critical to learning” (p. 9). Involvement of a group changes the interaction as Goodwin and Goodwin (2000) explain, “Cognition is not lodged exclusively within the head of an isolated actor, but instead within a distributed system, one that includes both other participants and meaningful artifacts“ (p. 8). This is also compatible with Smith’s (2005) description of EL as
learning to acquire and apply knowledge, skills and feelings in an immediate and relevant setting. Lave (1988) suggests learning is naturally tied to authentic activity, context, and culture. Discussing theories of embodied and situated cognition, Rambusch (2008) says that human thought and action are situated, quoting “what people perceive, how they conceive of their activity, and what they physically do, develop together” (Lave, 1988, p. 21). If these authors are correct, then the affective and social domains can be integrated into an EL model.

Wilson and Beard (2003) relate EL to the nature of cognition through an experiential learning model based on information processing. Their model is a satisfactory representation of individual EL process, and most of the processes are familiar in the literature. First, the stimuli may be caused by external elements such as the objects and people around us. Stimuli may also occur internally and include the feelings of being hungry, thirsty, or perhaps the pain from a migraine, etc. In the second stage, the senses of sight, touch, hearing, smell, and taste become aware of the stimuli. Third, the stimuli are filtered to focus on factors which are more important. This filtering depends upon such factors as previous knowledge and experience, emotions, our concept of self, the loudness and intensity of the stimulus, location, and personal needs. The fourth stage involves interpreting the experience. We ignore it if it confirms an existing schema, or if it surprises us, we may choose to accept the new information, or to modify, construct or reconstruct our mental frameworks and adapt it to the new information. It may be ignored if it is too alien to expectations or the perception of the world. The last stage involves one or more responses to an interpreted stimulus. We may think about a response (cognitive), we may dislike the way in which we are directed (affective); and physically respond (behavioral). The responses may be recycled to evaluate the stimulus further or disregard it. "Interpretation begins where perception ends. What perception leaves for interpretation to complete depends drastically on the
nature and amount of prior experience and training” (Kuhn, 1970, p. 198). This model tends to focus more on the front-end data interpretation rather than meaning making, but for the purposes of this study, this an EL model seems suitable to support the data collection and analysis process.

Experiential learning seems to be the core from which humans have evolved powerful learning capabilities. Boud, Cohen, and Walker (1993) argue it is: “Meaningless to talk about learning in isolation from experience… it is the central consideration of all learning” (p.8). I suggest the learning process evolved and diversified over millions of years, and we became better at learning by using ways to trick our need for real experience so that we can learn in less risky and less expensive circumstances than demanded by experience only. Animals and humans do this when young by playing in pseudo-real experiences which build stories of experience for the maturing animal to eventually supplement with real experiences with significant survival value (Burkhardt, 2005; Cohen, 1993; Ellis, 1973).

The essence of experiential learning is in the story we create in our memories, which we can review or reflect on for the rest of our lives. We interpret and retell it as new events provide new ways to re-examine past experiences. An evolutionary trick is expanding communication through narration. By rephrasing a story in language with conceptual, verbal and physical elements, it becomes more useful to us and to the community. More evolutionary steps perhaps included playful representation of popular stories as staged plays, dances, music, drawings and carvings, enhancing the narrative recreation and social acceptability and assuring its retelling. After millennia of refinement with formal languages, writing and graphical representation, stories become the basis for art and culture (Callois, 2001; Huizinga, 1950).

Play is an engaging activity, but is hard to define, even though we all know it when we see it or do it. For this study, adult playfulness is defined as a catalyst for learning is as follows:
Playfulness is the emotional disposition which supports a self-effacing view of the individual and permits a person to exhibit fun, mirth and jocular interaction with others in a group. The resulting environment permits the participants to experiment and make mistakes with the assurance that learning errors are accepted and shared by the group in a constructive and reassuring fashion, supported by framing cues such as smiling, laughing, giggling, joking and mock admonishments that permit the group to interact while protecting each member from dis-incenting reactions.

Huizinga (1950) warns us to avoid over-defining play, “They attack play direct with the quantitative methods of experimental science without first paying attention to its profoundly aesthetic quality. In this intensity, this absorption, this power of maddening, lies the very essence, the primordial quality of play” (p 3). Play is seen as having four attributes: 1) it is usually voluntary, even if initiated by others; 2) it is intrinsically motivating, that is, it is pleasurable for its own sake; 3) it involves some level of active, often physical, engagement; and 4) it has a make-believe quality. Play is an essential ingredient in our personal and social development and important to all forms of learning (Gee, 2007; Piaget, 1962; Rieber, 1996; Vygotsky, 1966). Playfulness is an attitude or internal disposition that sparks interest, evokes cognitive resources and helps adults learn better in less time. Playfulness may strengthen the learning process, enhance the quality and retention of learning and improve likelihood of transfer. With a playful attitude, adults are more inclined to embrace challenge, better equipped for failure and opposition, and more likely to find original and novel solutions (Rieber, 1996).

Research on adult playfulness and learning is almost non-existent outside of psychology and computer science, where this search for a theory for playfulness in learning must wander. Csikszentmihalyi’s (1990) concept of Flow, or the psychology of optimal experience, is familiar but less familiar is the large body of work done on ‘serious games’ and Micro-Computer
Playfulness in the last fifteen years. For example, Wosczynski, Roth, and Segars (2002) borrowed from other disciplines to relate states and traits to playfulness to synthesize a model of a network of constructs around playfulness in computer interactions. Trait influences are captured from the Big Five theory of personality and microcomputer playfulness, while state influences are borrowed from Flow theory. They suggest “there is an important emotional component of flow that denotes an intrinsic enjoyment of the activity in and of itself” (p.9). There is also a meta-model called the Learning Combination Lock (LCL) from Wilson and Beard (2003). They tie experiential learning to cognition through a model based on information processing, which is then used as the basis for the design of their meta-model. The LCL model offers a systematic process for a trainer, educator, or developer to consider and select ingredients of the learning process, including emotions and perhaps even playfulness. While none of these satisfies the need for a holistic theory, together they represent many of the factors needed in such a theory. From this foundation we can extend ourselves into the more comfortable design of adult learning activities build around playfulness.

When the learner group accepts a social commitment to ‘play around’, the individual is safe in dropping inhibitions, suspending credibility, nullifying skepticism and rejecting seriousness to join in playful learning. This state can be described using the concept of FLOW (Csikszentmihalyi, 1990) as a group mental phenomenon that seems like what emerges. Polaine (2005) examines case studies in which the flow principle is applied to interactivity and shows that engagement may begin and end with playful experiences that are satisfying in their own right. With this conceptual framework, this study can examine the ways all these elements work together with real people in a real world (Rambusch, 2008).
Background of the Study

In addition to teaching adult students in a number of certificate programs, I am a qualified boating instructor and the Squadron Education Officer of the local Power Squadron. Based on my experience, compliance and safety course instructors like easy-to-use outcome-oriented adult learning activities that complement and supplement teach-to-the-test techniques. These educational tools are tailored to setting, audience and content and are situated in a particular context which enables the learners to become intimately involved (embodied) in the physical aspects of the learning. Instructors often create such tools to be easy-to-use, inexpensive and effective classroom activity that they believe will help the learners.

A Playful Adult Learning Activity (PALA) was conceptualized as a role-play situated in a learner group in a contextually relevant micro-world. The short role-play incorporates a collection of easily positioned or wearable artifacts of the contextual world that is being simulated. This collection represents learning objects, assembled into props and rules which can be embodied into the context immediately by the adult learner’s mind. The learner decides how to use and play with the objects, with no directions or rules other that those inherent in the context. Prompted by the physical and procedural elements of the PALA, a group of learners create a micro-world of a specific environment with a few cognitive clues and exploit that context for learning purposes driven by their own playfulness and engagement.

A PALA was designed for day and night operation of a vessel in coastal waters including hard-to-learn content of the Rules of the Road, Lights and Nav-Aids. Essentially, the classroom becomes a harbor and boating area with a few ‘Nav-Aids’ or markers, and the learners become boats by wearing a boat-like prop with a horn and lights around their waists. A twenty-minute activity followed by discussion creates a memorable learning experience on the content.
An action research study in the spring of 2008 refined this classroom exercise that incorporates adult playfulness into an integrated package of props, rules and training that contributes to the learning experience. Initial reactions from instructors and learners are very positive, and the PALA can be used as an experimental intervention to examine playfulness in the adult classroom. A considerable amount of work was done developing the PALA to refine and establish the procedure and the activities and those studies are not a specific part of this study. However, the confidence in the PALA is high and a key assumption is that the PALA is a suitable intervention, offering experiential learning with a focused process to induce playfulness into the group and the learners in a very effective and socially acceptable fashion.

This study follows the introduction of Playful Adult Learning Activities (PALA) into standard Boating Safety courses, explores the learning experiences of boaters attending those courses, and evaluates the benefits of the PALA training as a classroom practice. It uses a mixed-mode methodology to examine the effects of the PALA and playfulness on learning quality, retention and transfer in a longitudinal study in the spring-summer of 2009 in cooperation with the United States Power Squadrons (USPS). The proposed study is the terminal study of a four-phase research program starting with the design of a PALA in 2007 and followed by: Phase One - PALA Design Action Research Study (Spaulding 2008a); Phase Two - Pilot Study (Spaulding 2008c); Phase Three – (Experimental Intervention during roll-out of PALA); Phase Four (final study of research project and longitudinal data collection).

Research Methodology

The methodology for the study is built on a framework of pragmatism. The experimental intervention precedes a mixed-method multi-stage longitudinal parallel data collection supported
by a mixed-methods analysis. This study has the advantage of a pilot program (Spaulding 2008d) to help inform data collection and analysis, so it seems more expeditious to use a concurrent data collection design approach which incorporates surveys, quizzes and interviews into each of three Data Collection cycles (DC0-Enrollment, DC1- Early season, DC2-late season).

The hypothesis guiding this study is: “A PALA in a boating safety course will have a positive impact on the confidence level and the ability to answer exam questions after the course, and for some period following the course and will be affected by the on-the-water experience after the course.” USPS boating Safety courses provide a study opportunity that assures reproducible high-quality classes with standard content and evaluation techniques. The Rules of the Road PALA is designed for this environment and was refined and enhanced in an Action Research program in 2007-2008 (Phase 1). The PALA covers some of the same content as a standard presentation by an experienced instructor. The PALA is highly structured with specific steps, course materials, instructor guides and standardized props, and was reviewed and approved by educational officers of the USPS. It was well-received by students and instructors, and it appears to have positive benefits based on these assessments (Spaulding, 2008c). As a controlled experiment, the only new element is the PALA and its use as an intervention tool.

The fairly homogenous class population has a detectable degree of variability of location and activity focus. Since the PALA is specific in its intent and scope, the only difference the PALA made to the curriculum is additional learning reinforcement which should be detectable with minimal effort and assessment tools. A degree of confidence in it as an intervention tool in an experiment seems reasonable and justified and was pre-validated in a Pilot Study (Phase 3) performed in the fall of 2008 (Spaulding, 2008c).

This study also seeks to understand the experience of learning and playfulness in the
PALA. This “description” is in the form of the learners' and instructors' understanding of the phenomena, the students’ perceptions of the after-effects, and the researcher’s observations about the phenomena. This study is not seen as a statistically rigorous large-scale experiment, but rather a practical investigation of a useful tool, so the standard of acceptance is to demonstrate credible outcomes which will satisfy instructors and administrators in the use of such practices. By this standard, confirming positive effects might be affirmative since there is confidence based on the benefits to the overall course, class flow and learner and instructor enthusiasm. In this regard, my analytical approach is pragmatic as Pierce (1868) says, “Reasoning should not form a chain which is no stronger than its weakest link, but a cable whose fibers may be ever so slender, provided they are sufficiently numerous and intimately connected” (p. 141).

This parallel-group (e.g. PALA and Control) longitudinal (e.g. 2-3 contacts with each participant) mixed-methods study with quizzes, surveys, and interviews, examines and evaluates the efficaciousness of a PALA using mixed-mode data analysis techniques. The preceding Phase 3 roll-out study enrolled 12 instructors and 113 learner participants who operate as the active and control groups for this experiment. All instructors and 89 participants were contacted with surveys, quizzes and interview questions in telephone contacts with the researcher in three data collection cycles as follows: DC1 – Instructor’s class report, DC0 - Participants enrollment, DC1 - Early-season telephone contact (May-June), DC2 - Late-Season telephone contact (July-Aug).

All results were tabulated as days since intervention (DSI) of reporting-date minus intervention-date. This provides snap-shot samples of a credible individual retention curve, corrected by experience and application. Comparing the survey, quiz and interview results of participants and controls helps identify relevant differences of learning retention and transfer. The interviews were analyzed to help refine and categorize demographic data and explain
individual quantitative data, identifying outliers by relevant characteristics, phenomena, or events. Analytical techniques triangulate major points in a fashion that was appropriate to the source and confidence associated with the original data.

Significance of the Research

This study may substantiate the confidence that practitioners have in the design embodied in the PALA by tying outcomes to the activity, which may encourage use of the PALA and improve training outcomes in boating safety, transportation, compliance and certification training. This also informs the design specifications of adult classroom activities and helps ground classroom practice in a tangible outcome-based framework. Ultimately, it provides data which might influence development of a theoretical framework for adult play in the classroom and address a gap in the research literature with long term significance.

Further, this study seeks to describe the learning impact of playful activities in the adult classroom, while affording confidence that it applies to a broader range of applications in transportation and certification training. The results help clarify the factors involved in adult understanding, retention and transfer by blending participants’ perceptions and researcher’s observations. This helps identify and understand the mechanisms at work in adult learning and serves as a stronger foundation for further studies. It is significant on a practical level if it helps validate the intuitive insights that teachers make every day in the design of learning activities. Potentially, knowing that this activity improves outcomes of training is helpful in planning and development of training activities, thereby enhancing the outcomes. It helps clarify rules of design and practice which expands the effectiveness and confidence of teachers, so the benefit may be significant. In the best case, benefits accrue to instructors and learners with adoption of
the design principles of the PALA by other practitioners and into other applications in safety and certificate training. Ultimately, it provides data to inform a theoretical framework for adult play in the classroom and address a gap in the research literature. Most importantly, it helps bring play back into adult education. In a sense we should not struggle to prove the value of play, which is obvious, but rather ask the obverse: Why we are not using play?

Studies of adults in workplace, leisure, personal relations and psychology literature have documented many benefits associated with play and playfulness, however, there is little that explores play and playfulness among adults in learning. The potential benefits of play and playfulness in the adult learning classroom have not been explored. This study will address this gap by seeking to identify how instructors may integrate play/playfulness into their classrooms. The findings of this study may inform further studies of specific benefits and techniques of play in the classroom in a range of applications. It also contributes to the adult education literature as it broadens the understanding of other ways of knowing and experiential learning.

Terms and Definitions

1. **Confidence** is a degree of certainty that a belief is correct or that a choice is best. As used here, confidence describes the adequacy of knowledge and competency to handle tasks.

2. **Competency** is knowledge or ability in a subject or skill. “Unifying concept that integrates everything it takes in order to perform in a given situation or context” (Illeris, 2004, p. 47).

3. **Data Collection Cycles** include: Enrollment / Demographic Survey (DC0), Early Season – May June (DC1) Late season- July August (DC2) these are associated with Days Since Intervention (DSI) for both DC1 and DC2

4. **Engagement in learning activities** suggests enjoyment, facilitates learning, and drives
motivation and persistence in activities with cognitive and affective elements (Laurel, 1991).

5. Experiential Learning (EL) is a process of learning directly through experience, either real world drills or exercises or simulated, as in role-plays or project based learning.

6. Flow: state where an individual is consumed and focused on an activity that is so enjoyable, that they will continue to do it just for the sake of doing it (Csikszentmihalyi, 1990).

7. Motivation is the activation or energization of goal-oriented behavior. As used here, motivation is the interest or drive to commit to a path of action within the next year.

8. PALA: Playful Adult Learning Activity is designed for small group of adults to place the learning in context through the use of a simulation or role play, yet inspired by playfulness and prompted by very simple rules and props.

9. Play refers to an activity (game, event), and may consist of amusing, pretend or imaginary interactions. [Playful] – attitude or state of mind: lighthearted, full of fun; jesting. [Playfulness] – disposition to find causes for amusement, indicates a playful state of mind.

10. Simulation is an imitation of reality, state of affairs, or process as a complex situation. May include role play which is generally simple, brief and flexible and participant represents or experiences a known character type (Ladousse, 1987; Scarcella & Oxford, 1992).

11. Spontaneity is a quality of being spontaneous, free, natural, acting on impulse, without premeditation;[Physical] - exaggerated or animated gestures or expressions. [Cognitive]– marked by curiosity, inventiveness, imagination and free thinking (Lieberman, 1977).

Assumptions

The assumptions underlying this study are as follows:
1. The PALA is a suitable intervention tool: Earlier work with the PALA demonstrates that its’ unique characteristics are tied strongly to the use of playfulness in experiential learning, and that playfulness makes a significant difference in the experiential learning.

2. The research questions are answerable: Adult learning is dynamic, contextual and intertwined with social practices. Adult learners can interpret what they learned and how to apply that to their needs in a fashion which can be communicated and understood by researchers.

3. The study is feasible: Instructors may include play in classrooms, and learners may express playfulness or join in play. Playful behavior can be observed and instructors and adult learners can identify and articulate their understanding of it.

4. The results are detectable: The methodology is designed to examine and contrast results between teaching techniques. It is assumed that the assessment tools and protocols developed in the Pilot Study are suitable and sensitive enough to detect differences in results.

5. The results can be interpreted: Each course covers the same material as per a standardized curriculum and the PALA follows the standard format close enough that effects are similar across classes. It is further assumed that the adult students that participate in this study answer the survey and quiz instruments honestly and to the best of their ability.

Limitations

There are differences between classes, instructors and individual experiences that may impose limitations on data quality and the confidence levels with which the data can be analyzed.

1. Classes are different from each other: The classes are voluntary, and are offered by different organizations and in a variety of locations, so there is some preferences, variety and self-
selection involved in the decision to participate. There is no plan to control such relationships but such factors will be observed with an eye toward eliminating the impact on the analysis.

2. The instructor and the resulting teaching and learning differ from class to class based on the instructor's personality, boating experiences, shared stories, teaching techniques and physical space in which the class is held. There was no plan to control this but such factors were examined with an eye toward understanding or eliminating the impact on the analysis.

3. Individual reactions to the learning environment, instructor and techniques vary: Learning retention and transfer depends on teaching and learning styles, and learning retention and transfer depend on the type and timing of real-world application. Classes included friends, family groups and others with social interaction that may have affected outcomes.

4. The investigator handled the interventions personally, as well as many of the enrollments, and the experience gained in that process had an impact on the detailed implementation, the effectiveness and reception of the intervention. There are strong indicators that the quality of the intervention improved during the period (8 months) the study proceeded.

Summary

This first chapter outlined the background of the study, with an overview of the conceptual framework including experiential learning melded with adult playfulness. In addition it covered the purpose of the research, to better understand playfulness in adult learning and use of the PALA as a classroom technique. This was expanded with a specific problem statement and the research questions that guide the inquiry. The significance of the study and a list of definitions, assumptions, strengths and limitations are also provided.
CHAPTER 2: LITERATURE REVIEW

This chapter examines the state of the research in experiential learning and playfulness as described in the literature. The first section seeks a practical definition of experiential learning as the central focus of the conceptual framework, which is expanded in section two to integrate playfulness into adult learning. It also examines the complex relationship between the affective domain and experiential learning in a more personal view of the conceptual foundation and what it means to our practice as adult educators. The third section examines the environment and challenges facing safety, compliance, and certification training in the 21st century, and frames the broad application and practice of adult learning for this research. Working from that baseline, the next section drills down into the needs of the transportation sector to position a specific training environment involving the United States Power Squadron Boating Safety Courses in the study. A fifth section explores the state of the art used to design learning activities and derives the general specifications for Playful Adult Learning Activity design, tied to the needs of the learners. The overall conclusion brings these elements together in a short summary.

Experiential Learning : Conceptual Framework for Research

John Dewey suggests that we learn by doing, confirming what Aristotle, Aquinas, Locke and others assert about experience as a widespread and effective means of learning. The word experience may be used as a noun: a catalogued, objectified, and reflected-upon resource, but it can also be seen as a process of learning. Experiential Learning (EL) is usually associated with a constructivist approach, which argues that humans construct meaning from current knowledge structures. It also builds on Dewey’s pragmatism and focus on education, Lewin’s social psychology and group dynamics, and Piaget’s model of learning and development.
A foundational theory comes from Kolb’s (1971) work that views learning from experience as an interaction of two processes: experience is grasped, and then transformed into meaning. The first process, apprehension, relies on the tangible qualities of experience whereas comprehension relies on interpretation and symbolic representation. Kolb’s model of adult development through learning involves a "direct encounter with the phenomena being studied rather than merely thinking about the encounter, or only considering the possibility of doing something about it" (Smith 2005, p. 1). This is inadequate to describe the ways in which EL plays a fundamental role in adult education, as Merriam and Caffarella (1999) attest, especially outside formal settings. Kolb (1984a) claims that, ”Learning is the process whereby knowledge is created through the transformation of experience” (p.38). Wilson (1999) highlighted this interrelatedness to define learning as: “A relatively permanent change of knowledge, attitude or behavior occurring as a result of formal education or training, or as a result of informal experiences” (p.8). This interdependency of formal and informal concepts with experience seems to be a major impediment to a clear definition of experiential learning.

Kolb’s model (1971) suggests that EL is a process of learning through reflection on doing as a four-stage learning cycle in which experiences are the basis for observations and reflections. Reflections are assimilated and distilled into abstract concepts from which implications for action are drawn. These implications can be actively tested and serve as guides in creating new experiences (Boyatzis & Mainemelis, 2000; Kolb, 1984). Kolb’s model ties our common-sense experience with trial-and-error learning with important aspects of inductive and deductive reasoning and prior knowledge to provide intelligible guidelines for abstraction and planning.

EL is not a simple hit-and-miss proposition. Not all activity results in experience and painful experiences may discourage learning. Wlodkowski (1999) tells us that experience can
even lead to *mis-educative experiences*, in which experiences do not produce learning, or we may learn the wrong thing from an experience. Kolb goes further, and suggests that experiential learning is also not simply incidental learning. We must consciously or subconsciously engage with the experience and reflect on what happened, how it happened and what it means. Kolb (1984) suggests a conscious choice is involved in learning, along with an extensive set of skills needed to exploit the experience, including observational, analytical, reflective, decision making and problem solving skills, as well as a commitment to invest in that learning process.

For the purposes of this study, a working definition of EL suggests at least minimal levels of physical activity, situation involvement, and mental engagement combined with social and emotive factors, and with at least some portion or aspects of the content as part of the experience. This is defended by a number of writers, including Merriam, Caffarella, and Baumgartner (2007) who assert “the whole person is always involved in learning, even when we think it is just our brain” (p. 187). There are many related adult learning traditions, including, action learning, adventure learning, cooperative learning, service learning, outdoor education, problem-based learning, discovery learning and others that focus on aspects of experiential learning. Military basic training is an intensely experiential learning environment, and we can appreciate the idea that adults learn more through experiential learning than by any other means. The next few pages examine ideas that can help frame the application and define EL in a more constructive fashion.

*EL in Social Groups*

Many theories overlap with EL, and the role of social relationships in learning and development affirms that “no man is an island” (Donne, 1624). Nykvist and Masters (2006) tie these concepts to EL in their study of Cultural-Historical Activity Theory (CHAT). This evolved
from the work of Vygotsky, who showed that learning develops through interaction with others, and awareness emerges from participation in a social structure where activity with tools to produce artifacts leads to socially valued outcomes. In doing so, a person develops a perspective, changing how they think and behave in future situations. CHAT shows how learners interact with the community, rules, division of labor, instruments and objects and helps map interactions between participants, technology, pedagogy and environment (Nykvist & Masters, 2006). It is this participation in an experience within a communal situation that differentiates many latter theorists from the more individualized earlier models (Fenwick, 2003).

A popular experiential model is discovery learning, a constructivist method of inquiry-based learning supported by Piaget, Bruner, and Papert that includes models such as: guided discovery, problem-based learning, simulation-based learning, and case-based learning, among others. At one end of the spectrum, tools and information needed to solve a problem or learn a concept are provided and a learner makes sense of them. In between are degrees of exploration or experimentation with clues, coaching, and a framework to help get to a reasonable conclusion.

At the other end of the continuum is the expository teaching model where the learner discovers what a teacher decides should be discovered with a process prescribed by a teacher, as explained by Bruner (1961) who explained, “Practice in discovering for oneself teaches one to acquire information in a way that makes that information more readily available in problem solving” (p. 26). Such learning occurs in problem solving situations (often in play) where a learner draws on prior knowledge and experience to explore and interact with the environment, manipulate objects, wrestle with questions and controversies, and perform experiments. Proponents attest to many advantages, such as: learners discover facts and relationships, it causes active engagement, promotes motivation and autonomy, develops creativity and problem solving
skills, and is widely adopted in the commercial world. Hundreds of websites refer to active learning, and the 4H Club (USDA 4H Headquarters, 2009) offers a website listing 46 other sites dedicated to experiential and active learning.

Active Learning includes case-oriented methods such as Problem-Based Learning (PBL), in which students collaboratively solve problems and reflect on experiences. Teachers may act as facilitators in a staged-self-directed learning activity (Altman, 1986). This bottom-up approach relates learning to authentic practices and pragmatic goals, as in apprenticeship learning (Hung, 2002). It is a process of inquiry, beginning with an experience of not knowing ‘what to do next’, and finding answers through collaborative inquiry with fellow learners. This is a profound shift from dependence on available expertise and pride in self-learning to learning with and from others, disclosing doubts and admitting ignorance. Darvin (2006) says “When teachers provide opportunities for students to apply their cognitive skills to a personal issue or problem, learning is enhanced and the students experience an affirming sense of accomplishment” (p. 398).

Teachers relate to such opportunities when Svinicki (2007) suggests “One particularly good form of active learning is to make the information meaningful or memorable for the individual.” The visual component often can help the learners reconstruct all the content because visually stored information is very efficient and memorable. The process of trying to explain ideas to another person is often the best way to learn. This mechanism may contribute to the success of small group work in facilitating learning. Before a misconception becomes a solid memory, it is reformulated in response to feedback and discussion (Svinicki, 2007). Jablokow (2008) tells us “No one problem solver can possibly manage such problems … alone… we must collaborate with other problem solvers, and we must do so wisely and well” (p. 2).
**EL and Story Building**

Though these ideas often seem quite different, some common elements run through them that distinguish them as experiential learning. A natural way of thinking about this idea is that experiential learning produces a story that can be told, and some researchers claim that real-world decision-making is guided by internalized stories that direct our goals, judgments, and actions (Bruner 1986; Cole 1997; Crites 1986; Sarbin 1986). The use of internalized stories that are heard, lived, and told to others provides ways of thinking about the meaning of past events. This in turn, frames the understanding and meaning of current circumstances, as well as a means of projecting goals for the future (Cole, 1997). Narratives (or ‘war stories’) have traditionally been used in safety training as experienced individuals describe events related to the points being learned. Stories of disaster events are often presented as case studies followed by an analysis of what happened, why it happened, and who was responsible. Though quite useful for a number of important teaching outcomes, a story analyzed in this fashion does little to simulate the foresight needed to deal effectively with an emergency situation where decisions must be made with incomplete and often conflicting information (Cole, Wiehagen, Vaught, & Mills, 2001).

Cole et al (2001) studied the success of what they termed ‘simulation exercises’ or ‘exercise narratives’ described as an ”Unfolding story of an actual event that either had the potential to or actually evolved into a serious injury event or disaster. Each simulation exercise story has a plot, characters … and predicaments that cause well-rehearsed protocols to break down” (p. 15). The simulations use stories in a carefully planned interactive teaching method. Trainers report that the problem-solving nature of the exercises helps foster collaboration for solving problems. Rules alone cannot formulate creative and effective solutions to most problems (Cole et al, 2001). Such learning can also incorporate physical elements as well.
EL and Physicality

Adventure education may be synonymous with outdoor learning, adventure therapy, challenge education, and others, which incorporate play, games, challenges and competition. Participants direct their own learning as they strive for an established goal. Such techniques may be used in teams, sports, apprenticeship training, simulation and gaming environments and even military training. All of these build basic skills and support personal, social and emotional development (Altman, 1986). The idea of progression adds a challenge to the theoretical framework, since experiential learning may be a portion of a developmental activity. Gee (2007) highlights the design of games to examine the cyclical nature of experiential learning:

Good games offer players a set of challenging problems and then let them practice these until they have routinized their mastery. Then the game throws a new class of problems at the player, requiring them to rethink their taken-for-granted mastery. only to be challenged again. This cycle of consolidation and challenge is the basis for the development of expertise in any domain. (p. 217)

Physicality has a special place in experiential learning and one critique of Kolb’s ideas is the lack of attention to the body as a site of learning and knowledge construction (i.e. somatic or embodied learning). Fenwick (2003) argues that, “Experience exceeds language and rationality, because it reiterates the crucial locatedness of bodies in material reality, that cannot be dismissed as a solely linguistic construction” (p. 6). Iacucci, Linde, and Wagner (2004) claim, “Meaning is created in use of shared objects and social interaction is related to how we engage in spaces and artifacts. In this interplay the body has a central role, in many ways the body can be seen as the medium for having a world” (p. 7). According to Goodwin and Goodwin (2000), learning is tightly tied to the objects and materials around us. “Cognition is not lodged exclusively within
the head of an isolated actor, but instead within a distributed system, one that includes both other participants and meaningful artifacts” (p. 8). This views bodies with actions in a setting as key components of a system that operate as crucial components of the cognitive activities.

In this concept, learning is guided by what we do with our bodies and learning objects. Widely accepted types of learning objects are: Design and Construction, Conceptual Manipulation, and Reality Role Play. These concepts have shifted into the digital world in a similar classification scheme. Even though the physicality is different, the cognitive effects of virtual objects can be similar to real objects, and they provide insights into the process of abstraction and imagination in learning (Joolingen, 1999; Zuckerman, 2006). We may learn skills, tactics or stratagems from different activities with the same objects.

EL often incorporate embodied learning based on situated cognition, in which context is key to understanding. According to Merriam and Brockett (1997) "what we know and the meanings we attach to what we know are socially constructed. Thus, learning and knowing are intimately linked to real-life situations" (p.156). Bandura (1977) argues that people learn from observing role models, which then serves as a blueprint for the behavior (mimic). Lave (1988) suggests learning is naturally tied to authentic activity, context, and culture.

**EL, Simulation and Gaming**

Simulation includes practices as simple as role-play and as complex as computer-based virtual worlds. Dewey said, “Imagination is the inner mental side of play. Aside from the games, the value of play is measured by the imagery which finds expression in it” (Dewey, 1991). Simulation permits the instructional designer to create virtual worlds populated with learning objects in such a way that the learning replicates the kind of learning gained in actual experience.
Game-based learning is perhaps the oldest and most viable form of learning after mimic. Huizinga (1950) tied such learning to the development of culture, sports, art and language, but in recent years it has taken on greater import with electronic gaming and computer-based learning. Shaffer (2007) describes new learning games that give students the chance to creatively manipulate a virtual world, and promote creativity and innovation, abilities that are important in today's competitive global economy. His most radical assertion is that students who play videogames will think and learn differently: rather than collecting facts and skills, students will learn how to creatively adapt and apply knowledge in a variety of real-world situations. Communication and expert problem solving are features imbedded in most game genres, but problem-based learning modules have not approached the cognitive complexity and fast-paced processing that game contexts afford (Spires, Lee & Lester, 2008).

EL and Self-identity

Over the last few decades, the study of how learning style influences adults' preferences for learning activities has enhanced the understanding of EL and the appropriateness of several models. For example, adult social learners prefer role-play activities, while intellectual learners prefer reference-style presentations, and visual-spatial learners benefit from different teaching styles than others (Schaller, Borun, Allison-Bunnell, & Chambers, 2007). It seems that emotion, imagination and social value play a key role in most adult learning, and can impede or assist both learning participation and effectiveness, perhaps by helping to overcome some of the limitations of personal learning styles. Dirkx (2001) tells us that “Personally significant and meaningful learning is fundamentally grounded in…the adult’s emotional, imaginative connection with the self and with the broader social world” (p. 65). Dealing with a classroom filled with different
preferences suggests that playfulness may help drive participation and more effective adult learning (Silverman, 2002). Wlodkowsky (1999) tells us emotion is critical to learning “For adult learners to experience intrinsic motivation, they need to connect who they are with what they learn” (p. 12). This real-world dependence on emotion is a challenge for theoretical work that has been largely based on cognitive and constructivist principles. Others have highlighted the deficiency, but few models correct it. Other issues are self-identity and motivation. Wlodkowsky (1999) observes that self-identity as an adult is when one “perceives herself or himself to be essentially responsible for his or her own life. Responsibility is the cornerstone of adult motivation“ (p. 10).

Each of these divergent traditions contribute to the models that describe experiential learning, but Fenwick (2000) warns us that EL is also a problem area despite its’ significance for current research and practice. Most adult learning is understood to be located in everyday tasks and interactions, and other sites of non-formal education, and the term *experiential learning* is used to distinguish non-directed informal experience from formal education and practical meaning-making from theory. EL celebrates informal and non-formal learning, however, Fenwick (2000) warns, “When brought into the purview of the educator, the notion of experiential learning has been appropriated to designate everything from kinesthetic-directed instructional activities in the classroom to special workplace projects interspersed with critical dialogue led by a facilitator, to learning generated through social action movements, and even to team-building adventures in the wilderness” (p. 1).

She continues to develop her position that EL is a reflection-oriented constructivist perspective that “casts the individual as a central actor in a drama of personal meaning-making” (Fenwick, 2000, p. 248). If such learning is change or transformation, or an expansion of human
possibilities (Davis, Sumara, & Luce-Kapler, 2000), then (from a critical perspective) experiential learning may challenge the hegemony of expert knowledge, discount claims of universal validity, and resist knowledge authority. As Reeve and Gallacher (2000) argue, “taking experience as the starting point for learning has the potential at least to erode traditional boundaries between knowledge and skills, vocational and academic learning” (p 127). These arguments reach back to a basic problem of defining EL as somehow involved in the ideological judgments of the value of formal versus informal versus incidental learning. So while excitement and enthusiasm adorn the EL proponents’ shelves, critics of EL may argue that we undercut the standards of a formal environment, which may lead to acceptance of mediocrity.

A Practical Model of EL

A recent definition of EL adds a touch of simplicity and insightful comprehensiveness as follows: “Experiential Learning is the sense-making process of active engagement between the inner world of the person and the outer world of the environment” (Wilson & Beard, 2006, p. 2). They also proposed that EL may be related to the nature of cognition through an experiential learning model which builds on previous perception process and information processing models. This is a suitable model that incorporates many of the elements discussed in this section.

This model is a satisfactory visual representation of the individual EL process for our purposes, and most of the processes are familiar in the literature. Working from the left-hand side of the model in Figure 1, there are five main elements: stimuli; our senses; the filtering process; interpretation; and response(s). First, the stimuli may be caused by external elements such as the objects and people around us. Stimuli may also occur internally and include the feelings of being hungry, thirsty, or perhaps the pain we suffer with a migraine, etc.
The second stage in the process is that our senses of sight, touch, hearing, smell, and taste become aware of these stimuli if they are within our sensory ranges. For example, at a conscious level our senses may pick-up definable objects and activities, but our senses also operate at an unconscious level to continually scan the environment, so that our bodies trigger perspiration to cool us down long before we become consciously aware that we are too hot.

Figure 1.
Experiential Learning Model (Wilson & Beard, 2003, p. 5)

Third, we filter stimuli to prevent our brains from being overloaded with information or to allow us to focus on important factors. We learn to pay attention to some details and disregard others. The cognitive filtering process may occur at a conscious and/or unconscious level and involves examination of the stimulus to determine whether to pay attention to it. This filtering depends upon such factors as previous knowledge and experience, emotions, our concept of self, the "loudness" and intensity of the stimulus, location and personal needs.

The fourth stage involves the main cognitive interpretations we make as we undergo an experience. First, if it serves to confirm some already held beliefs, it is interpreted as supporting
the existing conceptual framework or schema and little attention is paid to it. In an actual learning experience, the stimulus or experience differs from our expectations in such a way that we may choose to modify, construct or reconstruct our mental frameworks and adapt or accommodate it to this new information. The third response is to reject it since it is alien to our expectations and our way of seeing the world. In this case, the filters may be so powerful that they can result in mental blind spots and an inability to see new things.

The fifth and final stage of the experiential learning model involves one or more of the cognitive, affective and behavioral responses to the interpreted stimulus. For example, we may think about how to respond (cognitive), we may take an emotional dislike to the manner in which we are directed (affective); and finally, we may physically respond to danger (behavioral). The cognitive, affective and behavioral responses in the experiential learning model may be recycled to evaluate the stimulus further or disregard it. Importantly, these responses are very individual and two people may respond in very different ways. If we find ourselves on the top of a very steep mountain edge we may be exhilarated or terrified, depending on our past experience and attitudes. Kuhn (1970) stated that: "What perception leaves for interpretation to complete depends drastically on the nature and amount of prior experience and training” (p. 198).

This model tends to focus more on the front-end, as many cognitive models do, though it also suggests the means to construct a new framework for future learning as constructivism focuses on. For the purposes of this study, this weakness seems an acceptable tradeoff since no more pertinent model was found in the literature, and this at least provides a model to support the data collection and analysis process. Clariana (2000) has simulated information processing using Connectionist models with neural network simulations to predict instructional feedback effects. Such work tends to reinforce the confidence that we can design better instructional techniques by
paying attention to specific mechanisms that relate to specific learning effects. This model does not integrate all potential mechanisms, but it does provide a framework that permits mechanisms to be inserted as we learn more about them. In addition to its merits as an intellectual exercise and its potential applicability to this study, I find this “building block” structure attractive.

A Definition of EL as a Conceptual Framework

As used in this study, the concept of EL is more narrowly applied than seen in some literature, and we are left with a conceptual foundation more compatible with Smith’s (2005) straight-forward description of EL as learning to acquire and apply knowledge, skills and feelings in an immediate and relevant setting. I accept that experiential learning is the basis from which humans evolved our powerful learning capabilities. Boud and others (1993) argue it is: “Meaningless to talk about learning in isolation from experience. Experience cannot be bypassed; it is the central consideration of all learning” (p.8). Animals and humans do this with cubs and kids by ‘playing’ in pseudo-real experiences with limited survival potential, but which build ‘stories’ of experience for the maturing animal to eventually supplement with real experiences with significant survival value (Burkhardt, 2005; Cohen, 1993; Ellis, 1973). The essence of EL seems to be in the ‘story’ we create in our memories, which we can then review or reflect on: interpreting, re-interpreting and retelling it as new events provide new ways to re-examine past experiences. This ability benefitted from formal languages, writing and graphical representation, becoming the basis for art and culture (Callois, 2001, Huizinga, 1950).

The paucity of relevant literature found in this research verifies that more research is needed on EL and playfulness, but it also suggests that more EL research is needed on the elements of community, social interaction, physicality, situatedness, emotion and motivation that

This study uses a more restricted definition of EL than in popular use, as follows:

Accepting constructivism and informed by a pragmatic approach, EL is seen as learning as a result of engagement, physical activity and participation as a member of a learning group in a setting which incorporates physical and abstract learning objects along with rules and procedures needed to support an outcome-based plan to produce understanding and meaning-making, along with knowledge retention and transfer to the real world. The learning experience, whether real or simulated, produces an individual story which may become part of a group narrative that can be shared with others as experience.

Playfulness in Learning: Conceptual Framework Catalyst

As educators, we may see the commitment and determination to engage in contests and games as a challenge to engage our students with the same enthusiasm and dedication. Huizinga (1950) confirms this observation in his perceptive analysis of human culture as an outcome of our need to compete for status as shown in our propensity for play. This section examines the literature concerning playfulness in adults as an element of effective experiential learning. This proposed research examines the outcome of EL-inspired instructional activities that incorporate playfulness in a real-world environment by comparing retention and transfer with techniques based on lecture and presentation. Experiential learning in the context of this study is applied in activities involving engagement in well-defined content with appropriate materials and learning objects, offered under the direction of experienced instructors in a short timeframe (less than a half hour) in the normal environment of an adult classroom in a non-formal or formal learning curriculum. Taylor (2006) studied such classes in which teachers emphasize hands-on teaching
and fun with learning. EL is viewed as a component of a well-designed and professionally executed instructional repertoire including other learning techniques, initiated and enlivened by adult playfulness. There is a paucity of literature on empirical and experimental research of this type with adult learners to help inform this research.

People often use the word ‘play’ as a contrast to other parts of their lives: sleeping, eating, working, etc. Play can be intense and serious; creative and spontaneous. Some play has simple or complex rules with mild or major consequences, yet we call it a game. Many terms describe play and we hear similar concepts in comedy, humor, enchantment, magical moments, whimsical toys and zany ideas (Altman, 1986). Some assume that play is easy, but adults tend to engage in challenging and difficult activities when we play, such as sports, music, hobbies, and games like chess (Csikszentmihalyi, 1990). Glynn (1988) developed the Adult Playfulness Scale and demonstrated that experimental framing of a task as play or a game can yield more creative and complex task performance than the framing of a task as work. She also found that the play orientation created more focus on process during task performance, while the work orientation created more focus on outcomes.

A playful person is guided by internal motivation, with self-imposed goals, a tendency to attribute their own meaning to objects or behaviors, a focus on pretence and non-literality, a freedom from externally imposed rules, and active involvement (Staempfli, 2007). Vygotsky (1978) depicts play with ‘imaginary qualities and (internal) rules.’ Play may consist of amusing or imaginary interactions in people and animals. Piaget (1962) in children and Groos (1898) in animals attest that the individual is aware of the self-illusion as part of make-believe, and out of this awareness is born the symbolism needed to learn from the activity, “in play and art… there is deliberate, conscious illusion” (Piaget, 1962, p. 152). Play can be intense and serious or creative
and spontaneous. Play has simple or complex rules with different consequences, yet is a game. Many terms describe playfulness and we often hear related ideas expressed in comedy, humor, magical moments, whimsical toys and zany ideas, but our goal is to examine how playfulness helps adults to become more engaged and more likely to retain learning (Altman, 1986).

According to Rieber (1996), “Play appears to be one of those constructs that is difficult to articulate… we all know it when we see it or experience it” (p. 44). Play is seen as voluntary and intrinsically motivating or pleasurable. It also involves active, often physical, engagement; and has a make-believe quality (Rieber, Smith & Noah, 1998). Caillois (2001) tells us that “play is like education of the body, character or mind, without the goals being determined” (p 167). In this concept the less realistic play is, the more educational it becomes. He adds, “it does not teach facts but rather develops attitudes” (p. 167).

To cover this in all its nuances is outside the scope of this project, but we know that playfulness assists personal development and promotes work satisfaction and productivity. It is exhibited in social groups as adults learn subjects and skills in activities, games and simulations (Staempfli, 2007). Playfulness in adults is often associated with word games, humor, flirting, and power displays. EL is a practical framework in which to examine playfulness in adult learning.

**Integrating EL and Playfulness**

While Piaget (1962) did very little work with adults, he did an excellent job of tying EL and play together while focusing on learning. In this regard, some debate the distinction between children's and adult’s play, and Rieber (1996) says, “Many researchers dispute this by viewing such distinctions as artificial” (p. 3). Indeed, I found no claims that the benefits of play in a learning environment do not apply to adults. Much of the literature can be read with ‘adult’
substituted for ‘child’ and not only make sense, but seem quite credible and natural (Altman, 1986; Erikson, 1993; Sawyer, 2007). Accepting this, many teaching techniques integrate EL and playfulness. Froebel focused on outside activities (kindergarten) that encourage free movement, exploration of the environment and the value of the creative arts in spontaneous play. Susan Isaacs believed that play is valuable in enabling children to build positive relationships, helping them deal with strong emotions, develop their thinking, and understand differences between reality and fantasy. Dewey emphasizes inquiry-based, learner-centered, hands-on experiential learning, and maintained that play is a form of thought for children, which then becomes internalized, and allows them to explore society and nature. Marie Montessori felt that children learn through sensory experiences in play. She emphasized learning with structured play and claimed that children learn independence by working alone in self-directed activity (Altman, 1986; Sawyer, 2007; Verenikina, Harris, & Lysaght, 2003). Fenwick (2003) claims that EL “successfully championed learners’ personal knowledge and lived experience” (p.1). However, this seems at odds with the reliance within EL theory on rational thought and reflection, which tends to ignore the role of personal factors such as affect and playfulness (Yorks & Kasl, 2002). Beyond that, play often involves physical movement and an awareness of the body in play may contribute to the learning and may engage other forms of learning and meaning-making.

The effort to integrate EL and Playfulness into more effective learning may demand a better discrimination on the idea of games versus play. Playing with toys differs from playing games because of game rules and winning conditions that define victory or defeat. Rodriguez (2006) argues that a player's experience depends on the rules, norms and resources that guide or organize actions, so that experience is inseparable from structured action, in which the player confronts either another player or obstacle. The player’s experience is tied to an event, and
Rodriguez (2006) tells us: “Playing consists in a trans-individual process of action and reaction, which often takes on a to-and-fro quality reminiscent of dance… Instead of saying that "someone is playing." it might better to say that "there is playing going on" (p.3). In many games we even refer to the participants as ‘players’. Gadamer (1989) claims "the purpose of the game is not really the solution of the task, but the ordering and shaping of the movement of the game itself" (p. 97). In his view, the fascination of play lies in how structured movement ‘draws’ players into its arena and ‘fills’ them with its distinctive spirit as a key aspect of the play experience. This also shares some features with concepts of Flow: The Psychology of Optimal Experience and Enchantment which are often associated with Play and life experiences (Csikszentmihalyi, 1990; McCarthy, Wright, Wallace, & Dreadon, 2006; O’Neill & Shaer, 2008) This suggests that simply participating in a game-like activity may infect a group’s learning activity with playfulness, like the effect of the PALA in a classroom, which is a driving observation behind this study.

Perhaps a blending of these concepts as used in pre-school and early child development has merit. Even the rather enigmatic Sutton-Smith (1997) notes that “higher forms of play… are … correlated with higher forms of school-related social and educational success” (p. 39). Such activities include kinetic movement, spatial refinement, motor skill coordination and concrete knowledge leading to later abstraction (Johnson, Christie & Wardle, 2005).

Play as an Educational Tool in Groups

The idea that learners receive instruction first, and then apply what they learned by ‘playing with’ the environment informs the design of learning activities. Experiential methods are often oriented to groups, and playfulness may be more social than individual. For example, Harris and Daley (2008) explore play as an educational tool and conclude that, “Play qualities
are seen to foster learning by enriching adult learners’ engagement, co-operation and sense of connectedness with one another as well as with people, resources and information beyond their group” (p.1). Katzeff (2003) suggests playfulness may be about coping and is a social construct as much as an individual construct. In a practice-oriented piece, Perkins and Salomon (1988) suggest that, “Students often fail to apply knowledge and skills learned in one context to other situation. With well-designed instruction, we can increase the likelihood that they will” (p.26). Sometimes learners must consciously extend themselves from one context or application to another. In such activities, simple engagement is not enough: role-plays, games, simulations and other learning activities must also be fun as a part of an adult education toolkit to assist retention and transfer to real-world applications (Thompkins, 1998).

The focus is on the complex process of learning and a multifaceted relationship with experience and playfulness. It seems likely that playfulness acts as a structural and motivational force in learning and it may evoke cognitive, affective and creative resources. Sutton-Smith (1997) explains, “Fantasies are not meant to replicate the world… they are meant to fabricate another world… much more emotionally vivid than mundane reality” (p.158). Such imaginary worlds can also be created in a virtual space, and are referred to as micro-worlds. Rieber (1996) tells us, “A micro-world presents the learner with a ‘simplest case’ of the domain.” He adds, “Learners immediately know what to do in a micro-world - little or no training is necessary” (p.49). A micro-world is like a child’s sandbox… the perfect place to initiate a playful activity. As this example shows, technology has opened many doors for our thinking and research, though theory and empirical research lags in key areas (Marshall, Rogers & Hornecker, 2007).

The proverbial ‘school of hard knocks’ convincingly persuades us that we learn ‘the hard way’ by making mistakes and suffering the consequences. Experiential learning and the ‘school
of hard knocks’ seems to share many common elements, but usually with fewer or negligible consequences. However, research shows that transfer of learning is more effective when learners make-and-correct errors during a learning process (Ivancic & Hesketh, 2000). The instructional designer then strives to reach a balance of positive reinforcement and error-based-training in the design of experiential learning activities. In the adult classroom, this is a particularly touchy task: adults do not like making mistakes, particularly in front of others. Adults may forego an opportunity to learn rather than place themselves in a position to be embarrassed by a mistake. However, playfulness enables a group to make mistakes without embarrassment and becomes the social construct to protect participants and afford everyone a greater ‘safety zone.’ Lugones (1987) suggests that to be playful in a situation means that it is both safe and appropriate to take risks, to be foolish and uncertain and to abandon competition and self-importance. This suggests that playfulness goes beyond the choice to participate and may help draw the individual into the group so they are engaged in the activity and committed to learning and making meaning of the content. Melamed (1985) studied play and playfulness in adult learning and proposes that “play can also be a means of understanding or a way of coming to know something” (p. 123).

There is a growing interest in the multiple ways adults construct meaning and ‘ways of knowing’ that suggest playfulness in learning. Katzeff suggests that playfulness results from the interaction of elements: freedom to suspend reality, internal control, intrinsic motivation, and framing (cues to others about how to act). Playfulness may be about coping, avoiding distress and embarrassment, and may be a social construct as much as an individual construct (Katzeff, 2003). According to Polaine, (2005) true interactivity is a feedback loop of action-reaction-interaction and involves collaboration or exchange, and the concept of Flow (becoming absorbed in activity) is a favored way of describing this phenomena. Flow has become a mainstay of the
affective domain in the world of gaming, play, and activities as the “psychology of optimal experience” (Csikszentmihalyi, 1990). Several case studies suggest that the flow principle can be applied to interactivity in groups and engagement may begin and end with playful experiences that are satisfying in their own right (Polaine, 2005). This is what happens in a playful social group, where participants become performers in the interaction. The incredible success of on-line gaming and on-line social groups also attest to the importance of the social element in play.

Play and Affective Learning

The relationship between playfulness and the affective domain leads us to a more useful perspective than EL alone affords. John Heron (1992) assigns major significance to the role of affect in learning. Rather than beginning with ‘concrete experience,’ his model begins with a ‘felt need that seeks resolution.’ Learning is in response to an emotional need, and a controlling factor of an activity that makes it playful is the attitude or emotions of the participants. Johnson et al. (2005) attest that, “playing is intimately related to the expansion of a sense of self as an autonomous and functioning person who can influence surrounding events” (p.149). Whether it be with children, animals, adults or in a variety of contexts, many writers suggest that play is an essential ingredient in personal and social development and learning (Gee, 2007; Piaget, 1962; Rieber, 1996; Vygotsky, 1966).

A person exhibiting playfulness is guided by internal motivation, with self-imposed goals, a tendency to attribute their own meaning to objects or behaviors, a focus on pretence and non-literality, a freedom from externally imposed rules, and active involvement (Staempfli, 2007). Adults with marked playfulness exhibit joie de vivre, an open mind, and an ability to see the positive side of situations. With a playful attitude, adults are more inclined to embrace
challenge, better equipped to deal with failure and opposition, and more capable of discovering
original and novel solutions to problems (Rieber, 1996). Research on playfulness in marital
relationships confirms the surprising idea that playfulness is a slightly better predictor than
intimacy on marital adaptability and survivability (Klien, 1980; Lutz, 1982).

Huizinga (1950) repeatedly cites games that require players to risk their lives and
suggests that a borderline between playful and serious is hard to identify with precision.
Focusing on the emotional domain, psychoanalytic theorists explain that people deal with
stressful situations by incorporating them into play, then act out the same situation multiple
times. A person ‘acts out’ unsatisfied wishes by representing them symbolically in play and
gaining mastery over ego-threatening or painful experiences. Erikson (1993) accepts that play
has cathartic elements, and that play helps people to cope with the environment. He felt that play
can express inner feelings, problems and personality; gain satisfaction using abilities, master
motor skills, and resolve conflicts. Play facilitates learning identity, roles and acceptance of rule-
regulated behavior during socialization (Altman, 1986; Erikson, 1993; Sawyer, 2007).

The Serious Side of Play

We tend to use terms such as ‘engagement’ to avoid the implications of ‘playful.’ Much
research focuses on the powerful concept of engagement during the learning process as an
indicator of learning, retention and transfer to the real world. Kearsley and Shneiderman (1998)
defined engaged learning as “all student activities involve active cognitive processes such as
creating, problem-solving, reasoning, decision-making, and evaluation. In addition, students are
intrinsically motivated to learn due to the meaningful nature of the learning environment and
activities.” They differentiate engagement and interactivity and place emphasis on providing an
authentic (i.e. meaningful) setting for learning. They suggest that students are engaged when they see meaning and purpose in what they are doing, and that authenticity provides meaning and purpose. They claim that their theory, “emphasizes collaboration among peers and a community of learners, it can be aligned with situated learning theories. Because it focuses on experiential and self-directed learning, it is similar in nature to theories of adult learning” (p. 1).

As important as engagement is, ‘enchantment’ is a term that goes beyond the concept of playfulness. McCarthy et al. (2006) describe it as an experience of “being caught up and carried away … perception and attention is heightened… disorientation as we are awakened to wonder and imagine” (p.370). They argue that enchantment is induced by the potential for the unexpected, for new discoveries, and a range of possibilities. Enchantment enables the mind to adjust the rules of reality to fit whatever the desired reality is; and is key to our understanding of play and playfulness in learning. A story of enchantment is the O’Neill and Shaer (2008) article about Paul St. George’s ‘Telectroscope’ a Victorian invention he created with modern technology. It looks like a giant brass, wood and glass telescope that enables one to see people on the other side of the Atlantic, so New Yorkers can see Londoners and verse-vice. Everyone knows it is not real, but they play with it as if it were real … enchanted by the whimsiness. The article ends with an anecdote about a boy, Ryan,

Two sisters on the other side of the Atlantic raise their fingers to their lips, and blow a long-distance kiss across thousands of miles. For a moment, Ryan stands still. Then he raises his own hand, catches the kiss, and blows it back.

(O’Neill & Shaer, 2008, p.2)

Play has a role in serious learning too, as seen when Vitez (2008) describes Helen Davies, 83, a professor of microbiology at University of Pennsylvania Medical School. For 40
years, she composed songs with her classes to memorize material, such as:

_Leprosy, /... Bits and pieces falling off of me._

_Suddenly, /... I'm not half the man I used to be._

To the tune of "Yesterday," (Beatles) and to "Sounds of Silence," (Simon & Garfunkel):

_Hello, herpes our old friend /...Will be with us till the end._

'Cause the virus softly creeping, /... Left its genes while we were sleeping

_Not integrated into our genome, it'll roam, that episome, /... The DNA of herpes._

Her students learn more and better as a result of a playful activity they pursue with little external incentive. While this may seem very different from the PALA, in many ways it is quite similar. This is adult playfulness inserted into a serious situation as an element in learning and motivation for future learning. It is closely intertwined with the situation and the setting and the social environment and even the physical activities of the participants. Playfulness encourages an emotional state exhibiting spontaneity, creativity and fun in learning. There is a growing interest in the multiple ways adults construct meaning and ways of knowing that suggest playfulness in learning. Melamed (1985) studied play and playfulness in adult learning and proposes that “play can also be a means of understanding or a way of coming to know something” (p. 123).

There seems to be a consensus that motivation is an internal state or condition that activates, energizes and directs goal-oriented behavior and influence arousal, intensity and persistence of behavior (Kleinginna & Kleinginna, 1981a, 1981b). There is a lack of research on how playfulness is related to motivation but it seems likely that playfulness can be used for interest generation and motivation building when facing a new learning situation.

Learning is like being introduced to a ‘new world’ of ideas and new realities, such as we see when we travel to a new environment the first time. Lugones (1987) revealed a personal
account of traveling from her own world of a woman of color to the often hostile world of the White Anglo male. According to Lugones, we may be playful in one world but not another, because we feel at ease in the one world but not the other, and feeling at ease can help us be successful. Aikenhead and Jegede (1999) conceptualized the transition between a student’s life-world and school as a cultural border crossing and explained cognitive conflicts in terms of collateral learning. Flexibility and playfulness help by reducing perceived risks of joining in a new culture, so landlubbers may dive into the world of old salts in boating safety training. Motivation and willingness to participate are essential to explore concept construction, and a sense of community encourages learners to engage the material and playfulness clearly energizes learning (Fosnot, 1996; Julyan & Duckworth, 1996; Schank, 1997).

*Playfulness in a Conceptual Framework*

Playfulness has proven difficult to define to satisfy a specific audience. A historian such as Huizinga (1950) can build an analysis of the playfulness of Achilles as he baited, tortured and killed Hector and desecrated the Trojan Hero’s body, but this is not in the scope or this study’s interest in Playfulness. Nor is the playfulness of Froebel’s children in a kindergarten. Playfulness has many faces, from horror and whimsical fun to the joyful intimacies of lovers, and most do not apply to this study. This examination of playfulness in learning postures the literature around our research study, but the analysis does not do a thorough job of ‘explaining’ playfulness. The literature is unfulfilling in this regard. Many writers referred to this definitional problem, and indeed several books are dedicated to dealing with this issue (Sutton-Smith, 1997). Ellis (1973) tells us that “most of the explanations for play are unacceptable. The most satisfying explanation seems to involve an integration of three: play is arousal seeking, play as learning, and the
developmentalist view of the child” (p 119). Based on this research, thirty-five years has not changed this picture. What has happened is that we have refined our set of rules, tricks and techniques that enable us to use play in various situations, and these have helped illuminate the conceptual and practical beauty of playfulness, without yielding its’ innermost secrets.

The search for a theory of adult playfulness in experiential learning must wander into psychology and computer science. Ideas from this exploration include Csikszentmihalyi’s (1990) concept of Flow, or the psychology of optimal experience, with whom many people are familiar. Less familiar is the large body of work done on ‘serious games’ and Micro-Computer Playfulness in the last decade. For example, Woszczynski et al. (2002) synthesized a model of a network of constructs around playfulness in computer interactions, to relate states and traits to playfulness. They claim “there is an important emotional component of flow that denotes an intrinsic enjoyment of the activity in and of itself” (p.9). As Goodwin and Goodwin (2000) explain “Crucial components of the cognitive activities in progress are located in the setting and in the performed actions of participants' bodies“ (p. 8). Wlodkowsky (1999) also tells us that “When learners imagine or enact the physical and emotional properties of an idea, the concept becomes more salient and engaging … Using images and the physical senses to experience ideas makes them more directly compelling and enhances their emotional associations” (p. 236). As we develop simulations, we use this awareness to fully engage adults in the learning activity. My study continues this tradition, by seeking to add more insights and applications.

For the purposes of this research, the conceptual framework is based on experiential learning with adult playfulness as a major catalyst for participation and dynamic engagement in a group learning process. The essence of experiential learning seems to be in the ‘story’ we create in our memories, which may include ‘playful’ representation of stories as staged plays, dances,
music, drawings and carvings, enhancing the narrative recreation and social acceptability (Callois, 2001; Huizinga, 1950). Unfortunately, there is a distinct lack of usable models of playfulness in individuals and groups, though key elements often include self-efficacy, volition, type and degree of control, freedom and flow (Reid, 2004). Nonetheless, most readers clearly understand the concepts and words used to describe playfulness, but this broad understanding must be narrowed down to a definition so that it is applicable and useful in our research.

Therefore, based on the literature, adult playfulness for this purpose is defined as follows:

Playfulness is an emotional disposition which permits a person to exhibit fun, mirth and jocular interaction with others in a social group. The resulting environment permits the participants to experiment and make mistakes with the assurance that learning errors are accepted and shared by the group in a constructive and reassuring fashion, supported by framing cues such as smiling, laughing, joking around and mock admonishments that permit the group to interact while protecting each member from dis-incenting reactions.

Huizinga (1950) warns us to avoid over-defining play: “They attack play direct with the quantitative methods of experimental science without first paying attention to its profoundly aesthetic quality. In this intensity, this absorption, this power of maddening, lies the very essence, the primordial quality of play” (p 3). So it is with a sense of humility, we approach this research with the intent to exploit the power of experiential learning and playfulness, without understanding all that they are, for the benefit of our adult learners. This research examines playfulness as a vibrant component of adult learning in classroom-based activities. Such adult playfulness may be a critical component in focusing and energizing the power of experiential learning so that material can be understood, retained, and transferred to the real world.

We may also examine community, social interaction, physicality, situatedness, affective
aspects and motivation that enrich complex human relationship with experience and playfulness in learning (Brown, Collins, & Duguid, 1989; Chen, 2003). However, given space and time limitations, this work tries to focus on the central concepts needed to conduct this research. This follows Dewey’s admonitions in his last book, “Scientific man is interested in problems, in situations wherein tension between the matter of observation and of thought is marked … he passes on to another problem using an attained solution only as a stepping stone” (Dewey, 1934, p. 16). So it is with this research, which is but a stepping stone to future research.

In order to bring our theoretical musings into the practical domain, we must address the questions that frame how specific learning is contextualized by the subject matter and value to the individual and the community. The next several sections examine the literature that helps us frame such questions and responses in the environment and setting of this research.

Research Context: Safety, Compliance, and Certification Training

This section addresses the adult learning and teaching needs that are driving this research, focusing initially on the increasing demands for more effective learning at lower cost to satisfy the growing needs for safety, compliance, and certification training in the 21st century. This is a massive challenge as we respond to the demands of a global economy based on ever-increasing complexity and technological changes in the transportation sector. The literature research also addresses the issues of teaching and learning environments as well as techniques.

*Driving Forces behind Growth in Training*

Significant growth in adult certification programs is likely with the increasing complexity of laws, regulations, technology, and interdependencies between disciplines and systems. These
processes weld the world together in a vast network of politics, commerce, society, arts and technology that gets more complex every day. We all see the fragility of these interdependent systems as simple human errors in judgment cause disasters. We can intellectually write-off quality, risk and safety issues to some degree, but when we sense the personal nature of human injury and loss we find that emotional reality demands we take action.

We have developed organizations whose sole task is protecting us from ourselves, our systems, and our technologies. For example, the International Standardization Organization (ISO) lists over 17,000 standards and publishes 1100 new ones each year (International Standardization Organization, 2008). Even though such standards are needed for planning and quality assurance, such standards require training to assure that organizations can comply. The expertise demanded as an outcome of such training continues to grow with the complexity of systems and technology. The need for more effective quality control, greater competency and better decision-making is shown dramatically by the growing number of errors and accidents in work, travel, home and leisure. These result in tens of thousands of deaths and millions of injuries for Americans each year, without any contribution from Natural Disasters, war or disease (Bureau for Labor Statistics, 2008; The World Almanac, 2008).

Organizations offer courses not just to avoid accidents, but as part of a philosophy of operation. Saccaro (1994) claims “We know that safety is a clear-cut barometer of organizational excellence. You cannot have an excellent organization that has a lot of accidents” (p. 3). He adds, “A healthy workplace is likely to be a quality workplace” (p. 4). Total Quality Management (TQM) is a widely known concept that is found in transportation as “a ship management philosophy” (Goulielmos, Mitroussi, & Gatzoli, 2008). Goulielmos et al. (2008) point out that, for a complete analysis, one has to use self-assessment and other management
tools to complement quality under a legislative and regulatory umbrella. TQM has evolved into a fully coordinated approach of government, industry and overseeing organizations, backed by quality programs and extensive training at every level.

Obviously, safety standards and quality cannot guarantee error-free and accident-free operation, since accidents unfortunately do occur. Saccaro (1994) tells us “Risk is inherent to living. It is a reflection of the fact that people are neither omniscient nor infallible…. Although safety programs cannot eliminate risk, they can go far to reduce it” (p. 2). He examines safety training from a perspective of a safety professional, and incorporates Safety Analysis as a foundation concept to help devise safety training programs. He positions the role of training in a safety program, as “Competent workers… are likely to be safe workers. Therefore competency training should be considered a component of a safety program” (p.1). Businesses often operate with an army of people with: Lean Manufacturing, Six Sigma, Project Management, and hundreds of other types of training and certificates. Large organizations create entire departments and even a ‘Company University’ in some cases, dedicated to training for in-house purposes, usually associated with Human resource groups. Such activities are often supplemented with formal or continuing education at extension universities for Certified Public Accountant (CPA), cost accounting practices, business analyst training, professional risk management and many other classroom-based programs. Oftentimes, the EL techniques such as case studies are a preferred learning activity, and are a standard part of many formal programs.

Our response to errors and accidents is often more quality and safety programs, with more licensing, certification and accreditation, backed up by more education and more training in every organization and activity of our already complex lives. Though it is a leap from quality and safety to the classroom, the need has caused huge growth in our education and training
functions, and there is no hint of when such dramatic growth will level off. A quick survey of the internet confirms that hundreds of formal, non-formal and informal training outlets offer courses for certification in every conceivable subject. Science, technology and research depends on many certificates and training, such as: Good Laboratory Practice, Good Research Practice, and even Good record-keeping. The health industry has one of the largest percentages of highly trained workers, with HIPAA Compliance, CPR, First Aid, hypnotherapy and hundreds of others. These often use EI techniques, including custom role-play simulations and practice dummies for drills and exercises. The computer industry often uses problem-based learning with highly interactive computer-based training techniques in their diverse certification programs.

The number of training organizations that offer such courses is astronomical, ranging from classical schools and colleges to professional associations, union training shops, technical training and vocational schools, and thousands of in-house activities. Compliance with a range of regulations and standards demands continuous updating of such knowledge for all levels of workers and professionals. This has become such a challenge that most government departments have organizations dedicated to compliance and certification training, such as the Department of Labor (USDOL) who has the Office of Compliance Assistance Policy (OASP), and website (Office of Compliance Assistance Policy, 2008). A website at Occupational Safety and Health Administration (OSHA) indicates the scale of such undertakings by listing one hundred and eighty-four topics for which they offer special courses just for trainers of certified courses.

This educational marketplace is not dominated by higher-education, but rather by the needs of the workforce in civilian and non-civilian applications. There are probably more people being trained by Human resource departments, unions and private and volunteer education organizations than by Higher education. For these reasons, the research may be limited, but the
practice is diverse and rich. This study will try to blend these together in a limited range of learning environments that can benefit from EL techniques and adult activities with playfulness.

*Safety, Compliance, and Certification Teaching and Learning Environment*

The teaching and learning associated with safety, compliance and certification training covers a broad range of pedagogical techniques and organizational options, and the techniques and practices seem to more closely match the incredible number and diversity of environments than the content or application. This is evident when examined through the lens of the Informal - Formal continuum as defined by Coombs (1968). Rogers (2004) defines formal education as the institutionalized, chronologically-graded and hierarchically-structured education system found in most countries. Such systems provide the education for Military officers, Captains of ships and planes, and professional careers. Non-formal education is any organized, systematic, educational activity carried on outside the formal system to provide learning to subgroups such as Trainmen, Engineers, Petty officers, etc. (Rogers, 2004). Merriam and Caffarella (1999) discuss non-formal settings including community-based learning such as extension programs, literacy and job skills programs, and others. Safety, compliance and certification training is found in each of these categories and settings.

There are different interpretations of these ideas. For example, Coombs (1973) says formal education includes “a variety of specialized programs and institutions for full-time technical and professional training… non-formal education is the same but not certified by formal education credentials” (p. 11). He sees informal education as “a legitimate source of serendipitous or self-directed adult learning resulting from daily experience that is as important as learning provided in more formal settings” (Coombs, 1968). Such learning often represents
the ways in which training for leisure activities is pursued. These options become less clear as we consider the very sophisticated training used for aircraft pilots and naval officers, which include classroom training, simulation training and many training activities and drills, as well as apprenticeship and mentoring activities. Etling (1993) offers balance “Learning occurs in formal, non-formal, and informal educational settings and that the learning experience can be equally powerful in each of those settings” (p. 73). If we are to discuss such training properly, we need to consciously drop any value judgments or implications of what is good (i.e. ‘formal’) or bad (i.e. informal) and focus on how to produce the desired outcomes, guided by an appreciation for the legacy and traditions of the application and organizations.

Technology has created a range of other options, including computer-aided instruction, simulation, and distance learning. Sherry (1996) tells us that distance education generally fits in between formal and non-formal education. Its’ hallmarks are the separation of teacher and learner in space and/or time, the volitional control of learning by the student rather than the instructor, and noncontiguous communication between student and teacher, mediated by technology. She says “Although technology is an integral part of distance education, any successful program must focus on the instructional needs of the students, rather than on the technology” (p. 6). We also benefit from Extension education and ‘spare-time culture’ as: a learning hierarchy of learners work in an apprenticeship model; a learning community in which social structures form and reform; and a learning network where knowledge is stored and accessed (Sherry, 1996). This kind of analysis is pertinent to many people in the mobile workforce in today’s world, where a company wants a unique certification more than a person.

Certain training environments do not fit these models well, such as the large scale virtual world simulators used in Aircraft Pilot training and Naval officer training. These are formalized
programs with considerable research and proven effectiveness, but they utilize EL techniques that may border on the edge of behaviorist brainwashing to accomplish their teaching goals. It may be that the Formal-Informal continuum is not suitable to properly categorize forms of education and learning, especially those on the far side of experiential learning.

Informal education may be seen as unorganized and unsystematic; yet it accounts for the great bulk of lifetime learning according to Coombs who popularized the split between informal, non-formal and formal education. Cole (1997) tells us that miners learn much from on-the-job training, but they also participate in extensive formal and non-formal training supplemented with many drills and exercises. According to Coombs and Ahmed (1974) Informal education is often seen as supplemental to learning in formal environments, but perhaps formal and non-formal training is supplemental to informal training at times. Non-formal may identify any intentional and systematic educational enterprise in which content is adapted to the unique needs of the students in order to maximize learning and minimize other tasks which may occupy formal school teachers (Masters & Nykvist, 2006). Style and quality issues may be accentuated in non-formal settings by subject matter experts who are casual teachers with other responsibilities (Marsick & Watkins, 2001). The proposed study setting of USPS boating safety classes matches what Taylor (2006) identifies as non-formal education, including a learner-centered approach to teaching, an emphasis on hands-on teaching, and the importance of fun in learning.

The Marsick, Watkins, and Cseh Model of Informal and Incidental learning, is accepted as a suitable model to examine such learner-centered activities, and important elements in the learning cycle (Marsick & Watkins, 2001) as seen in figure 2. In this model, Marsick and Watkins(2001) integrate the incidental learning process, noting that learning begins with some kind of a trigger, that is, an internal or external stimulus that signals dissatisfaction with our
current ways of thinking or being, our worldview, frames what we pay attention to.

Figure 2
Marsick and Watkin’s Incidental learning model (2001)

This frame is a pivotal point in the model since people diagnose or frame a new experience that they encounter, but it is also influenced by lessons learned at the end of a learning cycle. People assess the problems or challenges posed by the experience and compare the new situation with prior experience, identify similarities or differences, and use their interpretation to make sense of the new challenge. People refine their diagnosis by interpreting context, which leads to choices about alternative actions. Such choices are guided by recollections of past solutions and by a search for other models for action.

Many contextual factors influence the ability to learn, including available resources,
willingness and motivation to learn, and the emotional capacity to take on new challenges. Once an action is taken, a person can assess the outcomes and decide if they match his or her goals and intended results. This step of judging consequences then enables a person to draw lessons learned and to use these lessons in planning future actions. These become the new frame that a person uses to encounter a new situation, which brings us back to the beginning of the cycle.

Practical Implications for Training

The unique, successful and often field-proven techniques used in informal and non-formal training environments are attractive in training programs, but integration from informal settings into a non-formal or formal setting can be challenging and even problematic. HRD may foster informal learning with the premise that it is less expensive and more effective than formal learning, but research suggests that HRD often supports research into informal learning and mentoring programs in the workplace (Cofer, 2000). Programs are often tailored to the audience, setting and environment, and many incorporate EL activities, such as fire-extinguishing exercises, CPR practice, etc. John Dewey and others assure us that EL is the most effective learning technique for skills and real-world transfer. Smith, (2005) describes Kolb’s idea of EL as a “direct encounter with the phenomena being studied rather than merely thinking about the encounter, or only considering the possibility of doing something about it” (p. 1). Classroom activities based on such techniques often fit adult learning requirements.

Saccaro (1994) discusses the limitations of training, “Safety training is only effective in addressing skills and knowledge, and may play a small role in attitude. Many occupational safety hazards are not founded in training-related sources and cannot be alleviated by training” (p.1). He points out that it is imperative that learners in safety training classes are sensitized to danger
recognition and safety awareness, leading to a ‘change in attitude’. One of the biggest perceived problems is practical aspects of training and assessment in terms of meaningful outcome. TQM has been criticized as ignoring human resource issues, perceptions, attitudes, commitments and culture changes, because it focused the attention of managers on *production*. Goulielmos, et al (2008) suggest that TQM programs failed because they did not achieve ‘culture change’ related to the underlying values and behavior of employees. They frame one picture a ‘*quality culture*’ as nurturing “high-trust social relationships and respect for individuals and a shared sense of membership of the organization”, so that “The ship must become ‘our’ ship and the company ‘our’ company” (Goulielmos et al. 2008). Endsley (1995) examined such high-level goals concerning situation awareness, which Goulielmos et al (2008) argue is key to ‘Safety Culture’ which they see as synonymous with ‘mindfulness culture’ (Wieck & Sutcliffe, 2007). It is no coincidence that such concepts are integral to plans for military activities, the vocabulary of Nuclear Safety after the Chernobyl nuclear power plant explosion, the commercial aviation and chemical processing industries as well as the literature of ‘adverse medical events’ in the health and care systems (Kohn, Corrigan, & Donaldson, 1999).

Cole et al (2001) tell us that traditional safety training is often rule-bound. A set of procedures is often specified for how to deal with a specific problem, such as a first-aid or an escape-from-a-fire procedure. Such protocols provide a logical framework for how to respond to classes of events. History suggests that standard protocols often break down (Cole et al. 1997). It is aspects of culture-building, consciousness raising and attitude change that offers the best opportunities for transfer to the real world. Cranton (2006) suggests role-playing and simulation as good activities for raising consciousness and transformative experiences.

Cole et al (2001) investigated the effectiveness of ‘simulation exercises’ as role-plays
designed as unfolding stories of a real event that either was or had the potential to evolve into a serious injury event or disaster. Each simulation exercise story has a plot, characters who have goals and who encounter obstacles to those goals, and predicaments that cause well-rehearsed protocols to break down. The simulations purposefully avoid fixing blame and focus on the constructive use of foresight to prevent or limit the effects of a problem situation, which helps to bring stories to the forefront in a carefully planned teaching method (Cole et al. 2001).

Cole (1997) reports on the development of 70 narration based simulation exercises for the mining industry that proved quite effective. He explains, “Each exercise is designed to influence worker’s knowledge, attitudes and conduct concerning specific job-related hazards and tasks” (p. 325). Such interactive narrative exercises tap a deep core of story telling, with experiential and problem solving techniques working together in a real-world environment. Many studies demonstrate the creative ways that an intelligent, sometimes rational, emotional, and situation-dependent human decision-maker can create unforeseen consequences or results in direct opposition to the desired outcome. Wilde (2001) suggests that we have to examine the personal and communal values and situations in order to assess what effects specific education programs may actually produce, and then reassess them periodically as the situation changes. He tells a story of the ‘boomerang effect’ that happens all too often, “An interesting boomerang effect occurred as a result of a 60-minute televised safety program regarding drinking and driving…. Counter to expectations and intent, the program appeared to decrease the anxiety level about traveling on holiday weekends” (p.104). Wilde is not discouraging the attempt to train or educate, but his work consistently warns us to teach the right things and to assess our results intelligently compared with the important and desirable outcome(s).
Technology and Training

Simulation learning may be as simple as group role-play, or as complex as computer games with virtual worlds, but it improves results in transfer to the real world, and is recognized as imminently successful in the aircraft and marine industries and the Department of Defense (Miller et al. 1985). Computer-based simulations are standard for driver-testing and oftentimes even training. Computer science helped create the driving simulation and computer gaming industries, from which we have derived useful and credible models of interaction, engagement and playfulness as a factor in, and as an outcome of, learning activities (Gee, 2007).

Such technology will become more important in the future as the next generation learns to exploit such activities more readily than previous generations. Technologies used in gaming and simulation and distance education can significantly increase the array of learning techniques and opportunities. Candy (2004) examined the dynamics of self-directed learning and learners’ participation in a digital world with an internet, computer games and simulation as learning tools. He says “In years to come… today’s technologies are bound to seem crude and undeveloped. As time passes, the technology and the users will adapt to each other; the intuitive ‘user friendliness’ of information technologies steadily advancing more or less in direct proportion to the rising generation for whom they are becoming literally ‘second nature’” (p. 312).

A crucial insight from this discussion about the learning environment in the 21st century is the commonality of many of the needs, subjects and techniques available to handle the challenges of the training requirements for safety, compliance, and certification. It seems that we already have an extensive assortment of practical teaching techniques including a variety of simulation techniques that have been developed and refined in different educational settings that may be applicable to the safety, compliance and certification training environment. This is
attractive as we examine the possible scenarios for future development, and conclude that the needs will grow and be fulfilled by a wide range of organizations operating in an even broader range of settings. Of particular interest are experiential learning activities such as simulations that permit the instructional designer to supplement lecture and presentation with more interactive learning opportunities that match the learning requirements.

It is easy to look toward the world of technology to address these needs, and this certainly represents a logical and rewarding area of research when we examine other possibilities suggested by the internet and distance learning and computer-based instruction. However, we should also be carefully examining the basics and asking ourselves: how simply can I accomplish my goals? The closer we can come to learning around a bonfire in a social group with the use of songs and dancing and games the better we are likely to do the job since we obviously learn better in such powerful experiential environments.

Along these lines, there also seems to be plenty of room in the area of role plays and narrative simulations and other forms of adult learning activities that are less technology dependent. However, the volume of literature has been weak in such design-oriented research and in general, a real challenge has been a lack of empirical research on many issues, combined with a dearth of practical theoretical models to direct design choices and related decision-making for curriculum and instructional designers. Oddly, it is easy to find examples of exciting practices and applications that are widely used, but hard to find useful research literature describing how and why they work and how we can design other activities that also work.

Such training cannot be easily ‘sliced and diced’ as in a typical classroom, presentation oriented instructional design model. All aspects of the environment and context including the legislative and regulatory environment have an impact on the learners, instructors as well as the
content and context. We must design such training in a more holistic fashion, seeking how all the pieces fit together as we bravely step forward to devise new ways to teach material and change attitudes and build cultures. The consequences of what is done are far reaching and often times unknown consequences in the practical and/or ethical domain can become paramount. The next section focuses on the design of such learning activities framed around the specific boating safety application courses offered by the USPS, the application focused on in this research.

Research Context: Transportation Safety

All of these settings and different teaching and learning techniques are meaningful as we examine the particular applications of interest to this research and pay attention to the critical role of transportation. An outstanding characteristic of transportation is the pure scale of sizes, numbers, and volumes of everything it creates. This section investigates the training needs of transportation, shipping, the maritime environment and specifically the boating safety training.

An outstanding characteristic of transportation is the pure scale of sizes, numbers, and volumes of everything it creates. Long before men could move anything weighing more than a few hundred pounds more than a few feet on wheels, hundreds of tons were being moved many miles on boats larger than modern eighteen-wheelers. Today, a modern oil tanker weights more than the Sears Tower. The Wall of China, Stonehenge and the pyramids flaunt transportation capability more than architecture or technology. Transportation accidents awe us with scale: an eighteen wheeler collides with an object at 50 mph with the force of a hundred elephants at full run, and a bicyclist at 25 miles per hour hits with the force of five NFL linemen (The World Almanac, 2008; Graham, 1932). Over 40,000 Americans died and more than three million were injured last year in auto accidents (Bureau for Labor Statistics, 2008).
We can expect continued technological changes and competition to push the demand for an already extensive training and certification activity. (Current growth rates are 2%–4% per year.) It is more than just scale, since transportation is ubiquitous in our complex global world, it is the combination of pervasiveness and a qualitative difference in the type of training required. This environment includes a high degree of physicality and interaction with heavy, fast-moving equipment. Since operator error contributes to most accidents, transportation, including air, rail, marine, auto and others needs safety and accident prevention programs with aggressive training.

One interesting fact is the wide acceptance and generalizability of the rules that guide transportation. Since maritime activity has dominated expansion around the world, the rules of maritime courtesy and collision prevention have been accepted for centuries, and are encoded as international rules (US Coast Guard Auxiliary, 2008). These rules are accepted for rail, auto and aircraft travel. Most transportation world-wide use the same “rules of the road” and similar lighting and navigation systems, all derived from the same source: the Maritime community.

With this history, vessel captains world-wide can avoid collision without understanding a word of those who share the seas, which inspires the selection of ‘rules of the road’ teaching in this research. These rules are exactly the same content as for captains of aircraft carriers, tankers and police patrol boats. These rules are also closely related to the rules for aircraft pilots, rail engineers, truck and automobile drivers. In all of these domains, a visible red light means ‘give way to the vessel or vehicle with that visible red light.’ A visible green light means ‘you may proceed with caution since that vehicle or vessel may give way to you.’ The same rules world-wide, so a training technique for boaters would be effective in all these applications and all of these can share a similar rules of the road training module with slightly different props.

Though the rules may be the same, the variety of technologies and ways in which it is
applied has evolved many different training and certification programs. A quick survey of the Internet discovered these; FAA Flight Test and FAA Avionics Systems Certification, Forklift Drivers, EMS driver, Fleet Vehicle Safety, School Bus Driver, and Medic- Rescue Apparatus Driver Certification, as well as many others. The size of the demand can be seen on one of many pages on the OSHA website, Standards for the Maritime Industry, which describes twenty-eight scheduled courses at diverse sites over a twelve-month period (Occupational Safety and Health Administration, 2008). This list does not include the hundreds of courses such as U.S. Coast Guard training, and a growing list of others.

*Technical Training versus Safety Culture*

Despite the obvious need, and the predictable ‘knee jerk’ reaction to ‘close calls,’ ‘near misses,’ accidents and catastrophes, we must be cautious in assuming that improved or more training / education will automatically result in improved quality, fewer mistakes, or lower accident rates with fewer injuries and deaths. There are many cases where the converse has proved to be true, and a number of studies have examined this phenomena. Wilde (2001) examined this in great detail, and points out that few educational programs actually ‘fixed’ the problem they were designed to ‘fix.’ He points out that “better driving skill is not associated with greater safety” (p.92) and “study of the accident record of racing drivers in the USA found these drivers to be involved in crashes considerably more often than drivers on the average” (p. 93). Goulielmos et al. (2008) studied the disappointing history of the Martime Shipping Industry and its attempts to incorporate ISO 9000 conventions. Despite a apparently successful zero defects program, they ascribed much of the perceived failure to improve outcomes to the lack of recognition of the role of the Captain in the maritime industry. They proposed a Total Safety
Management philosophy and a Safety Culture for ship’s Captain (Goulielmos et al. 2008). The need to tailor programs and training to match the essential forces and structures of each application are too often ignored in the attempt to offer a ‘one-size-fits-all approach to every problem. “The culture of the ship should be transformed … to a Safety Culture, and even more to an Informed Culture” (Goulielmos et al. 2008).

The National Transportation Safety Board (NTSB) guides America’s approach to the transportation industry, and in 2008 they announced two new marine safety training courses to be held in 2009 at the NTSB Training Center in Ashburn, Virginia (near Washington, D.C.). Accident Investigation Orientation for Marine Professionals and Marine Accident Investigation provide in-depth exposure to NTSB investigative techniques (Callaway, 2008). This follows the strategy Wilde suggests, and is aimed at mid- to senior-level marine industry professionals.

Safety, Compliance and Certification Training

In a sense, the challenge is not all that confusing, and it comes to a way of thinking, a culture, a set of assumptions that are accepted in the hazardous environment. Goulielmos et al. (2008) examined the development of what they termed “ship’s safety culture.” They suggest that the recipe for success is that beliefs, values, actions, and need for safety are communicated credibly, consistently and saliently to captain and crew, so that the captain’s culture can be received and felt strongly by the majority of those on the ship. This must be communicated in concrete terms since safe working practices make much more sense to the crew than an abstract notion of quality imposed from above. Unlike quality, safety is underpinned by statutory legislation and as a result the entire crew is more likely to build on what already exists. Saccaro (1994) tells us that workers have an attitude regarding their influence on their workplace, either
empowered and able to make significant changes to reduce risks, or powerless to do so. The safety culture must encourage and enable the development of such attitudes of empowerment. He says that the most important attitude to promote… is one of personal responsibility for the prevention of accidents and injuries” (p.7).

This culture seems to impact many facets of human endeavor, but a significant issue to learning is the emotional state associated with the learning process. The world is regarded as rational and objective, and this is reflected in our education and training, which offer a scientific approach to intellectual enquiry. This was noted by Boud et al. (1993) who stated: “emotions and feelings are the ones which are most neglected in our society: there is almost a taboo about them intruding into our education institutions, particularly at higher levels” (p.14). Likewise, Fineman (1997) made a similar observation: “Learning is inextricably emotional“(p. 13). Boud and Miller (1996) stated that: “Emotions and feelings are the key pointers both to possibilities for, and barriers to, learning“ (p.10). Emotional intelligence can help learners to access and surface unconscious feelings, control negative thoughts and anger, and reduce conflict. They may take greater control of their feelings and emotions and so progress towards more productive behaviors that they wish to develop, such as increased calm, the ability to challenge a belief set, or the development of increased sensitivity to self and others.

Recreational Boating Safety

In a sense, this review circles around some important issues that Wilde (2001) raises, not because of any debate, but out of consideration for the real-world and the myriad of choices and traditions concerning how to deal with such issues. One of the more difficult challenges in this century will be the growth of new industries and activities and their overlap with others in which
historical choices have produced different structures, legacies, organizations and learning techniques. For example, the growth of leisure boating and the explosive growth of the global maritime industry have created overlap, confusion, and competition for space and resources. Oddly, much of the material and content that people need to learn is almost identical, yet, quality assurance, certifications, licensing, education, training, budgets and learning techniques are radically different across the world in similar applications.

Even as leisure boaters try to relax and enjoy, accidents plague our complex life style. For example, in 1995, over 5,000 boating-related deaths and more than 25,000 injuries were reported in the US (Smith & the Wet ICE Collaborative group, 1998). In 2000 alcohol was involved in 31 percent of boating fatalities, and 84 percent of boating fatalities occurred on boats where the operator had no boating safety course (Commandant USCG, 2001). A key problem is the attitude that safety is 'no big deal' and boating 'is just fun' (Spaulding, 2007). Bell, Howland, Mangione, and Senier (2000). studied 3,042 boaters, and found that only 17% had formal training, and those used life jackets as little as those without training and were just as likely to use alcohol while boating. They conclude unsafe boating practices are probably due to poor risk perception and inadequate boater training programs. They suggest a change in boaters’ attitudes and better training that transfers to the real world. These requirements for quality, retention and transfer, framed by the need for real-world assessment drive the need for this study.

Every year, thousands of Boating Safety courses are conducted throughout America to qualify tens of thousands of boaters for boating certificates. Courses are offered by organizations such as the United States Power Squadrons (USPS) or the US Coast Guard Auxiliary (USCGA), as well as agencies such as state or marine police and game and fisheries departments (Boat US, 2008; US Power Squadrons, 2007a; US Coast Guard Auxiliary, 2008). Boating safety classes
may be taught by experienced boaters with subject knowledge and a commitment to boating (US Power Squadrons, 2007b; US Coast Guard Auxiliary, 2008). Instructors match the profile for non-formal teachers, often with less formal training and more mentoring or personal experience (Marsick & Watkins, 2001; Spaulding, 2007). This is evident in a classroom by the “war stories” and anecdotal tidbits in lectures and discussions, with a blend of formal and informal techniques in which the setting and social factors dominate. Learners in USPS boating safety classes are pursuing an immediate real-world need for a specific set of skills, and the USPS is organized to encourage them to become members and to progress through a long-term educational program in a staged progression from novice to expert.

In sailing days, apprenticeship at sea was considered an ordeal, and in 1834, Richard Henry Dana’s *Two Years Before the Mast* described a sea voyage deemed insufficient to make him a hardened sailor. Training that took months last century we want to acquire in a few hours, but demand that it be meaningful. Our challenge as educators is to find better ways to teach and better ways to help our learners learn, so that we can do more with less in less time. This is our challenge: find ways to teach what we know is right while adapting to a 21st century drive to rush everything through in the minimum time with the least attention, cost and effort. In recent years, shorter and more condensed curriculum is placing pressure on the course materials and instructors to maintain quality, retention and transfer. This environment seems to encourage lecture-oriented techniques of ‘*teaching to the test*’ (Spaulding, 2007).

Maintaining and preserving quality is a serious challenge, which encourages an ongoing evaluation of teaching practices and materials. Some practices in less formal teaching environments tend to be more learner-oriented and encourage high levels of learner involvement and engagement which may produce better results in retention and transfer to real-world
environments, which is a major issue in compliance and safety training. Perkins and Salomon (1988) conclude that, “students often fail to apply knowledge and skills learned in one context to other situations. With well-designed instruction, we can increase the likelihood that they will” (pg 9). The bottom line is that better training that transfers more effectively to the real-world and will make a difference in all these situations.

*The United States Power Squadrons*

The United States Power Squadrons (USPS) is an impressive non-profit, educational organization dedicated to making boating safer and more enjoyable. Local squadrons, such as the Main Line Power and Sail Squadron (MLSPS), offer Public Boating Safety Courses for new boaters of all ages which meet the legal educational requirements for boat operation. Attendees tend to be middle-class couples with teenagers and newly purchased boats. Such public offerings are also a means of drawing new members into the USPS, and a desire to become competent mariners may be inspired by the course (Spaulding, 2007). Considering the “yachting crowd appeal” of the USPS, it is not surprising to find many members from the dominant-class with a professional, training-oriented culture and members who contribute to their communities by promoting safe boating through education (USPS Web Site). Members also socialize in a range of activities both on and off the water, and squadrons offer more advanced courses for members taught by experienced member-instructors. Such courses appeal to educated adults who may attend over a period of years to become more competent mariners and earn certificates and grades. The courses also help to train and recruit instructors (Spaulding, 2007).

The USPS is also an effective pressure group representing the rights and privileges of boaters to government and regulatory agencies. It has a great deal of clout built over decades and
a membership that wields disproportionate power in the electoral process. Its history, size and clout are impressive and its credibility and reputation seem unimpeachable. In its ninety-year history it is proved as an adaptable decentralized organization with a formula for long-term stability. “Organized in 1914, USPS is a non-profit, educational organization dedicated to making boating safer and more enjoyable by teaching classes in seamanship, navigation and related subjects.” The Web site comes across as a public relations presentation, as one would expect with almost a century of history and Chapman as the famous founder, The USPS Web Site continued, “USPS has some 60,000 members organized into 450 squadrons across the country and in some US territories. USPS is America's largest non-profit boating organization and has been honored by three US presidents for its civic contributions” (USPS Web Site).

In a cooperative program with the US Coast Guard Auxiliary, squadron members conduct courtesy Vessel Safety Checks and help the National Ocean Service keep nautical charts accurate by reporting chart corrections. Squadrons participate in community projects and offer courses in subjects like Seamanship, Piloting, Plotting and Position Finding, Celestial Navigation, Cruise Planning, Engine Maintenance, Marine Electronics, Sailing, and more. These courses are taught by experienced member instructors, and members who complete them receive a certificate and earn a nationally recognized grade (USPS Web site). Public boating courses were voluntary for most of USPS history, but recent legislation places the boating safety courses into a legal role to meet educational requirements for boat operation in all states. Such laws came from accidents that plague the boating community and a greater emphasis on legislated remedies such as training, inspection, testing and licensing (Spaulding, 2006).

The USPS has practical down-to-earth concerns and political issues that are both idealistic and practical (Spaulding 2006). The philosophy of their educational programs derive
from the original charter by Chapman from the early 20th century, refinements due to experience, and the impact of law, regulation and socialization. A review of the course designs and materials suggests that the educational philosophy leans strongly toward the 19th century Liberal view, which strives to educate knowledgeable Captains and Gentlemen of the Sea to maximize the safety, pleasure and reasonableness of boating (Elias & Merriam, 2005).

However, the most obvious everyday influence is the social roles of the membership including educational leadership and mentoring framed by their relationships with each other. Humanists want the learning community to work and learn together in a cooperative fashion with respect for each other and the sharing of stories and experiences. As adult classes proceed, attendees begin to recognize the dangers of ignorance in a threatening environment like boating. The learners arrive with pre-existing issues; emotional reactions, fear, physical discomfort, legal responsibilities or exposure, salvage rights, and even lower insurance premiums. Such issues are quite relevant to these adult students, and expand the teacher’s agenda beyond the basics of the USPS course contents. The classroom setting and the instructor’s role testifies to the universal use of ‘stories to live by’ or ‘culture tales’, which help us understand goals and conduct and devise responses to challenges and problems (Cole 1997; Crites 1986). Adults sharing and discussing a broad variety of subjects with each other and the instructor is natural (Elias & Merriam, 2005), but evidence of progressive ideas appear in the way members seek to create an organized and structured communal environment in which all share the water and knows and abides by the spirit of the rules. The teaching often emphasis skill development and self-learning to become aware and savvy mariners, again suggesting a Progressive inclination. Last but not least, blatant advocacy for good seamanship, safety issues, and responsible boating permeate the USPS culture. Advocates also want good things to happen following their agenda of clean water,
pollution control, social responsibility and competency for women. For a middle-class group in the twentieth century, this is about as radical as they get (Elias & Merriam, 2005).

A practical vein runs through the USPS: these people are doers first and thinkers later. This focus on practice rather than philosophy is an accepted observation about adult educators in general (Pratt 2005). The USPS espouses its beliefs strongly, and the message is everywhere in the classroom, but the teaching materials are more behaviorist, the classroom style is more humanist, and the purpose and goals are more radical than the instructors tend to verbalize, and is often seen in real world evaluations (Pratt, 2005). The program orientation/worldview shows a strong commitment to the idea that there is a right way and a wrong way, a definite set of rules. To the USPS, the ultimate goal of adult education to is raise the bar for performance on the water and to gain stature within a group that believes such knowledge and activity to be worthwhile and honorable. These people are trying to keep alive traditions such as personal responsibility, honesty and serving others that they see as the mainstay of society. There is also an assumption of personal responsibility to learn all that material as part of a community of boaters that work and study together to bring the entire community to a higher standard. In one sense, the USPS constitutes a “Community of Learners” in the real world (Rogoff, Matusov & White, 1996).

The biggest un-theorized element of the success is the degree of authentic relationships the instructor created with the other instructor and the student/fellow members. This key practice element is not an espoused part of the USPS philosophy, but it is clearly a major contributor to organizational success. Many writers relate such social bonds to organizational success and culture (Brookfield & Preskill, 2005; Merriam et al, 2006). When USPS members socialize, the strength of the relationship melded in the classroom helps support social inter-relationships, which helps define the organizational culture.
There is a culture that permeates the organization and the on-board practices of many USPS members: a culture exemplified in the navies and merchant fleets. It is this aspect that makes USPS boating safety courses particularly attractive as a ground for empirical research. As seen in previous literature, a major goal of safety and certification training is the development of a culture and an attitude toward safety. The USPS has provided a safe avenue for such cultural and attitudinal development for almost a century. It is my belief that these goals are compatible and it is our challenge to find better ways to meld these into more effective training.

A crucial insight from this review of the learning environment in the 21st century is the commonality of many of the needs, subjects and techniques available to meet the challenges of the training for safety, compliance, and certification. There is an extensive collection of practical teaching techniques, including a wide assortment of simulation techniques that were developed and refined in non-formal and informal educational settings that may be applicable to a more formal educational setting. This is an attractive framework with which to examine the possible scenarios for future development, and conclude that the needs will grow and be fulfilled by a wide range of organizations operating in an even broader range of settings.

*Designing Experiential Learning Activities with Playfulness*

This next section focuses on the design of experiential learning activities such as simulations that permit the instructional designer to supplement lecture and presentation with interactive learning opportunities that match the learning needs better. These needs are framed around boating safety courses offered by the USPS, to teach Rules of the Road, Nav-Aids and Lights. This section addresses the design and use of a Playful Adult Learning Activity (PALA) which blends experiential learning and playfulness in an adult learning environment. This design
process derives a set of general specifications that are appropriate for transportation sector safety, compliance, and certification training where real-world success in critical.

The goal is to research and elucidate the process and rules of design to fulfill these key objectives. The activity must be physically active, mentally engaging and intimately related to the content. It must be usable in a wide variety of environments, including informal, non-formal and formal settings, while being simple and easy-to-incorporate into a curriculum. Though there is a history of variety, many courses in the transportation arena can share a similar ‘rules of the road’ training module with different props. It is this potential range of applicability that is attractive about this application as a research technique. If such improvements can be made in teaching and learning important content like the Rules of the Road for so many potential users around the world, it is an important contribution to the state of the safety teaching art.

The plan follows a basic instructional design process such as Saccaro (1994) used in his work on narrative simulations for safety courses with miners: 1) Determine if training is needed. 2) Identify training needs. 3) Identify goals and objectives. 4) Develop learning activities, 5) Conduct the training. 6) Evaluate program effectiveness. 7) Improve the program. As examined earlier, the need for training is well-established and has been recently legislated. A number of studies and organizations have determined what those needs are (point # 2), and have converted those requirements into course designs and field-proven content.

An extensive search of the literature offers little guidance in the conceptualization or design of experiential, situated, embodied and playful learning activities for an adult classroom. Some useful work is found in gaming and simulation environments, though Marshall (2007) complains of too much focus on technical development, “Theory and empirical demonstrations of the utility of tangible interfaces for learning have been less forthcoming. This has led to a
situation where designers of learning environments … must therefore rely upon intuitions about physical interaction” (p. 1). It is into this research environment that this study pursued adult learning activities for certification and safety training.

Saccaro(1994) suggests a standard instructional design project plan but does not address the specific design techniques which our requirements seem to demand. Specifically, there is an assumption that most of the actual design work is somehow based on creative ruminations without any substantive link between requirements and designs. However, the environment is quite demanding and specific in terms of desired output for a range of facilities and instructors which are limited in flexibility.

The Wilson and Beard EL model (2003) was used as the basis for the design of a meta-model: the learning combination lock (LCL). The LCL supports a systematic design process for the educator or developer to select the ingredients of a learning activity. The enhanced awareness and examination afforded by this model should lead to more considered and appropriate design decisions rather than instinctive or random guesses and trial and error. The experiential learning model and the LCL is sufficiently accommodating to deal with the activity design.

The LCL model uses six tumblers to visually represent the alternatives or ingredients which may be selected from left to right: the places and elements tumbler relates to some of the various components found in the external environment and which may be used as part of the learning process. Adjacent is the milieu tumbler of options which can be incorporated within outdoor management development and other indoor learning exercises. The third tumbler is the mediator which connects the external environment and its associated stimuli with the internal cognitive environment. Our senses alert us to the presence of the stimuli which begin the process of perceiving and interpreting.
Moving from left to right, the emotions tumbler presents some of the vast range of emotional responses we can make to the stimuli and is a very powerful aspect of the learning equation. The fifth tumbler illustrates some of the various forms of intelligence whose development may be the objective of the learning process. The sixth and final tumbler in the learning combination lock focuses upon the various types of learning theory which, on the one hand, may be widely recognized and applied, or personal ones.

Figure 3
Learning Combination Lock Model (Wilson & Beard 2003, p. 7)

This somewhat mechanical model is inadequate to fulfill the complete task. There are more than six important factors in the activity design that have been examined in this review, and there is more than one combination that works in the real world. There is also an issue of variability, in that each factor seems to have equal control of the outcome, whereas the value of any factor is probably dependent on other factors and often in a state of flux. Finally, a critical
theorist may observe that somebody must be in control to dial the right combination, whereas adults often change power and decision-making relationships as fits their needs and perceptions.

**Determining a Design Start Point**

A start point can often be determined by seeing what worked in the past. Story-telling, role-playing and simulation are attractive options that have been used for centuries. Cole, et al. (2001) examined the use of Simulation Exercises for Safety Training and reports the results of a survey of organizations that used problem-solving simulation exercises. The exercises are designed to teach judgment and decision-making skills by building off well-designed simulations using internalized stories to guide and direct goals. They conclude that the techniques were well received and effective on a number of criteria, and recommended the continuation and expansion of simulation exercises for safety training on a broad scale. In USPS Boating Safety Classes, story-telling helps foster changes in attitude by hyper-sensitizing learners to situations and near-misses or situations that were worst than near misses. USPS stories may be standardized, in that the stories get passed around and only those that resonate get repeated often and passed through generations of instructors and customized to fit an instructor’s personal experiences. Once sensitized, the group discusses and digests the subject and builds consensus on appropriate action, which builds personal resolve (Brookfield & Preskill, 2005).

Silberman-Keller (2003) points out that non-formal education teaching and learning processes exhibit varied forms of discourse with broader pedagogic objectives characterized by debate, dialogue and conversation. Such narratives and role-plays are often supplemented with technology in the form of learning objects. Some forms of simulation are thousands of years old… the ancients used model boats and armies to plan their battles and wars and simulated
warfare was a art-form in the Roman Coliseum. Models have been used since the beginning of time to simulate what we want and how it will look before we build it. Math and word games are centuries old, and model sailing ships and airplanes preceded the reality by years.

*Simulation: An Attractive Instructional Technique*

We use simulation so extensively that we hardly recognize it as a learning activity. A modern simulation provides an environment that permits the learner to become intimately engaged in an artificial scenario designed to invoke reactions akin to a real-world scenario. Experiences in a simulator can range from programmed learning, to sophisticated visual-motor training, to transformational events. The Marine Boards Committee examined the U.S. Coast Guard licensing program and concluded that simulation offers a mechanism for determining mariners’ competence on a more comprehensive basis than current written multiple-choice examinations (National Research Council, 1996). Patterson, Veitch and Billard (2006) examined small boat training in Canada and recommended the use of computer-based simulation for training, “simulation could be used to teach navigation safety, basic navigation skills, basic maneuvering and emergency procedures. Through a structured program, the trainees will be able to enrich their understanding of the dynamics of boating as well as the associated risks” (p.9).

This requires acceptable technology, well-defined curricula, good courseware, properly trained teachers, and appropriate budgets. In 1987 I created the first personal-computer based sailing simulator using actual charts and scenery to teach sailors how to sail, and vestiges of those designs exist today in newer products. Drawing on that experience, I designed a boat docking simulation with simple mechanical props to enable novices to learn how to maneuver and handle boats in docking situations which are particularly intimidating and uncomfortable for
new boaters. When designing a simulation to handle the Rules of the Road teaching requirement, it seemed reasonable to carry forward the basic concepts from the docking simulation which can easily be extended to other applications.

Outcomes and Transfer of Learning

Such role-play and active learning enhance engagement which may strengthen learning, retention and transfer. Kearsley and Shneiderman (1998) defines engagement as, “Students are intrinsically motivated to learn due to the meaningful nature of the learning environment and activities.” They differentiate between engagement and interactivity, placing emphasis on providing an authentic setting for learning. Laurel (1991) described engagement as: "the state of mind that we must attain in order to enjoy a representation of an action. engagement entails a kind of playfulness - that ability to fool around, to spin out 'what if' scenarios" (pp. 113-114). Note how the authors have tied together engagement, motivation and playfulness.

Play is an engaging and deliberate activity to which we devote great effort, but struggle to grasp it as a factor in learning. Play is seen as voluntary and intrinsically motivating, with active, even physical, engagement; and a make-believe quality (Rieber et al. 1998). Playfulness assists development and promotes work satisfaction and productivity, and is often exhibited in social groups (Staempfli, 2007). Katzeff (2003) suggests that playfulness depends on framing (cues about how to act) and may be as much a social construct as individual. Perhaps playfulness in less-threatening learning situations is about coping, avoiding embarrassment and emotional trauma and maintaining motivational levels, as in improving morale. When studying non-formal educators, Taylor (2006) noted “the essentiality of fun with learning.” Flexibility and playfulness can help reduce cultural discord by reducing the perceived psychological risks
associated with participating in another culture (Lugones, 1987).

Playful kinesthetic activities may become powerful learning tools if specifically designed to encourage transfer to real-world use. For example, with a steering wheel and a horn the learners pilot a boat the way they drive a car... no thinking required. According to Perkins and Salomon (1992) students take what they know and extend it to a new domain in low road transfer if we provide them opportunity and clues. Sometimes, students consciously extend themselves from one context or application to another in high-road transfer. It is in this spirit that the PALA is designed to use both low-road and high-road transfer on different elements of the content to learn about the rules of boating (Spaulding, 2008a).

Learning often seems related to the idea of being introduced to a ‘new world’ of ideas and new realities, such as we see when we physically travel to a new environment for the first time. Lugones (1987) revealed a personal account of “traveling” from her own world of a woman of color to the often hostile world of the White Anglo male. According to Lugones, we may be playful in one world but not another, because we feel at ease in the one world but not the other, and feeling at ease can help us be successful. Aikenhead et al. (1999) conceptualized the transition between a student’s life-world and school as a cultural border crossing and explained cognitive conflicts arising from cultural differences in terms of collateral learning.

As we move between micro-cultures, we may negotiate border crossings so smoothly that borders may seem invisible or nonexistent. It is when we feel some discomfort with a micro-culture that border crossings become less smooth and need to be managed. Contributing to our discomfort may be a sense of disquiet with cultural differences or an unwillingness to engage in risk-taking social behavior. For example, if self-esteem is in jeopardy, border crossing may be hazardous and we tend to react in ways to protect our egos. Flexibility and playfulness may
reduce cultural discord by reducing the perceived risks of participating in another culture. Playfulness encourages an emotional state exhibiting spontaneity, creativity and fun in learning. Motivation and willingness to participate are essential to explore concept construction, and a sense of community encourages learners to engage the material and articulate ideas, playfulness clearly energizes learning (Fosnot, 1996; Julyan & Duckworth, 1996; Schank, 1997).

**Situatedness and Embodiment in Design**

Vaughan (2006) notes that the lived relationship between user and object is an evolving participatory act in an intimate relationship between wearer and clothing. This insight informed my thinking when some users were not holding the boat *properly* so that it could be worn comfortably. I created holes on both sides of the prop so that their hands instinctively held the boat in the best viewing position and balanced on the center of gravity. Not only is the prop more practical and easier to use, but it reduces the impulse to carry or handle it: instead, it becomes part of the person’s body. Vaughan (2006) confirms this thinking, “The situated practice of being, as expressed and understood through the clothed body, is an interactive and subjective act of communication and creation. … Such a relationship infers a rich, dynamic and intimate relationship between object and body.” In the framework of the PALA, participants are more likely to make the mental juxtaposition and are not distracted or inhibited in the relationship.

Play is often physical and the sensation of movement and awareness of the body in play may contribute to the learning that occurs. A critique of Kolb’s ideas of EL is a lack of attention to the body as a site of learning and knowledge construction (i.e. somatic or embodied learning). Fenwick (2003) argues that, “Experience exceeds language and rationality, because it reiterates the crucial locatedness of bodies in material reality, that cannot be dismissed as a solely
linguistic construction” (p.6). Iacucci, Linde, and Wagner (2004) claim “Meaning is created in use of shared objects and social interaction is related to how we engage in spaces and artifacts”. (p.7). They extend this idea into a powerful link between learner and the world, “In this interplay the body has a central role, in many ways the body can be seen as the medium for having a world” (p.7). The sensation of a world, with physical activity and the self-perception of physicality is key to our identity and it leads to a concept of wearing an object (dress-up as) or becoming an object (pretend to be). Vaughan (2006) examined how we dress, “Usually this ‘covering’ is more than practical, as the process of dressing is complex and layered with personal, social and cultural meanings“ (p. 42). This seems natural; we take on the guise of how we dress: if we wear a uniform, we stand straight and tall; if we dress as a bum, we slouch. We change voice and mannerisms as we change clothing, and even ‘dress-up’ to feel good. Vaughan (2006) confirms this thinking, and others recognize the playfulness and accept that embodied relationship. With such acceptance, our playfulness may be accessed by what we wear.

According to Goodwin and Goodwin (2000), learning is tightly tied to the objects and materials with which we surround ourselves: the setting. “Cognition is not lodged exclusively within the head of an isolated actor, but instead within a distributed system, one that includes both other participants and meaningful artifacts.” This includes participants’ bodies in the distributed system as noted in… “Crucial components of the cognitive activities in progress are located in the setting and in the performed actions of participants' bodies” (p. 8). Clearly, our learning is guided by what we do with our bodies and what we do with objects in the learning. We may learn skills, tactics or stratagems from different activities with the same objects.

However, any attempt to rearrange that space or use it in ways other than the learner expects, must deal with the many subtle issues raised by Dekel, Simon, Dar, Tarazi, Rabinowitz,
and Sterman (2005), who highlight how we set up the space, how we present the space and how we situate the participant within that space. This challenge cannot be met by changing the space, rather we must purposefully change the way the participants ‘see’ the space. We must get their imagination to accept a different world with a minimum number of props and changes. In this regard, playfulness is especially crucial to the success of the activity.

Although motivational factors are recognized as crucial for learning, playfulness is rarely discussed in connection with adult learning. Still, playfulness may provide critical motivational forces to support improvisation and stimulate novel lines of thinking while arousing functions within the zone between what is already mastered and what is yet to be learned. Katzeff (2003) maintains that, “Play, thus serves a role in development and may contribute to the emergence of something new through evoking functions in the zone of proximal development.” Likewise, Iacucci et al (2004) claim that our interaction with the world is so intimately mediated by our bodies that our identity is derived from that relationship. The PALA enables the learner to create a micro-world with a few cognitive clues that enable them to explore the context driven by their own playfulness and engagement (Frank, Helms & Voor, 2000).

The setting can be of any type or collection of objects on any content of interests, but when a group accepts the play environment, all are safe to drop inhibitions, suspend credulity and nullify skepticism According to Polaine, (2005) true interactivity is a feedback loop of action-reaction-interaction and involves collaboration or exchange. This state is variously described, but the concept of FLOW (becoming absorbed in an activity) has become a favored way of describing this phenomenon for individuals and groups. Flow has become a mainstay of the affective domain in the world of gaming, play, and activities as the “psychology of optimal experience” (Csikszentmihalyi, 1990). Several case studies suggest that the flow principle can be
applied to interactivity in groups and engagement may begin and end with playful experiences that are satisfying in their own right. This is what happens in a playful social group, where participants become performers in the interaction (Polaine, 2005).

As Goodwin and Goodwin (2000) explain “Crucial components of the cognitive activities in progress are located in the setting and in the performed actions of participants' bodies“ (p. 8). Wlodkowsky (1999) also tells us that “When learners imagine or enact the physical and emotional properties of an idea, the concept becomes more salient and engaging … Using images and the physical senses to experience ideas makes them more directly compelling and enhances their emotional associations” (p. 236). As we develop simulations or role-plays, we are aware of the physicality, and use that awareness to fully engage the adult in the learning activity

A Playful Adult Learning Activity for Boating Safety Courses

The design rules that we have derived during this investigation can be summarized into a recipe type structure that may be useful for other future designers (p. 55). The goal is to have fun and improvise with relevant and transferable content. The design objectives are best learner impact in understanding and retention at the lowest investment of money, manpower, and classroom time. This investment is justified since playfulness may strengthen the learning process, enhance quality and retention and improve likelihood of transfer (Rieber, 1996).

As the design evolved in a directed fashion to improve the deliverable(s), it was based on the general specifications in table 1. While not specific enough for every need, these design specifications represent a consensus of researchers filtered through an extensive developmental program, action research project and formative evaluation designed to produce a usable set of general specifications. As cognitive and affective elements, engagement and playfulness are
powerful constructs in experiential and non-formal learning (Laurel, 1991). All else is distraction to be eliminated, so the activity and props were redesigned and enhanced a number of times to be as simple and easily applied as possible. (Spaulding, 2008).

Table 1

<table>
<thead>
<tr>
<th>Development specifications for a playful learning activity for a classroom</th>
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<tr>
<td>Setting and rules must qualify as an accurate micro-world, with a minimalist set of rules and setting and props that are totally self-contained;</td>
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<tr>
<td>Underlying concept of the play activity must fit the concept of the micro-world, so that the learners can accept and adapt quickly to the rules.</td>
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<tr>
<td>The environment and rules should be more demanding than the real world, involving increased risk factors and more challenges in a shorter timeframe.</td>
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<tr>
<td>Activity must be content-related at all times, with no superfluous rules or distracting elements or staging components, and nothing from outside;</td>
</tr>
<tr>
<td>Activity should have action and easy-to-learn kinesthetic elements so that all the learners can do something that is fun to turn on playfulness;</td>
</tr>
<tr>
<td>Secondary role for people to stay on the sidelines while being engaged at a lower level of intensity, without fully engaging in the primary activity;</td>
</tr>
<tr>
<td>High correlation must exist between features and rules of the micro-world and the real-world to assure applicability and transferability;</td>
</tr>
<tr>
<td>Visual features and sound effects may be novel or symbolic, but must enable the mind to accept them as content-related quickly.</td>
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</table>

The result of this design is a collage of easily positioned objects or wearable artifacts of the contextual world that is simulated in a situated and embodied fashion. This collection of artifacts represents learning objects, assembled into simple props and rules that the mind can quickly place in context, easily decipher how to use and then play with using only the rules that
are inherent in the context. Students create a micro-world with cognitive clues that enable them to exploit the context they have created for learning purposes by activating adult playfulness and engaging their cognitive resources in a motivated fashion. The activity is used in a non-formal teaching environment in which adults learn difficult content. The props are simple boats they carry around their waists and navigation aid props that mark the navigable channels. Despite this simplicity, it still takes an experienced instructor several PALAs to become fully effective.

Malo, Stapleton, and Hughes (2004) assert, "Nothing replaces the importance of the sweat, blood and tears of a live simulated training experience in which all your senses … play into a physical, mental, and emotional life-and-death scenario in a fully 3-dimensional, real-time world" (p. 1). Cole et al. (2001) tell us “Learners appreciate that when the simulation exercises are used, their personal knowledge and experience becomes an integral and legitimate part of the classroom problem-solving activity” (p.14).

This section reviewed the instructional and experiential activity design process, and a set of general design specifications for experiential adult learning activities with playfulness that are appropriate for safety, compliance, and certification training. This was summarized into a recipe structure for future educators to design a Playful Adult Learning Activity (PALA) which blends experiential learning and playfulness as a more effective teaching technique.

**Summary of Literature Review**

This chapter reports on the literature review for the conceptual foundations of this study, beginning with an examination of experiential learning as the heart of the conceptual framework which was melded with adult playfulness in section two and ties together the working definitions of experiential learning and playfulness. Part two examines safety, compliance, and certification
training, with a focus on transportation and recreational boating safety training, along with an examination of the diverse teaching and learning environment. The report focuses in on the environment in which the research is performed including a unique teaching / learning organization, the United States Power Squadrons and how that application area drives the needs of the design of learning activities. The fifth section provides a more detailed review of considerations for building better adult learning activities with playfulness, and in the sixth section examines the Playful Adult Learning Activity (PALA) as a teaching and research tool.

The PALA is a twenty minute role-play that helps students understand the content, retain more learning longer, helps transfer learning to the water, and improve the likelihood they will use the rules. The design principles, rules and insights documented in this effort may help others to apply the principles to other applications and create PALAs for other applications. This PALA may also be a useful tool with which to experiment with adult playfulness, engagement and motivation in a classroom environment and relate those to adult learning of difficult context ands to refine the design rules for a Playful Adult Learning Activity.

Concerning the effectiveness of simulation exercises, Cole et al (2001) incorporated an important recommendation to “make sure that the exercises are researched, authenticated with experts, and field tested with individual and small groups of miners.” (p.15). Compliance and safety course instructors need easy-to-use outcome-oriented adult learning activities that can supplement teach-to-the-test techniques. These tools must incorporate elements of situatedness and embodiment which can be tailored to setting, audience and content. Instructors often create such tools on their own, but they need something easy, cheap and basically “bullet-proof” that they believe will “deliver the goods” for the learners if the instructors simply ‘do their part.’ It is the goal of this research to assure that the PALA is such a refined and validated tool.
CHAPTER 3: METHODOLOGY

This chapter provides an overview of the mixed-methods research methodology selected for this study based on the requirements of the experimental intervention and the longitudinal study design. The final design is reinforced with a review of the researcher’s background, and the background of the study as the terminal phase of a long term research project. The details of the prior phases are available in referenced but unpublished papers. The data reduction and analysis plans for the quantitative and qualitative methods are examined based on a pilot project which helped refine aspects of the study. The data collection / analysis scheme uses surveys, quizzes and interview questions in four collection steps as follows:

1. DCI – Instructor form, class observations and reactions to the class and intervention.
2. DC0 - Participants fill-out enrollment & demographics forms after the intervention.
3. DC1 - Early-season (May-June) survey, quiz, and interview administered: via telephone.
4. DC2 - Late-Season (July-August) survey, quiz, and interview administered via telephone.

This scheme helps stretch the limited resources and draw more data and conclusions from a smaller population, at the expense of more complexity, more forms and organization. The details of the forms and procedures are included in the appendices. The chapter concludes on an examination of the trustworthiness issues and verification activities planned for the research.

Research Paradigm

Salmani and Akbari (2008) argue that the research paradigm determines the direction of research and how the research answers the questions of the seeking mind. They list research paradigms as positivism, constructivism, critical theory and post-structuralism, and argue that these “create not only the mind set of the researcher (what the reality is and how it can be
accessed), but also help him/her use the research methodologies, research methods, and apply the research findings” (p. 1). Olsen (1995) suggests that focus on method should not drive research, but rather the ontological and epistemological stances of the researchers. Bearing such ideas in mind, it seems that a paradigm is a reflection of the researcher’s mindset: a perspective supported by Shelef (1994), “Personal understandings and interpretations from the researcher's experiences contribute to the incubation of a research question.” She also quotes Moustakas (1990):

The heuristic researcher is not only intimately and autobiographically related to the question but learns to love the question. …. It creates a thirst to discover, to clarify, and to understand crucial dimensions of knowledge and experience. (p. 43)

The attempt to understand how these ideas apply to the investigator and this study begins with the idea for this research, two years before this proposal. Much effort has driven a kind of life into the idea and has infused this researcher with a Moustakas kind of mindset. The questions “How does playfulness affect adult learning?” and “Does a PALA really make a difference in learning boating safety?” have become every day’s reality. A path to the answers has grown from these questions into an experiment using mixed-mode data collection and analysis techniques on a longitudinal study. I have long held a distrust of the completeness of the positivist world-view and have been unimpressed by its’ dependence on the frailty of numbers, facts and statistics. This mechanistic view misses the reality in front of our eyes of how human beings behave and perceive the universe and each other. Human behavior is the greatest challenge to positivism, and this recognition suggests a constructivist view of reality.

These two study questions bracket these views, and the research paradigm for this study should reflect this. If the PALA has discernable effects on learners, then perhaps we can detect this by collecting data and comparing the differences between groups that experienced the PALA
with groups who have not experienced it. In this case, the research is proceeding within the positivist paradigm, utilizing experimental methods and empirical techniques with quantitative or categorical data, even if collected with surveys or interviews. This fits Dervin’s (1977) ‘external reality’, information that describes reality, the innate structure or pattern of reality: i.e. ‘data.’

Study participants may share experiences in their own fashion and permit the researcher to understand those experiences and how those experiences relate to the events of their lives and learning activities, and particularly to the affective states of playfulness and flow. In those cases, the research proceeds within a constructivist paradigm, using storytelling and experience sharing techniques with data that is qualitative in nature, even if collected from examination scores. This fits Dervin’s (1977) internal reality, the structures or pictures imputed to reality by people: i.e. ideas. Qualitative research tries to reflect the diversity within a population, rather than some hard to grasp ‘average’ (Collins, Onwuegbuzie & Jiao, 2006) Such research can work with convenient samples, if the group of interest is difficult to access, and use purposive sampling to gain some control and freedom from selection bias inherent in pre-existing groups. We can deliberately seek to include "outliers" which help illuminate those processes and relations that routinely occur, seemingly using the exception to prove the rule (Collins et al. 2006). Both of these selection techniques naturally and comfortably fit the real world of the planned study and the mutual relationships that exist between the researcher and the participants.

On the other hand, in the last half-millennium, curiosity, rationalism and industrialization led to experimental research with a positivist philosophy and quantitative analysis of relations between variables. In this scheme, a researcher maintains impartial detachment and objectivity to prove an hypothesis in a mechanistic universe (Deshler & Grudens-Schuck, 2000). Johnson and Onwuegbuzie (2004) view the strengths of the quantitative approach as: easy and accurate.
collection of well-defined data, simplification of variables, testing and validating theories and hypotheses, generalizes findings with replication and statistical analysis, and credibility with predictive abilities and causal explanations. This approach seems to answer the secondary question “Does a PALA make a difference in learning boating safety?” since the content being examined is standardized and conceptually measureable by standardized tests.

**Mixed Methodology Research Design**

Recognizing the strengths and weaknesses of these methods for the specific problems faced in this study, a more complex testing and verification regimen is used which incorporates both quantitative and qualitative elements in a mixed-methods analysis. This approach permits the cross-checking of the quantitative data with other data collection techniques so that it can be framed in an appropriate context and validated appropriately. Frechtling and Sharp (1997) support an approach “that combines quantitative and qualitative elements. A multi-method approach to evaluation can increase both the validity and reliability of evaluation data” (p. 8). Two advantages of mixed methods are generally accepted: the validity of results is strengthened by using more than one method to study the phenomenon (triangulation) and combined methods improve instrumentation for data collection approaches and improve understanding of findings (Frechtling & Sharp, 1997). Johnson and Onwuegbuzie (2004) add other strengths, including words, pictures, and narrative add meaning while numbers add precision, exploits quantitative and qualitative research strengths, generates and tests grounded theory, answers broader, more complex questions, not confined by methods or approaches, designs have specific strengths and weaknesses, may use strengths of a method to overcome weaknesses in another, stronger conclusions through convergence and corroboration, add insights and understanding missed with
a single method, can increase generalizability and produce more complete knowledge.

Some weaknesses of a mixed methods approach, including the fact that it can be difficult for a single researcher and may require a research team, and may be more expensive and more time consuming. There are also knowledge issues such as learning multiple methods and approaches and understanding how to mix them, problems of paradigm mixing, qualitatively analyzing quantitative data, and interpretation conflicts. All of these issues are a major concern as this project is defined, and significant constraints have been placed on the project in order to cope with these issues. Specifically, a much larger sample size would have been desirable and available, but the sample size was limited to what one researcher can handle.

Nonetheless, Johnson and Onwuegbuzie (2004) claim that “By utilizing quantitative and qualitative techniques within the same framework, mixed methods research can incorporate the strengths of both methodologies… investigators who conduct mixed methods research are more likely to select methods and approaches with respect to their underlying research questions…“ (p. 23). Mixed methods research also helps to relieve the conflict between positivism and constructivism by offering pragmatism as an attractive philosophical partner to provide a framework for designing and conducting research. Both qualitative and quantitative researchers use empirical observations to address research questions, describe data construct explanatory arguments from their data, and speculate about why the observed outcomes happened as they did, while minimizing bias and maximizing credibility. Mixed methods research should use a philosophy that attempts to fit together the insights provided by both qualitative and quantitative research into a workable whole. James (1995) argued that “The pragmatic method is primarily a method of settling metaphysical disputes that otherwise might be interminable… The pragmatic method in such cases is to try to interpret each notion by tracing its respective practical
consequences.” Pragmatism is a valuable framework with which to approach experimental design, enabling the designer to utilize methodologies based more on the problem definition than on the pre-conceived theoretical framework. It is also a natural way to operate with engineering and research experience in the investigator’s background.

The two-dimensional mixed-methods sampling model developed by Onwuegbuzie and Collins (2007) was designed to help mixed-methods researchers identify an optimal sampling design and to classify mixed-methods studies in the extant literature with respect to their sampling strategies. Time orientation refers to whether quantitative and qualitative phases of the study occur at approximately the same time (i.e. concurrent) or whether these components occur one after the other (i.e. sequential). A sequential design involves the qualitative phase first being conducted to inform the subsequent quantitative phase, or vice versa. In contrast, when a concurrent design is utilized, data collected from one phase do not inform the data collected in the other phase until the data interpretation phase (Johnson & Onwuegbuzie, 2004).

This study has the advantage of a pilot program (Spaulding 2008d) to help inform the data collection and analysis phases. It was more expeditious to use a concurrent data collection design which incorporated surveys, quizzes and interviews into each Data Collection (DC1, DC0, DC1, DC2) cycle as needed and appropriate to the situation, and final data collection continued until saturation (Strauss & Corbin, 1994). Qualitative data was processed in three steps: an initial attempt to develop categories which illuminate the data, saturation of categories with many appropriate cases to develop their relevance, and developing categories into more general analytical frameworks with outside relevance. (Glaser & Strauss,1967)

In summary, the methodology is built on a framework of pragmatism, as an experimental intervention with a mixed-method multi-stage longitudinal parallel data collection and analysis.
Based on my background in adult education and as an instructor in Boating Safety courses, I believe that simulation and playfulness are useful in activities for adult education. We have a long history of such learning activities in the informal and non-formal learning traditions, and it is especially in evidence in leisure, sports and military training. With this background, I conceptualized a Playful Adult Learning Activity (PALA) with outcome-oriented characteristics and techniques to encourage engagement and playfulness in a group of learners for a variety of applications, compatible with widely accepted instructional design principles. Simplicity and adaptability are key design criteria in this integrated package of learning objects and procedures so that it is easily transferable between classrooms, instructors and applications (Spaulding, 2008a). In addition to its practical advantages as a classroom technique, the PALA can be used as an experimental intervention to examine playfulness in the adult classroom. This environment is an optimal test-bed for classroom testing because the classes are many, short and standardized with well-defined outcomes with good instructors and a representative learner population.

This study is the terminal study of a four-phase research project following the design of the Playful Adult Learning Activity (PALA) in 2007. Each Phase (1-3) was performed as a stand-alone study, and relevant detail on the supporting studies is reported (Spaulding, 2007, 2008a, 2008b, 2008c, 2008d). The definitions of each Phase are:

1. Phase 1 was an action research study in early 2008 to refine and enhance the design of the PALA to fulfill its design goals as a potentially useful training technique (Spaulding, 2008a).

2. Phase 2 was a pilot study in late 2008 with a small-scale intervention and a longitudinal study tracking the progress of 20 subjects for forty-five days. This enabled development of instructor training, forms, data collection and analysis protocols. (Spaulding, 2008c)
3. Phase 3 was the PALA Roll-Out Intervention and Formative Evaluation Study with the PALA as an experimental intervention in the Mid-Atlantic States, with thirteen classes and eighty-nine participants in the DCI and DC0 data collection (Spaulding, 2008d).

4. Phase 4 is the Playfulness in Adult Learning Study. The heart of the research (Spring-Summer, 2009), tracks the participants enrolled in Phase 3; performs longitudinal data collection, data reduction, analysis, and verification.

The phases are graphically represented in the research activities project plan diagram (figure 4): The pilot study (Phase 2) to test and refine every step in the research as well as design quizzes, surveys, interviews, forms, protocol and analysis techniques was performed with four active PALA courses and one non-PALA control courses. This preparatory pilot study
(Spaulding 2008b) modeled the entire process of scheduling, intervention, enrollment, data collection and analysis to test and refine the protocol before implementation and collected data from three instructors and twenty learner-attendees through DC0, DC1 and DC2. Phase 2 also prepared materials, instructor guides, demonstration props and instructor training for Phase 3 roll-out, intervention and enrollment. Based on that experience, and the lessons learned from that study, the design for this study is based on more than theory. Relevant detail on the earlier phases (Phase 1-3) and their supporting studies is available on request.

**Research Study Design**

Merriam (1991) claims “The knowledge that is produced through research is a function of the questions the researcher asks and the methods the research uses to answer those questions … In adult education, many questions come from practice” (p. 1). We examine the demands, the environment and available resources for the research and make a careful and pragmatic decision on the appropriate methodology and tools based on the real world environment. The PALA was included in United States Power Squadrons (USPS) boating safety courses with mostly adult students led by certified USPS instructors. Each PALA included two simulations (daytime and night-time operation) of a vessel in coastal waters, and focused on learning Collision Avoidance Regulations (COLREGS) including Rules of the Road (or Nav-Rules), Lights (or Nav-Lites), and Aids to Navigation (or Nav-Aids) as standard offerings (US Power Squadrons, 2001).

This study explored the learning experiences of boaters attending those courses, and evaluated the benefits of the PALA training as a classroom practice. The challenge was to devise a study design that optimizes the use of the limited resources while maximizing the quality and value of the data collected and the knowledge gained in the process of answering the key
research questions. When preparing to design a study, a prudent investigator looks for similar studies and examines what was done and how well it worked. However, the shortage of reported studies in this area seriously inhibits this approach, so much of the design is based on the researcher’s past experience and reading of other studies and books. The Phase 4 study is the heart of the research project conducted during the spring and summer of 2009. Based on the pilot program in Phase two, it tracked instructor and learner participants enrolled in the experimental intervention in Phase Three, performed longitudinal data collection cycles including surveys, quizzes and interviews; and performed data reduction, analysis and verification as appropriate. This design is a compromise to match the resources available with the opportunity represented by the roll-out of the PALA within local squadrons.

*Design Discussion and Decisions*

With many such USPS boating safety courses offered each year, a controlled experiment can be performed with many participants that may help understand the value of the PALA as a teaching technique. USPS District 5 agreed to support such a study and permit solicitation of course attendees as participants in the study. This large scale introduction of this instructional technique offered the unique opportunity to examine the effects of a PALA in a controlled environment. The research concept was to perform an experiment by piggy-backing on the introduction of the PALA as a training tool into a number of the Boating Safety courses offered during the early spring of 2009, tied in with the spring-summer boating season in the Middle Atlantic states (NJ, PA, DE, MD, VA). Some classes received PALA training along with partial PowerPoint Presentations, while others received only the full PowerPoint Presentations. Subjects in classes that did not host a PALA were the control group for the experiment. All enrollees were
randomized and treated equally throughout the interviewing and testing process.

There are three reasons creating a robust design standard. First was the number and interrelationship between many variables including learning style preferences, instructional styles, time of the year, prior boating experience, age, and personal history. The second was the need to measure differences in a situation that may be dominated by other effects, such as the quality and style of the instructor, class size and other influences. The third reason was the variety of real-world learning opportunities afforded boaters during the novice period when much incidental and serendipitous learning occurs. Therefore, a longitudinal mixed-methods study was an attractive design concept to evaluate changes over time.

_Beyond the Basic Design: Answering the Questions_

Following the introduction of a PALA into standardized certification courses, this study explored the experiences of learners, evaluated the benefits in the classroom and in transfer to the real world, and examined playfulness as a vibrant component of experiential learning in the classroom. The hypothesis guiding this study was: ‘A PALA in a boating safety course has an effect on a subject’s confidence, motivation and competency during the course and for some period following the course and will be affected by the on-the-water experience after the course.’ Two general questions in this study were: How does a PALA compare with lecture/presentation in classroom learning? and How does a PALA and playfulness affect adult learning during and after class? These two questions were expressed more specifically.

1. What significant effects does the PALA have on subjects’ confidence, motivation and competency during and after a course compared to controls without the PALA?

2. What differences do subjects identify in their experiences during and after the course?
3. What outcomes do participants identify from the course and the PALA during or after the course and several months later?

4. How long do PALA effects last with and without real-world experience and reinforcement and how well does it transfer to the real world?

5. How does the effect of the PALA differ for different groups?

The research question guiding the quantitative aspects was: Does a playful simulation in the rules of the road teaching process in a boating safety course have a positive impact on the ability to answer Nav-Rules, Nav-Aids and Nav-Lights quiz questions after the course? This was measured by two quizzes conducted approximately sixty days apart (DC1 – May-June 2009) and (DC2 – July-August 2009) after the course. The results from learners who participated in a shortened presentation and PALA (44 in the experimental group) was compared with results from learners who participated in a full presentation only (45 in the control group). This was verified by surveys of the participants’ perceived confidence level in the same material. All data was tracked by randomized identifiers (RID) and days since intervention parameters (DSI).

The results of this experimental test were measured by comparing results from DC1 surveys, quizzes, and interviews between subjects and controls and analyzing the Instructors’ class evaluations and exam grades. It is assumed that these effects are less noticeable than longer term effects, so DC1 provides a baseline for later comparison. However, the ANOVA test(s) will give an indication of differences in baselines between groups within the participants, along with a credible basis to discriminate between groups in the final analysis.

Based on considerable experience with the boating community and responses seen in previous classes, it seemed likely that the effects of the PALA vary in different populations.
Such differences were determined by sorting the same DC1 and DC2 data by demographic and preference categories collected on the DC0 enrollment forms. This was important to the analysis since some effects are more detectable for novices rather than experienced boaters. This led to the elimination of some of the population in some parts of the analysis (Collins, Onwuegbuzie & Jiao, 2006). In general terms however, where there is a significant effect on participants’ skills, knowledge, and confidence after the course, it was highlighted and determined by comparing the differences between DC1 and DC2 results sorted by DC0 categories.

This is the heart of the retention and transfer question, since theory seems to support the contention that the PALA techniques should have greater long term effects than presentation techniques. Several simple test along with ANOVA test(s) helped discriminate between scenarios, questions and confidence factors to create detectable patterns for analysis. An important but difficult question to tease out of the data was: How long do PALA effects last without reinforcement with real-world experience? or its positive corollary, How much does the PALA help transfer to the real world? On a conceptual level, such things may be determined by comparing differences between DC1 and DC2 results sorted by DC0 categories and integrated with interviewing data. On a practical level, wide variances in the data because of a number of factors increased the difficulty of detecting relationships and establishing significance.

This protocol also yielded some sense of the way in which previous learning has been utilized by application and transfer to the real world. Such analysis was mostly qualitative, supplemented with some quantitative indicators. In the real world, and with an exploratory study, the data did yield a number of credible hard findings, but we have to be satisfied with other less-proven observations, ideas, insights and suggestions to guide future research.
Participant Selection

Two groups of participants, instructors and learners, are enrolled by the Phase 3 intervention and enrollment built around the ‘roll-out’ of the PALA into the standard boating safety courses. A dozen certified USPS Instructors were solicited who were conducting boating safety courses in late winter and early spring 2009 in the Delaware and Susquehanna Valleys. These instructors were selected based on previous experience, their interest level and logistics (travel distance, class scheduling, etc.). They were 90% male, with an average age of sixty with at least ten years teaching and an average of around forty years boating experience.

In the intervention classes, the instructors assisted or performed a PALA which included two simulations (daytime operation and night-time operation) of a vessel in coastal waters focused on the Collision Regulations (COLREGS) including Rules of the Road, Lights and Nav-Aids (US Power Squadrons, 2001). In both intervention and control classes, the instructors ask the students to volunteer for the study, after they satisfactorily pass the USPS exam. Each intervention class supported three distinct activities: Train 10-30 students per class using PALA or attend a control course w/o PALA; DCI - Instructors record their observations and reactions on Instructor Survey forms. DC0; Enroll participants (6-12 / class) with enrollment/demographics form.

A noticeable element of the design is the imbalanced active / control mix of classes. This decision is a direct result of prior experience in this environment, including over two dozen PALA experiences and reactions from the instructors and learners. Essentially, learning the content being covered (Rules of the Road, Nav-Aids and Lights) has a predictable outcome since the instructors ‘teach to the test’ with the same material many times and it hardly varies even though there are several formats in which the courses are offered. This predictability assures a
good baseline for our results from the controls and the PALA classes alike. On the other hand, the PALA causes a discernible and sometimes drastic change in the way a class relates to the content and each other, and that reaction differs from class to class. This less predictable result prompted the decision to do more classes with the less predictable PALA than with the more predictable Control, which yields the 7/6 split seen in the class schedule. Scheduling the experimental interventions and enrollments was balancing act between time, geography, squadrons, and types of courses. The schedule was also constrained since only the investigator is available to do the PALA. The criteria for the intervention and enrollment scheduling in Phase 3 was to mix up classes with controls or PALAs so that the distribution and spread of time delay from class to boating season start was fairly consistent.

The attendees in these USPS boating safety classes ultimately have a real-world need for a set of skills, habits and cognitive capabilities that enable them to be aware of all key factors in the boating environment, and the ability to respond as needed (Spaulding 2007). This capability is similar to functions performed by ship’s officers, airplane pilots, professional truck and bus drivers, and railway engineers (Endsley, 1995). Such competencies are not developed in boating safety courses, but the USPS is organized to enable boaters to develop such competencies in a progression from novice to expert (Spaulding, 2007). Boating safety courses are the first step in this process, but the instructors were aware of long term goals and treat students professionally while trying to interest them in joining the USPS for a longer term course of study. The fairly homogenous population in the classes has a detectable degree of variability of location and activity. For example, some sites are close to the ocean, bay, river or lake, and boating activities are focused around such settings. Similarly, boaters may “play” on a boat, or fish or cruise or even live-aboard, and they may be involved in racing, contests or club-oriented cruises or events.
All of these are well known and identifiable by demographic surveys quickly and reliably.

The intent in Phase 3 was to enroll as many students as possible from those classes by asking for volunteers, but some effort was made to preferentially enroll novices and younger students that are over 18 years of age. This approach enrolled 7 volunteers per class with a mixed group of 83% males and 17% females and an average of around forty-years of age with less than ten years boating experience. After enrolling the participants in Phase 3, a longitudinal mixed-methods study (with quizzes, surveys and interviews) was seen as an attractive design for the study. All enrollees were randomized and treated equally throughout the interviewing and testing process. The scale of this was restricted by available resources, as Johnson and Onwuegbuzie (2004) point out; mixed methods studies can be difficult for a single researcher and they suggest building a research team who know multiple methods and how to mix them. It is often more expensive and time consuming, and there may be analytical problems.

*Multi-Phase Longitudinal Data Collection*

Mixed-method data collection was appropriate for this study and increased external validity and transferability of findings while simultaneously presenting a “greater variety of differing perspectives” (Teddlie & Tashakkori, 2003, pp 14-15). The goal of the data collection was to provide a wealth of quantitative data and qualitative data with minimal effort and time. In order to determine the effects of the PALA the study examined several major activity periods: first the classroom activities; secondly, the period between the classroom and the beginning of the boating season when real-world transfer began, and the period when real-world transfer was occurring. For practical reasons, it was impossible to collect any data prior to the time that participants showed up to enroll in the courses. The first occasion was during the course when
the participants were asked to volunteer and provide basic contact and demographic data. Since courses were pretty busy, there is no opportunity to get into more detail during class.

The first opportunity for serious data collection came when the course was complete and the participants passed their USPS exam, at which time a baseline is created with the enrollment data and demographic survey. Once the learners returned to their normal activities, the second contact was just before the boating season started in May-June with the next contact toward the end of the Northeast U.S. boating season in late July or early August. The Data Collection cycles (DC1-DC2) are triggered off the experimental intervention in which 50% of the USPS classes will train 10-15 students per class (44 PALA subjects) using PALA and 50% are a control group without the PALA (45 control subjects).

Each Data Collection cycle has a specific role and time for participants: Results are tabulated vis-à-vis the DSI (Days Since Intervention) factor of reporting-date minus intervention-date, scheduled in six Data-Collection steps (DC1, DC0, DC1 and DC2) as follows:

1. **DC1** - Instructors (12) record class observations and reactions on Instructor Survey forms including appraisal of learners and exam grade analysis. Researcher telephone interview about a week after the course finishes.

2. **DC0** - Participants (113) with verbal scripts and implied consent forms, fill out enrollment & demographics survey forms (collected and submitted by Instructor). Random ID (RID#) is assigned and Quiz group is randomly assigned to enrollee.

3. **DC1** - Post-Class / Early-season (89) adult learners data collection is administered in May-June, 2009 by researcher 7-150 days after class via 10 minute telephone contact and includes a survey, quiz #1 and course appraisal interview to create an individual baseline.
4. DC2 - (74) adult learners data collection is administered in July-August 2009: 90-170 days after class via 25 minute telephone contact with a survey, quiz 2 and thorough interview about learning experience and summer boating experience and activities.

*Instructor Data Collection process*

The instructors (12) were solicited in Phase 3 and interviewed shortly after the class was done. The survey form was used for the interview, examining the data and observations, then building off that to examine the instructors’ analysis in more detail. Interview questions were open-ended to encourage discussion and reflection. The interviewer expanded or interacted so as to learn something from the instructor, and pursued ideas when introduced. There were also key questions for instructors who used the PALA: “Do you believe the Playful Adult Learning Activity (PALA) was helpful? How? What was your experience using the PALA? Why?” When finished, the interviewer completed the journal and notes, adding observations as appropriate, and filled-out the closing and contact line on the Instructor Enrollment form.

*Adult Learner Data Collection Process*

Participants received an implied consent form (read and retain) and filled out the signup sheet (sign and return) with name and contact number(s), preferred contact times and demographic data. Forms were encoded with class number, date, random ID number as well as a randomly assigned Quiz group. All results are coded onto several forms and at end, name and contact data are removed and anonymous form with RID only is used for analysis.

Demographic data (figure 5) was included when participants filled out the enrollment form. More data could have been collected, but the logistics were a challenge and the research
questions could be satisfied with this smaller set of demographic data. Another consideration was that the enrollment form should not intimidate potential subjects.

Figure 5
Demographic Sub-form of Enrollment Form

<table>
<thead>
<tr>
<th>DEMOGRAPHIC DATA:</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am a student [ ] I am an Instructor [ ] My gender is; male [ ] female [ ]</td>
</tr>
<tr>
<td>My age is: &lt;18 [cannot participate] 18-35 [ ] 35-60 [ ] &gt;60 [ ]</td>
</tr>
<tr>
<td>My boating preference is: Powerboat [ ] Sailboat [ ] Human Powered Boat [ ]</td>
</tr>
<tr>
<td>My boating intention is Fishing [ ] Cruising [ ] Racing [ ] Leisure [ ]</td>
</tr>
<tr>
<td>My boating experience is: &lt; 2 years [ ] 2-10 [ ] &gt; 10 years [ ]</td>
</tr>
</tbody>
</table>

Telephone interviewers matched the requested day and timing when placing the calls and started the call in a gracious and friendly fashion, and confirm the participant can take the time by offering to call back later if that would be better. To more efficiently support this process, the interviews were synchronized to a single two-sided form labeled by the randomized Quiz Group ID, that includes the survey, the quiz and the interview for each telephone call. This is drawn from a library of fifteen forms organized by Quiz Group (QG1, QG2, QG3, QG4, QG5) and Data Collection period (DC1, DC2) (see Appendix B).

Data Collection Instruments

This study uses surveys and quizzes backed up with interviews to measure confidence, motivation and competency for populations over time. For this purpose confidence describes the adequacy of knowledge and competency to handle tasks, while motivation is the interest or drive to commit to a path of action within the next year, and competency is a unifying concept that
integrates everything needed to perform in an on-the-water situation (Illeris, 2004).

The data collection process includes: Confidence surveys; Motivation Surveys, Competency Quizzes, Interviews and Observations. After enrollment, the data is collected in two data collection cycles (DC1 and DC2) during which these activities occur. The instruments used in the process were derived from the research questions and adapted for use in the contact process. Figures 9 through 12 presents the instrument derivation process, beginning with the research question, leading to the detail survey and quiz questions and then into the interviewing questions. In a sense, there is little different between survey, quiz and interview data. Researcher interaction is needed to interpret the interview responses, while survey and quiz data require less interpretation to understand and can be interpreted at arms’ distance.

Confidence Survey

Figure 10 shows how the Survey questions were derived. The survey is designed to elicit a sense of the emotional posture of the participants by asking them to reveal their confidence on particular subjects that are covered in the course and the PALA, basically providing a self-assessment of their own learning, knowledge and sense of empowerment. The confidence range across a 1-7 scale (no confidence to extremely confident) and as seen in Figure 6, each of four questions is asked twice to assess differences between day and nighttime confidence, as seen in earlier studies. The surveys are simple and unimposing and are scaled to a base of 100 points for discussion and analysis on three issues, confidence in the material, preference for day vs. night and motivation to continue learning. They were also tested and validated in the pilot project.

Survey responses on eight subjects (four daytime / four nighttime) help to compare feelings of “confidence” on specific subjects taught in the class between demographic and class
groups and over time between DC0, DC1 and DC2. The survey and the rating system were evaluated in the Pilot study and adapted by a number of changes to be more useful for this study. There is no objective framework to evaluate the scores created in this survey, but it seems quite sensitive to evaluation by comparison between different times and persons.

Figure 6
Survey Example

<table>
<thead>
<tr>
<th>DC1 - SURVEY: (Baseline survey)</th>
<th>QG1</th>
<th>RID #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Looking for a baseline. Survey rating scale of 0-10 (zero is uncomfortable- 10 is very confident)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How confident (uncomfortable, confident, great) do you feel about Boating on a scale 0-10?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How confident do you feel about Boating at night on a scale 0-10?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How confident do you feel about Nav-Aids in daylight on a scale 0-10?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How confident do you feel about flashing Nav-Aids Lights at night on a scale 0-10?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How confident do you feel about Nav-Lights on boats on a scale 0-10?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How confident do you feel about Nav-Lights on ships on a scale 0-10?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How confident do you feel about Sound Signals on a scale 0-10?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How confident do you feel about the Rules of the Road on a scale 0-10?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How likely are you to get more boating experience this coming season on a scale 0-10?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How likely are you to get more boating training in the next year on a scale (0-10)?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Along with its primary function of evaluating confidence, the survey was designed to contrast day versus night activities to help respondents answer in a more critical fashion and to contrast their confidence more specifically. Many boaters tend to exhibit nyctophobic (fear of the dark) symptoms which may blend with a touch of aquaphobia (fear of water) and astraphobia (fear of thunderstorms) as they extend their boating experiences into areas that trigger these fears of the unknown. This is isolated into two cases of boating in the daylight and boating at
nighttime, and is the basis for this split in survey questioning. Confidence surveys include four identical questions for night and day. Dividing the sum of the day scores by the sum of the night scores yields a non-dimensionalized variable Daytime Preference Index (DPI : 0.0-4.0).

**Motivation Survey**

The last two questions in the survey (figures 6 & 10) asked about interest-in and motivation-for additional training and mentoring. Wlodkowski (1999) suggests that “A useful functional definition of motivation is to understand it as a natural human process for directing energy to accomplish a goal.” These two questions deal with the subject’s commitment and are answered yes, no, or maybe. These responses were converted to a motivation score on a 100 point basis. With only two survey questions and three possible answers each, this was not a rich source of data to grasp interest and motivation. The survey was tested in the Phase 3 pilot study and the interviewer confirms that the scores generally agree with his assessment of interest / motivation during interviews. At times, the response is almost a knee-jerk reaction to what may be perceived by the subject as an accusation that they may not know as much as they should. Nonetheless, most subjects seemed to be open and honest about their confidence and interest in additional boating training or joining a boating organization for personal development.

**Competency Quiz**

The quizzes were used on the telephone interviews since the standardized USPS tests are not suitable as an assessment tool due to lack of history and a ‘training to the test’ approach. This led to the design of an assessment tool extracted from the USPS test, but targeted to this content, and designed to be short enough to be done on a web-site or telephone to assess retention levels
and transferability. The quizzes are almost identical to USPS testing scenarios and were field-tested by a team of instructors prior to use in class or data collection.

Figure 11: shows how the Competency Instrument (Quizzes & Scenarios) was derived. The quiz deals with competency in the content by testing the subject's understanding of the rules in a few simple scenarios that are standard fare for such courses and exams. These scenarios cover the basic rules of collision avoidance as well as Navigation Aides and lights. They are similar to those used in training as well as in USPS boating safety exams and USCG Captain’s exams. They have been reviewed by expert instructors for accuracy and assessment value. They cover six key concepts used to teach rules of the road, including Head-on, Passing, Overtaking, Left and Right Crossing situations, Vessel Light and Nav-Aid recognition.

The quizzes were designed to be simple and unimposing. They were validated in the pilot project, but build on a long history of similar assessment tools. Quiz responses to three questions are generally in the format of: “What is the situation?” “What should you do?” “What should they do?” and “Why is that answer correct?”. Which help to ascertain the ability to handle rules of the road scenarios on a comparative basis. Each question is scored on a basis of correct (+10 points), partly correct (+5 points), don’t know (0 points) and wrong (-5 points) and is corrected (Final Score= Raw score + 40 points) to a max of 100 points. The instrument rates an operational understanding of the rules and ascertains a group’s ability to handle scenarios on a comparative basis between groups. It can be correlated with the demographic categories as well as date collected, days since intervention, data collection cycle, and summer boating experience to evaluate changes over time. The Pilot Program (Phase 3) tested and refined all forms and procedures. Figure 6 is an example of a generalized scenario that could have been extracted from a typical coast Guard Exam and is used in this study library of scenarios.
Two scenarios with six questions were used for each quiz. This led to a short and simple data collection tool that was suitable for telephone use, which revealed if the key learning points were retained or not, with only eighteen questions.

**Figure 7**

**Quiz scenario**

You are cruising at 15 knots and another boat is approaching you at about the same speed from the right-hand side. The two of you will be too close in about 60 seconds…

{___} Q1: What should you do?
Correct answer: slow down to let them pass. (Alternate: steer behind them.)

{___} Q2: What should they do?
Correct answer: They should hold course and speed.

{___} Q3: How do you know that is right?
Correct answer: Boat on port side is give-way. (Alternate: Starboard is stand-on.)

Each quiz starts with a sample scenario, with one un-scored question to help telephone participants understand and consists of two scenarios or six questions, and with three quizzes, each person does every scenario. In this scheme, there are fifteen pairs of six different scenarios. Each participant was randomly assigned to a quiz group; which balanced any bias induced by specific scenarios or timing issues; and quizzes differed for different people (i.e. five quiz groups from six scenarios). without redundancy.

This structure, scenarios and questions were evaluated for effectiveness in the Phase 2 Pilot study, and were not revised based on the utility and sensitivity demonstrated in that study. When the quiz is conducted via telephone, participant were handled with a nice opening script: “Relax. There are three questions for each scenario, and everything was covered in class. If you don’t know the answer, just say so. If you remember, then do the best you can, but do not guess.”
Summer Experience Survey

Rather than depending on the open ended questions of the interview to provide detailed data, I incorporated a summer experience question to quantify how much experience the subjects gained through the summer. This summer experience is defined as the number of times on a boat in the last 90 days, and was incorporated into the DC2 interview.

Interview Data Collection

At the end of the DC1 and DC2 survey and quiz, the interviewer returns to a friendly tone for a free-form interview with the participant to find out more about their ideas and experiences and any learning and boating experiences since the intervention.

Figure 11 and 12 illustrate the derivation of the interview questions in two stages. The first interview (DC1) focuses on short term effects and participants’ experiences and reactions to the class and PALA (figure 8), at the beginning of the boating season before more boating experience. The second set (DC2) targets participants’ recent boating experiences since the first interview, in order to understand the longer-term effects of the PALA and course (figure 9).

Interview questions were different than survey questions: they are open-ended with a goal of facilitating discussion and reflection. The investigator interacts so as to learn something from the participant, and if they introduce an idea, it was pursued while keeping an eye on the clock to make sure they want to continue. Questions are guide-posts to generate a worthwhile discussion, though I tried to keep the interviews to roughly the same content and length. The strategy was to minimize chances to do it wrong. Several risks were addressed, including distraction, mission creep, skipped points, pulled into teaching or administrator role, and other challenges. A major
challenge was to create interview questions that inspire discourse on the interest areas, without inhibiting a participant’s ideas and comments.

Figure 8
Example DC1 Interview Questions

<table>
<thead>
<tr>
<th>DC1 COURSE EVALUATION INTERVIEW:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unlike survey questions, interview questions invite discussion and examination. First, determine the current situation after course with questions such as…</td>
</tr>
<tr>
<td>So, have you done any additional learning about boating since the course? Courses? Books? Practice?</td>
</tr>
<tr>
<td>Will you join the Power Squadron or some other boating organization? Get a Captain’s license?</td>
</tr>
<tr>
<td>Are you really using what you learned from the course? Where? When? How?</td>
</tr>
<tr>
<td>What is the most exciting new thing you have realized or learned since the course? Tell me about it?</td>
</tr>
<tr>
<td>Can you tell me about any really interesting or scary boating experiences since the course? Tell me.</td>
</tr>
<tr>
<td>Next question only for those classes who did the PALA: (not the controls)</td>
</tr>
<tr>
<td>Was the PALA activity helpful to what you remember now about COLREGS? Nav-Aids? Lights?</td>
</tr>
<tr>
<td>Tell me about it? What was good? Bad? Worth your time? Should we do more or less?</td>
</tr>
<tr>
<td>Was the survey, quiz and interview was fair and meaningful? Is there anything you would suggest?</td>
</tr>
<tr>
<td>Final Question: Any other points, stories? Observations, suggestions, ideas or comments?</td>
</tr>
<tr>
<td>Thank You, it was nice talking to you again. I’ll call you back in Mid May!</td>
</tr>
</tbody>
</table>

I used a standard question list designed to do in ten minutes, with the discipline to remind subjects that “I promised to take ten minutes of your time….” thereby redirecting the discussion. Telephone interviews are hard to control, so there were still some who said “I gotta go in the middle of the interview” and others who asked how to control mildew in the boat’s refrigerator. I completed the journal and notes, adding scores and observations appropriate, and filled out the closing / contact line on the Enrollment form after each interview was completed for each individual contact.
Example DC2 Interview Questions

**DC2 SEASON ACTIVITY INTERVIEW:**

Unlike survey questions, interview questions invite discussion and examination. First, determine the current situation after course with questions such as...

So how much were you able to get out on the water since the course? When? Where? What kind of boat(s)? How many people? What did you do?

Can you tell me about any really interesting or scary boating experiences since the course? Tell me...

So, are you really using what you learned from the course? Where? When? How?

What is the most exciting new thing you have realized or learned since the course? Tell me about it?


Will you join the Power Squadron or some other boating organization? Get a Captain’s license?

.Next question only for those classes who did the PALA: (not the controls)

Was the PALA activity helpful to what you remember now about COLREGS? Or Nav-Aids? Or Lights? Tell me about it? What was good? Bad? Worth your time? Should we do more or less?

Final Question: Any other points, stories? Observations, suggestions, ideas or comments?

Thank You, it was nice talking to you again. I’ll call you back in 3 or 4 weeks!

Graphical Representation of Instrument Derivation Process

There are many facets to the study design, and the following diagrams may help to grasp how it fits together. Figure 9 is a diagram of the derivation for the Confidence and Motivation survey. Figure 10 shows a diagram of the derivation of the Competency Quiz instrument. Figure 11 and 12 are diagrams of the derivation process for the Interview questions.
RESEARCH QUESTION:
What significant effects does the PALA have on different subjects’ confidence and motivation during and after a course compared to controls?

Questions are created by investigator, based on course design goals of USPS classes and personal experience.

SURVEY RESPONSES FROM INTERVIEWS
- Confidence building & retention

SURVEY RESPONSES FROM INTERVIEWS
- Motivation for training & experience

How confident are you about Boating in daytime?
How confident are you about Boating at night-time?
How confident are you about Rules of the Road in daytime?
How confident are you about Rules of the Road at night-time?
How confident are you about sound signals in daylight?
How confident are you about restricted visibility Sound Signals?
How confident are you with Navigation Lights on leisure boats?
How confident are you with Nav-Lights on commercial vessels?
How confident are you about Nav- Aids & daytime navigation?
How confident are you with Nav-Aids and their lights at night-time?

Do you want more boating training in the next year?
Will you join a Power Squadron or other boating group this year?
**Figure 11: Derivation: Competence (Quiz) Scenarios**

**Left Crossing:** You are cruising at 15 knots and another boat is approaching you at about the same speed from the left-hand side. The two of you will be too close in about 60 seconds. What do you do? What should they do? Why?

**Lights:** You are cruising at 10 knots at night and you see a green light ahead with two yellow lights above and a white light. You will be close in a few minutes. What are you looking at? What do you do? What should they do?

**Nose to nose:** You are leaving the harbor at 10 knots and another boat is approaching you head-on at about the same speed. The two of you will be too close in about 60 seconds. What do you do? What should they do? Why?

**Nav-Aids:** You are cruising down the river at night, and you see a flashing green light ahead on the right, and a flashing red light dead ahead, but you see shore lights across open water further to the left. What are you looking at? What do you do? Why?

**Passing:** You are leaving the harbor at 10 knots and another boat is going the same direction at 6 knots. The two of you will be too close in about 60 seconds, so you decide to pass. What do you do? What should they do? Why?

**QUIZ RESPONSES FROM INTERVIEWS**
- Knowledge, skill building & retention

**Scenarios created by investigator based on examples drawn from USPS class materials and related sources.**

**Research Questions:**
Does a PALA impact the ability of learners to answer Nav-Rules, Aids and Lights questions? What significant effects does a PALA have on competence during and after a course compared to controls?
Figure 12: Derivation Process: First Interview Questions

**RESEARCH QUESTION:**
What personal changes do subjects identify as a result of their learning experiences during and after the course? How does the effect of the PALA differ for different population?

- **Tell me about your Boating Safety course.**
- **How do you expect to use boating safety course knowledge & materials?**
- **How do you expect to use rules, Nav-aids & lights?**
- **PALA participants - Tell me about your experience.**
- **Any changes to the course you can suggest?**

**OBSERVATIONS & NOTES FROM FIRST INTERVIEW**
Discuss the course, how it was run, plus content, techniques, teachers and how the subject felt about it.

Questions created by investigator based on course design goals of USPS classes and personal experience.

Interview results influence ongoing interviews.
Figure 13: Derivation Process: Second Interview Questions

RESEARCH QUESTION:
What outcomes do subjects identify from the course and PALA? How long do PALA effects last with and without real-world experience? How well do PALA effects transfer to the real world?

Tell me about your boating experiences this summer

How did course help you use rules, Nav-aids, lights?

What is most exciting new thing you realized since the course?

Where, when and how are you using what you learned in the course?

Any exciting, difficult interesting experiences?

Any other points, ideas, suggestions?

OBSERVATIONS & NOTES FROM SECOND INTERVIEW
Discuss how course relates to subject's personal boating experience during the summer.

Questions created by investigator based on course design goals of USPS classes and personal experience.
Multi-Phase Data Reduction

Note taking and data reduction is done by the interviewing researcher soon after the interview to assure accurate and relevant scoring, grading, notes and categorizations. Scoring of the survey, grading of the quiz and categorization of the interview is done in a timely fashion.

Confidence and Motivation Survey Data Reduction

The investigator add up the scores of the answers on each survey form when the phone call is finished. This yielded a score between zero and one hundred (0-100), which is interpreted as a confidence factor. Several derivatives were calculated, including differences (delta change) between DC1 and DC2 and which were plotted to help reveal patterns. In addition, differences between confidence and experience data was calculated, ranked and plotted, looking for patterns.

Competency Quiz Data Reduction

The investigator awarded 40 points for taking the quiz, then added the score for each question so the final score was between 10 - 100 points which have little objective value, but a general sense is; (a) 10 points is poor… most are wrong (b) 40 points is not good… no answer or good - bad balanced (c) 70 points is adequate… some correct (d) 100 is knowledgeable… every answer is correct. Several derivatives were calculated, including differences (delta change) between DC1 & DC2 which was plotted and ranked looking for patterns.

Interview Notes Data Reduction

The responses were tabulated by questions and sources and sorted by intervention (PALA vs. Control) and Experience (Novices, Middies and Old Salts) for thematic analysis. Collections of more than 16% of the responses that are similar to each other are considered a notable theme, whereas collections greater than 33% of the responses are considered significant themes.
An advantage of mixed methods is the ability to perform common-sense checking and validation as the data collection and analysis process evolves. One aspect of this ‘triangulation’ is a simple cross-checking of all observations to ensure internal and external consistency. Triangulation is a rather arduous process that is performed in little steps as the study proceeds, but then is wrapped up in one large and thorough review of all the observations as a totality of details. This cross-sorting of observations is looking for matches (indicative of corroboration) and mis-matches (indicative of a problem). One criterion is confirming an observation with a larger or smaller grouping. For example: does the same observation apply for full population as for subsets, such as non-salts or novices. The sorting procedure used three different Cross Sorting Observation orders: grouped by Instrument, grouped by Population, and grouped by Research Questions. If there are no mis-matches, and many good matches then confidence is enhanced. With no evidence to infer a triangulation error in any of these analyses, then it seems likely that the findings are internally consistent, and therefore more reliable.

Multi-Phase Data Analysis

Johnson and Onwuegbuzie (2004) suggest an analysis framework in an eight step process: data reduction, data display, data transformation, data correlation, data consolidation, data comparison, data integration and legitimation. This is similar to my experience with data analysis except that I see it as a cyclical process that continuously loops through these steps until the results seem to make sense within a common sense perception.

This study is not seen as a statistically rigorous large-scale experiment, but rather a practical investigation of a useful tool, so the goal is to demonstrate credible outcomes which will satisfy instructors and administrators as to the value of such practices. In this regard, my
analytical approach is pragmatic as Pierce (1868) says, “Reasoning should not form a chain which is no stronger than its weakest link, but a cable whose fibers may be ever so slender, provided they are sufficiently numerous and intimately connected. A longitudinal mixed-methods study will evaluate efficaciousness of a PALA compared with presentations.

Quantitative Data Analysis.

The DSI (days-since-intervention) parameter provided a horizontal time axis to plot snapshot samples of survey and quiz scores, which was analyzed to derive a credible best-fit retention curve, corrected by subgroups of experience and application. This provided a base of quantifiable data within which the qualitative observations can be analyzed.

It is assumed that knowledge gained in the classroom extinguishes at different rates based on interest, experience, learning style, teaching style, and reinforcement. It is assumed that the loss will be minimal for a short period, then accelerate to some nominal level and then diminish to a vanishing point. Quizzes are designed to give a means to detect retention of very specific material related to the relevant content covered in the PALA. I analyzed how quiz scores differ between individuals, classes, intervention (PALA vs. Control), experience, and over time. Analytically, only differences between the group scores may have significance.

Pilot Study results Data Reduction and Analysis

The approach outlined above was tested during the Phase 3 Pilot Study intervention and enrollment with four PALA and one control class, which enrolled a total of twenty (20) subjects. The demographic data fits the selection criteria fairly well; with 30% female, 35% greater than 65 years of age, 90% power boaters, and 60% with less than two years experience. The size of
the sample base is not critical for the Pilot Study, so the DC1, DC0 and DC1 data collection was performed, with a basic analysis of samples. The real value of this work is what it tells us about the viability of the plans for this study in key areas: Instructor training, Assessment, Data Collection, Data Analysis, scale and focus of the Thesis study. A smattering of data was collected to test the viability of the survey, with a few surprises, mostly relating to the lack of independence between the confidence and experience questions.

The surveys and quizzes worked well, and better than expected as a data collection instruments and methodology. The subjects reacted well to this format and the investigator became comfortable and expert using the format quickly. Though telephone data collection worked well, the process is a logistical challenge and more time-consuming than expected.

**Qualitative Data Analysis**

The interview questions are an integral part of the data, and provides a framework for a range of discussion items covered in a relatively short telephone interview. The results from the surveys and quizzes blend with the power of a mixed methods study and the intense discussions that frame data collection. Specific “rules for inclusion” were developed based on the frequency of various responses to better focus analysis efforts. (Stead, D.B. 2001). Insights gathered during the interview process are matched and contrasted with evidence gathered from all sources in a holistic view of the situation, perhaps lending insights into mechanisms and processes that may not have been examined directly, and provideing an audit trail of all data.

The interviews were analyzed to give a more in-depth picture of what the individuals experienced during the first six months of their novice period as new boaters following the experience of learning with and without the PALA. They were also analyzed to help refine and
categorize demographic data and explain individual quantitative data, identifying outliers by
caracteristics, events or phenomena. These were referentially compared and statistically
correlated with the quiz and survey retention curve data supplemented with any specific re-
enforcement dates collected in the interviews. The analysis evaluated changes in learning quality,
retention and transfer of standardized content to the real world. The analysis explored the effects
of playfulness in the context of adult learning, the potential benefits of playfulness in the adult
classroom, and the longer term effects on retention and transfer outside a classroom.

Verification and Trustworthiness

The real challenge was taking all the data from the qualitative and quantitative sources
and integrating the analysis in a suitable fashion. The problems of many related variables, the
limited amount of control the researcher had over the environment and the poor sensitivity of the
assessment tools cause much a lot of partitioning of the data for different purposes in the
analysis, but little of the data or results needed to be totally set aside, in order to enhance the
trustworthiness of the results (Dunkin, 1996).

Frechtling and Sharp (1997) tells us “There is broad consensus concerning the qualitative
analyst's need to be self-aware, honest, and reflective about the analytic process.” Analysis is
more than just the end product, and the processes used mean as much as the design. As Patton
(1990) says: “Applying guidelines requires judgment and creativity. … qualitative analysis
ultimately depends on the analytical intellect and style of the analyst. The human factor is the
greatest strength and the fundamental weakness of qualitative inquiry and analysis.” A broad
range of strategies will assure credibility, confirmability, dependability, and transferability as
well as verification and trustworthiness.
In quantitative research, data collection techniques and instruments are crucial to the reliability and validity of the data. Reliability considers instrument reproducibility and validity considers how well instruments measure what is being measured. Freedom from subjectivity and bias is seen as concerns to validity as well. The survey samples, either 163, 89 or 74 depending on the sample population used at different times in the analysis, is large enough to support effective statistical analysis and representative of middle class population in demographics to maximize generalizability. Testing during the pilot study of the reliability and validity of the survey, quiz and interview instruments enhanced trustworthiness and generalizability somewhat, and every effort was expended to assure a high degree of confidence based on the researcher’s experience backed up with the review and assistance of experienced USPS instructors. As calculated by Dr. Clariana, the pilot study work supports a Cronbach alpha of around 0.89 for the DC1 quiz which provides some degree of comfort on the generalizability of the instrument.

Mixed methods research strives to verify trustworthiness of data for quantitative and qualitative methods while enhancing the congruency between them. This link between the methods is called inference quality and increases the credibility of a mixed methods study (Tashakkori & Teddlie, 2003). Inference quality is supported by using the same sample for the survey, quiz and semi-structured interviews. Although the quantitative instrument was analyzed first and results used to inform the qualitative piece, final data analysis is integrated to increase transferability. Dependability is increased by using triangulation supported by the collection of data from multiple sources (researcher, instructors, learners, active, controls, demographics, surveys, quizzes and interviews) as well as qualitative and quantitative methods (Patton, 2002).

Confirmability of the results also depends on audit trails consisting of raw data, transcripts and field notes including data reduction and analysis methods, all of which are
tracked on EXCEL worksheets. The audit trails increase dependability since the research and analysis process is well documented (Merriam and Simpson, 2000). Inclusion of description also increases the study’s transferability to other applications. The data collection process involved the researcher with many participants in several contacts over an extended period of time which provided opportunities to validate and verify earlier information.

The samples were congruent for each individual in time, so a relationship between the qualitative and quantitative samples is preserved, making it easier to conduct meta-inferences and statistical generalizations. The questions and issues derived from the analytical process, were directed toward the actual process of learning and the effects the PALA has on the retention and transfer of learning to on-the-water practice. Last but not least, the analytical techniques were thorough to assure that every link or relationship in the data is examined.

Summary of Methodology

This chapter provides an overview of the methodology used in this study, including a five month longitudinal study of 75-100 participants of an experimental intervention both with a PALA and without a PALA in a standardized USPS boating safety classroom. The mixed – methods data collection and analysis started with a very straightforward demographic survey at enrollment time, but gravitated more toward an interviewer and narrative type data collection process. In this regard, the methodology is flexible and adaptable to fit the circumstances.

I do not suggest that we should follow Vespasian’s decree banishing all Philosophers from Rome, but my analytical approach is pragmatic, as Pierce (1868) says, “Reasoning should not form a chain which is no stronger than its weakest link, but a cable whose fibers may be ever so slender, provided they are sufficiently numerous and intimately connected.
CHAPTER FOUR: FINDINGS

This chapter presents the results of the data collection and data reduction, along with the observations and findings to investigate the efficaciousness of playfulness in adult experiential learning. The goal was to evaluate the use of a Playful Adult Learning Activity (PALA) in a course in lieu of teaching the same content by presentation alone. This study also examined the effect of the learning experience through the first boating season after the safe boating class.

The study design can be classified as an uncontrolled, open enrollment, parallel group experimental intervention, mixed methods longitudinal study. The longitudinal design extends across three contacts with the subjects: the enrollment (DC0), a contact early in the boating season in May - June of 2009 for a telephone survey, quiz and interview (DC1), and again in July-August 2009 toward the end of the season after additional boating experience (DC2). These three points in the subjects’ learning are the basis for the longitudinal analysis, with two other variables: Days since intervention (DSI) and Summer Boating Experience (SumExp).

The study evaluated the benefits in the classroom and in transfer to the real world to help assess confidence, motivation and competency. The hypothesis guiding this study is: A PALA in a boating safety course has an effect on a subject's confidence, motivation and competency during the course, and for some period following the course, and the confidence, motivation and competency will also be affected by on-the-water experience after the course.

Two general questions are: How does a PALA compare with lecture / presentation in the adult classroom measured by the effects on confidence, motivation, and competency? and How does a PALA and playfulness affect adult learning during and after class? These two questions are expressed in a series of five specific questions to focus the inquiry process on differences between the experiences, reactions, and outcomes of the PALA participants versus the controls.
Population and Demographic Data

The study explored the experiences of approximately ninety (90) learners, who volunteered from thirteen (13) standard courses pre-assigned with a PALA in six (6) courses and only presentations in seven (7) courses. The first contact was during safe boating classes held in the winter and spring of 2009 in southeastern Pennsylvania and Delaware by several Squadrons of the United States Power Squadrons. All classes received standard PowerPoint presentations that teach Rules of the Road, Lights and Nav-Aids for day and night operation of vessels in coastal waters and participants who passed the standard USPS examination were certified.

All participants who passed (~250) were asked to volunteer for the study, and 113 chose to do so and filled out the enrollment form and demographic survey. The subjects self-selected; first by joining that class, then by volunteering to help with the study.

The second contact was an interview (DC1) on the telephone within five months after the course and included two short surveys, a quiz and an interview of class experiences. Sixty days later, the third contact (DC2), was longer and focused on the subject’s experience in the boating season. All data sources are supplemented with investigator observations. The classes are numbered 11-23 and the subjects were assigned random identifier numbers (RID) between 201 and 325 to differentiate the pilot project classes and participants. Data was transferred to worksheets by Random ID number for each subject. Transcription errors were corrected in several passes through the EXCEL worksheets.

The population summary in Figure 14 shows the enrollment of 113 dropped due to age restrictions, attrition, and logistical issues to 89 participants who contributed at least one interview. Of those, 74 completed the data collection process and contributed two additional
contacts, while 15 partial subjects contributed just one, for a total of 163 interviews, surveys and quizzes which are treated as separate samples. This yields three sample selections for analytical purposes: (N=163) non-time-dependent samples for instrument validation and general relevance testing. (N=89) individual classification activities, such as demographics and interview data. (N=74) individual longitudinal data with two post class contacts each for a total of three contacts.

This data is further grouped by the thirteen USPS classes with class date and intervention type (PALA vs. Control) in Table 2 to yield a better grasp of the data collection and scheduling. As reflected in the last row of the table, there are 72 males (81%) and 17 females (19%), 24 of whom are less than 45 (27%) and 63 who are greater 45 years old (72%).

Seventy-eight subjects use powerboats (89%) and some use sail and human powered, or more than one type boat. They use their boats primarily for leisure (56%) and fishing (55%) as well as other uses. There are 28 novices (32%) with less than one year experience, 34 middies (39%) and 27 old salts (31%) with greater than 15 years experience. Most are college educated (57%) but many have professional or vocational education. The table shows classes organized by PALA and Controls (46% vs. 54%) which are subtotaled (rows 9 and 16). This reveals typical
distributions which represent a likely range of any similar group, with no discernable pattern that may influence results. There are also many subgroups of boaters based on local activities.

Table 2
Demographics Grouped By Classes

<table>
<thead>
<tr>
<th>Class</th>
<th>N</th>
<th>&lt;45 yrs</th>
<th>&gt;45 yrs</th>
<th>pwr boat</th>
<th>other boat</th>
<th>Fish ing</th>
<th>cruis ing</th>
<th>lie- sure</th>
<th>&lt;1 yrs</th>
<th>1-15 yrs</th>
<th>&gt;15 yrs</th>
<th>Voc/ Prof</th>
<th>Coll Ed</th>
<th>Grad Ed</th>
</tr>
</thead>
<tbody>
<tr>
<td>PALA 2/10</td>
<td>6</td>
<td></td>
<td></td>
<td>33%</td>
<td>67%</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
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<td>3</td>
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</tr>
<tr>
<td>PALA 2/24</td>
<td>7</td>
<td></td>
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<td>43%</td>
<td>57%</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>PALA 3/11</td>
<td>7</td>
<td></td>
<td></td>
<td>57%</td>
<td>43%</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>PALA 3/26</td>
<td>7</td>
<td></td>
<td></td>
<td>29%</td>
<td>71%</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>2</td>
<td></td>
<td></td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>PALA 4/2</td>
<td>6</td>
<td>15</td>
<td>30</td>
<td></td>
<td></td>
<td>17%</td>
<td>83%</td>
<td></td>
<td>5</td>
<td>2</td>
<td>1</td>
<td></td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>PALA 5/30</td>
<td>8</td>
<td></td>
<td></td>
<td>13%</td>
<td>88%</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>7</td>
<td></td>
<td></td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>PALA ALL</td>
<td>45</td>
<td></td>
<td></td>
<td>51%</td>
<td>49%</td>
<td></td>
<td></td>
<td></td>
<td>15</td>
<td>16</td>
<td>14</td>
<td></td>
<td>10</td>
<td>28</td>
</tr>
</tbody>
</table>

As expected, many fishermen focused on the Jersey, Delaware and Maryland coastline

“Fishing. Ocean City” “two boats, Cape May fishing” “Ocean City 23' Comfortable Fishing.”

Other use the same waters for fun: “Ocean City MD. Bay fishing, tubing & kids”. “Indian River 14 ft Grumman.” Others prefer the ocean for fishing: “Chincoteague 24' center console. Fishing,
Flounder, tuna 45 miles offshore." “Cape Hatteras fishing.” However at least one sails in the ocean, “Crewing on 54' offshore yacht."

Most boaters use their boats for fishing or leisure, though in the Chesapeake Bay, some use them for cruising, as seen in these interview quotes: “23' Sea Fox. Perryville, Havre de Grace. Trailer, fishing." “Rock Hall. Sailing Swann Creek.” “Chestertown, 23' cab cutty, Cruising, history." “Socializing, Chesapeake Bay, Havre de Grace.” “Weekend boating & Marina hopping.” “21' walkabout leisure Chesapeake, nighttime, family, alone, friends.”


Some travel around to a variety of locations doing a variety of activities; “Avalon, NJ and Port Deposit, MD, tubing, water skis,” “Fishing in Bay, trying to catch crabs, go to Jersey.” “grandchildren tubing, Mays River, Ocean fishing, Tuckahoe River.” “weekly trailer, fishing, ICW, Back bay & Del. Bay.”. Others are just dreaming; “No boat, no boating, land locked.”

As in boat type and use, the distribution of boating experience, classified as Novices, middies and Old Salts, is quite different between classes as seen in Figure 15. The differences can be quite dramatic: Old Salts may have acquired extensive knowledge and experience that affects what they notice and how they organize, represent, and interpret information in the
boating environment, which affects the ability to solve problems. However, such classifications have limited utility as Ericsson and Lehmann (1996) observed that the number of years of experience in a domain is a poor predictor of attained performance. For these reasons, only three experience categories have been used. Experience is important for the learning opportunities for course attendees, but for this study, the safe boating courses are directed toward less experienced boaters, and the study’s primary focus was on less-experience attendees. However, due to some regulatory deadlines, experienced boaters were over-represented.

Figure 15
Class distribution by boating experience (Old Salts, Middies & Novices)

This study occurred at a unique time when there were older, experienced boaters in the classes, which provided an opportunity to examine the effects of experience on learning and evaluate learning by experience versus a well-structured class. Example interview extracts confirm this; “Required… only reason… 40 years on the water.” and “I’ve been boating my whole life, [and] I only took the course for the legal requirement.”
This variety of boats, locations and applications cannot be controlled and is not a deficit, since all boaters need to know the rules, Nav-Aids and lights. This variety is one reason for a mixed-methods study, so that useful conclusions can be drawn despite the variety. However, boating experience categories are examined and tracked separately throughout the study.

*Study Volunteers vs. Class Attendees*

The goal of this section is to determine if the study population is representative of a meaningful population, by comparing it with the usual boating safety course attendees, and the general boating population. For participants in courses held by the Main Line Power Squadron (MLPS) additional demographic data, exam scores and a more intimate knowledge of each class is available. As the Squadron Education Officer, my experience and observations suggest that there is little difference between the study volunteers and the overall boating population, which is consistent with the available statistical data. Comparisons on other characteristics, such as age and experience, yield no noticeable differences between attendees and volunteers, except for the younger attendees that were not permitted to enroll in the study. A comparison of demographics from other reports. (USCG, 2006; Bell et al. 2000) are similar to the attendee and participant population, though the Bell study used a protocol which counted non-boat-owners. This inflated the number of younger, lower income and less educated in their survey. The USCG report uses only registered boats, which shifts the other direction.

While demographics may vary, for the purposes of this study, it is critical that the same material is covered and that the study population learned that material as others have. This is affirmed by examining the differences within the five MLPS classes and comparisons of the MLPS classes with those of other squadrons. The MLPS classes have 36 volunteers or about
40% of the study population (74-89). This is large enough to assert that whatever is concluded about that population may apply to non-MLPS classes too. Each attendee took the same USPS exam which is certified, validated and maintained at high standards. While it is less extensive than the USCG Captain’s exam, it is accepted for boating safety certification. A comparison of class attendees and study participants’ exam scores for MLPS classes confirms this (see Table 3.)

Table 3

<table>
<thead>
<tr>
<th>MLPS Classes</th>
<th>Intervention</th>
<th>Non-volunteers</th>
<th>Exam avg Non-volunteers</th>
<th># Volunteers</th>
<th>Exam avg Volunteers</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCCC</td>
<td>PALA</td>
<td>12</td>
<td>94.7%</td>
<td>7</td>
<td>95.7%</td>
</tr>
<tr>
<td>Clews</td>
<td>PALA</td>
<td>25</td>
<td>98.3%</td>
<td>6</td>
<td>99.3%</td>
</tr>
<tr>
<td>PALA</td>
<td>2 classes</td>
<td>N=37</td>
<td>97.1%</td>
<td>N=13</td>
<td>97.4%</td>
</tr>
<tr>
<td>CC IU</td>
<td>control</td>
<td>2</td>
<td>87.0%</td>
<td>5</td>
<td>93.2%</td>
</tr>
<tr>
<td>Clews</td>
<td>control</td>
<td>29</td>
<td>93.5%</td>
<td>10</td>
<td>96.9%</td>
</tr>
<tr>
<td>Stoltzfus</td>
<td>control</td>
<td>10</td>
<td>95.6%</td>
<td>8</td>
<td>94.2%</td>
</tr>
<tr>
<td>CNTL</td>
<td>3 classes</td>
<td>N=41</td>
<td>93.7%</td>
<td>N=23</td>
<td>95.1%</td>
</tr>
<tr>
<td>Total</td>
<td>5 classes</td>
<td>N=78</td>
<td>95.3%</td>
<td>N=36</td>
<td>95.7%</td>
</tr>
</tbody>
</table>

There are no major differences between volunteers and non-volunteers on exam scores, though the PALA classes scored slightly higher than the control classes. Even after making allowances for obvious differences, the sample population is demographically similar to other course and boating populations. This study population represents a credible population from which the results may be extended to larger populations.

Selected Profiles of Subjects

There is a great deal of variety represented by these simple averages and percentages, creating a challenge to gather insights into this population. This section profiles a few examples
of the population to present a more holistic picture of the study population, reveal the variety of circumstances and interests and to examine how data and responses are related to the individual’s situation. These examples are representation of different but normative responses for a variety of study participants, and there is no criteria for selection other than their illustrative value. These exploratory snapshots are not analyzed in depth in this section, but I analyzed the data from all subjects so that it retains the value discovered in an intense data collection effort.

Subject RID210

Subject RID210 attended a five week Squadron Boating Course (SBC) in York, PA. starting January 19, 2009, which was designated as a Control class. RID210 is a college-educated female less than 45 years old who has two boats: a 24 foot cabin cruiser used for leisure and a bass boat used for fishing. She has between one year and fifteen years experience, mostly on rivers and lakes and went boating about a half dozen times this summer, launching two trailerable vessels from local boat ramps and state parks in Pennsylvania. The first interview was 5/17 which was 118 days after course (DSI), and her comments about the course follow: “Really good job, Know because of self experience… Work for board of education [Suggest] more sounds & stuff, more scenarios [PALA] … No experience [since course].”

The second interview was 8/1 which was 192 days after course and her comments about her experience since the previous interview were as follows: “Dad died, {inherited} Bass boat.. went fishing two times, and four times for cabin cruiser, fishing and relaxing. … [emergency] Bad battery, dead. … …” She pointed out that “ Boating in the rivers with many private marks & docks, which is not the same as public marks…caught me by surprise and created problem…… No marinas or supplies [where she goes] so must plan to take care of self.” She had additional
comments and suggestion about future courses: “Pretty good job, lots of scenarios & stories. [suggest for course] maybe cover private marks as well? [Frustrated by] handling with trailer & current. [suggests for course] Cover trailering better with river current.”

RID210 scored 69 and 10 on her first survey and quiz compared with her second set of 70 and 70. This yields an average competency score (quizzes) of 40, which is low compared to the average of 62 (max 100). The jump in quiz scores from 10 to 70 could be due to several factors, including different questions in the first quiz versus the second, experience, or even some preparation for the second quiz. The investigator’s observation and assessment is that it was due to the different material being tested. Her average confidence score was 69, which is higher than the 61 average for the population (max 100). The previous experience showed in the somewhat higher confidence she reported to nighttime scenarios and her generally higher confidence.

Though she is aware of and committed to education, in DC1 and DC2 she answered a weak “yes” and “maybe” respectively for future boating educational plans, and “maybe” twice for joining a group. The average motivation score of 55 may be tied to her higher confidence and a feeling that more training is unnecessary on river and lakes where they boat. She suggested scenarios and activities as perfect ways of training for much of the material, even though she was in a control class and she was not aware of the PALA as the intervention others has seen.

Subject RID232

RID232 is a college educated male, age under 45 who took the course so his son would take the course. He and his son attended class #12 Delaware Boating Course Wilmington Power Squadron PALA RID232 also pressed to have his son interviewed, and felt we should have let younger people in the survey, but did not understand that more than one person per family could
be in the study. Unfortunately, it was too late to incorporate other members, but it may help to remember that for future enrollment efforts. They attended a four-week evening course starting on 2/10/2009, and he claimed that the “Course paid for itself.” He was first interviewed on 6/7m which was 117 days after course, and some of his comments are as follows: “Took course so son would take course. Good job [on course]. 21 foot boat. Oldest son 21 yrs. Old as backup [Learned about] emergency, going sideways in tide and wind ... PALA helped. Needed more time. Teaching tool was helpful.” It was early in the season, but he had already had an experience I would not have expected to hear about until the second interview: “[First time out] Had what looked like a fire, but family worked together and it was very reassuring... To have backup & mutual knowledge. Testimonial [to course as family/team/crew building activity].”

The second interview was 8/11/2009, 181 days after the course, which generated a lot of enthusiastic feedback and responses, as excerpted from my notes: “Short time tubing, Northeast River went out about ten times looking for friend stuck in river... “ He also offered thoughts on the course and his experience, “[Course helped] Emergency Preparedness - fire prevention, greater comfort level. ... More conscious about safety. [ Noticed change in] vocabulary, sound like instructor... [Different attitude] New culture, drill, procedures, protocol... Not play macho.”

RID232 scored 66 and 60 on his first survey and quiz compared with his second set of 56 and 30. This yields an average competency score (quizzes) of 45, which is low compared to the average of 62 (max 100), and an average confidence score (survey) of 66, which is higher than the 61 average for the population (max 100). The previous experience showed in the somewhat higher confidence he reported to nighttime scenarios and his higher confidence responses.

The drop in quiz scores from 60 to 30 is likely due to different questions in the quizzes. The discussion concerning the PALA was very positive, and accentuated the social and group
aspects of the activity, though there was a worthwhile discussion of how the PALA helped increase awareness, vocabulary and change in attitude. An interesting idea was that he decided to use drills and activities to train his crew on the boat, by making it “fun.” He picked up this idea the PALA in his course. RID232 seems committed to further education with a motivation score of 85. He answered “yes” and “maybe” for future educational plans and later upgraded that, which may reflect his somewhat lower confidence after additional summer boating experience.

Subject RID267

RID267 is a female older than 45 yrs who is working with her husband to restore life to an older powerboat to be used for leisure. They have little or no experience, not much money, and a vocational educational background. They attended a Squadron Boating Course (SBC) with the Pennsway Power Squadron, which had a PALA on 2/24/2009. She was first interviewed on 5/26 which was 92 days after course; yielding the following notes about her comments; “Multi-instructors was great. Projector, computer, book, CD & homework… Length of class, computer breakdown, ran longer than planned, planning navigation” She did not participate in the PALA, but claimed “I learned more by watching than doing. Scenario helpful” She said it seemed like “Chaos” and that there were too many people in too small a space to learn easily

The second interview was 8/18 which was 174 days after the course. The interview was quite long as a she painted a picture of novice boaters plagued by problems who actually garnered little boating experience, despite a lot of frustrating and even terrifying activity: “Grease Lightening.[boat name - giant grease spot needed new carpeting, but then lightening struck them the first time they tried to use it, so named it Greased Lightening]…discovered a cracked block after $800 of work, then a new engine.” As if that was not bad enough, on their
first trip, “we had no forward gear, and no paddle so she started to be swept down river in the
current…” Then on their next trip they had “a bad time with her son on the landing ramp, the
motor stalled with the fuel filter for the injectors stuck in the dark Then on her third trip: “Water
ran through hole in hull, but bilge pump saved us in Neshaminy State Park.”

She also described the advantages she felt the course gave her: “Maneuvering in wind
lesson, greater confidence. Course put me in touch with people who are boaters. Camaraderie….Hearing the stories was very helpful. … Learned to communicate better. Changed behavior
because of the course, bought new radio… “ She also had a some insightful suggestions for
future courses: “Nice to be more individual training. Personalized boat training, Maybe offer a
free or even chargeable inspection of the boat. Perhaps have a parking lot inspection where
people can bring their boats over and experts go over them with them.”

RID267 scored 37 and 30 on her first survey and quiz compared with her second set of 37
and 70. This yields an average competency score (quizzes) of 50, which is low compared to the
average of 62 (max 100), and an average confidence score (survey) of 37, which is lower than
the 61 average for the population (max 100). The jump in quiz scores from 30 to 70 could be due
to several factors, including different questions in the first quiz versus the second, experience, or
even some preparation for the second quiz. The investigator’s observation and assessment is that
it was due to a combination of the different material being tested and a lot of heavy learning in a
difficult first season. She was very positive on the use of the PALA and felt it was exactly the
kind of training that was needed. She suggested that it should be used for launching and docking.

RID267 may pursue further education with a motivation score of 70. She answered “yes”
and “maybe” for future educational plans and joining a boating group, and then another “yes”
and “maybe” which may reflect his somewhat lower confidence after her experiences. The lack
of experience showed in the lower scores at all levels, but based on a long and rambling
discussion, the series of bad experiences and near disasters may have restrained growth in
confidence, though learning and knowledge may have gone up. This couple truly needs some
validation and good experiences to help build confidence at this point, but they seem determined,
and if they don’t kill themselves, they will probably learn a lot in the school of hard knocks.

Subject RID284

RID284 is an older college educated male with a 50 year history of boats including
power, sail and human-powered, all of which he uses for leisure exclusively. This is similar to a
significant minority of boaters… multiple vessels and multiple activities over a long period. The
first interview was 5/18 which was 16 days after the 5/2/2009 all-day Saturday ABC course
taught by two instructors from the Mail Line Sail and Power Squadron without a PALA. Some of
the notes on his comments were as follows; “Limited time. I came for the test, not knowledge…
[However] it prompted me to buy a VHF radio… Never understood value of radio but course
explained… [made me] Think more about safety and what if something went wrong.”

The second interview was 7/31, 89 days after course, which created the following notes
about their activities: “No emergencies, [boating] every weekend, Upper Chesapeake, rough
weather [only sailboats out there]” He also had a number of observations about the course:
“Course was no help in heavy weather…Lotsa years of experience, but the course helped as a
refresher & markers… Tried marine radio, not much luck, wish it was covered in the course.”

RID284 scored 50 and 90 on his first survey and quiz respectively compared with his
second set of 63 and 45. This yields an average competency score (quizzes) of 67, which is
slightly above the average of 62 (max 100), and a total confidence score (survey) of 57, which is
close to the 62 average (max 100). His previous experience did not show in higher confidence. Despite years of experience, he almost never goes out in bad weather or at night, which was reflected in the slightly depressed confidence due to low confidence assessments in the nighttime and bad weather categories. He commented that he could not go out because of “bad weather” and “only sailboats were out”, which is a pretty clear indicator that it was no bad weather, but that there was a breeze, since the interviewer knows the area well, and because if shallow water, the sailboats in that river are too small for bad weather. Despite having many years experience, he had only a moderate average competency score of 67 and never used the marine radio, a legally required function of boaters with engines.

Such cases are not unusual in the lore of experienced boaters, who know of people that have been boating for years, but are not very good boaters. A classic anecdote is “He has one year of experience repeated twenty times.” What is clear in this case is the aura of certitude on the boater’s part that they don’t NEED to know anything else. This attitude may even survive the boating safety course, which tries to dispel such myths. He was not even aware of the PALA, and even leading references to the idea of experiential learning or fun in class yielded no reaction.

RID284 strongly states “no” for future educational plans and joining a boating group in both interviews which reflects his unwillingness to learn or explore new challenges after many years of boating activity which may have produced little in the way of experience.

Observations about the Selected Subjects

The mixed-methodology used in the study permits the integration of all the data, responses, signals and nuances of the interaction with the subject, which helps to meld understanding and data in a cohesive and meaningful narrative for better quality and utility. This
intensive examination also helps reveal new data and confirm conclusions drawn with smaller data sets. It also helps to confirm the validity of instruments and interviews by cross-checking data sources and more readily noticing incompatible results.

These subjects represent a wide variety of circumstances and interests, but even this small samples suggests some common ideas worth examining on a larger scale. For example, a number of these subjects noted the involvement of other people in their motivation to take the course and their boating activities, affirming a social aspect to this endeavor. Likewise, it is clear that many came in the door with an agenda and expectations that changed as the course proceeded, producing unexpected outcomes. Both of these ideas are an issue in the analysis and findings.

*Population and Demographic Observations*

The following points summarize the observations made from the demographic data:

1. Study classes are identical in content and structure to USPS classes nationwide and study volunteers have similar USPS Exam results to class attendees and national scores.
2. Class attendees are demographically similar to USPS classes nationwide and the general boating population, and study volunteers are demographically similar to class attendees.
3. There was a fair balance of PALA vs. Controls of: 53%(47) vs. 47% (42).
4. Gender is unbalanced with 72 males (81%) and 17 females (19%), and education is strongly tilted toward college educated (58%) and (28%) graduate level.
5. Power boaters dominate with 89% vs. 17% for non-power (with overlap), and fishing and leisure dominate the applications with 51% and 58% respectively.
6. Age is tilted toward older people with 72%≥45 and 28%<45 years old, but experience
level is critical with 31% <1 year, 39% with 1-15 years and 30%>15 years

7. The study has a high percentage of older, more experienced subjects, so expected 60% dropped to 31% novices, with greater variance than expected.

8. Key issues are Intervention (PALA-Control) and experience (old salts-middies-novices).

Data Organization and Handling

The comparison of experiences and responses for the PALA and Control subjects is at the heart of this study, so data collection was blinded to intervention. Each participant was identified by a Random ID number (RID) and each interview has an interview date which is converted to a DSI (days since intervention) factor. Data was entered into a blinded EXCEL database identified only by Class date, RID, DC0, DC1, DC2 and DSI, and extracts were exported into a SSPS database for analysis. Data in the database is blinded and tied to these random IDs (RID) and no contact data is maintained in the database, so identities cannot be tracked except through the RID to the archived paperwork. Raw data forms are dated and initialed by the interviewer and compiled in 450 pages (113 demographics forms, plus 326 interview forms) with comments and observations to bring the data collection to over five-hundred pages which available on request. The responses are supplemented with interviewer’s observations, and organized and prioritized along the lines of thematic similarities based on number of similar responses.

Data Analysis by Source-Instrument

This section examines the structure, characteristics, quality and value of over five-hundred pages of data organized around the primary instruments used to collect the data, but working from a different perspective than Chapter 3 (Methodology). This section identifies how
well-behaved the datasets are, what variances and errors exist, and what limitations we must deal with during the analysis. After enrollment, the data was collected in two data collection cycles (DC1 and DC2) using five parallel instruments: Confidence survey; Motivation Survey, Competency Quiz, Interviews and Observations. Following enrollment and demographic survey, these instruments were completed in two telephone contacts (DC1 and DC2).

Confidence Survey

The survey is designed to ask the subjects to reveal their confidence on particular subjects that are covered in the course and the PALA, providing a self-assessment of their own learning, knowledge and sense of empowerment. The scale range across a 1-7 scale (none to very) and each question is used twice to assess day and night confidence. The surveys are unimposing and are scaled to a base of 100 points for discussion and analysis. They take less than five minutes on the telephone and are used to measure three components: 1) confidence in the material, 2) preference for day vs. night and 3) motivation to continue learning. Survey responses on ten question (five daytime / five nighttime) help to compare feelings of “confidence” on specific content taught in the class. This survey instrument uses a standard scale of 1-7 which is then collated and corrected to a maximum score of 100 points. The survey and the rating system were evaluated in the Pilot study and adapted by a number of changes to be more useful for this study.

There is no objective framework to evaluate the scores created in this survey, but it is sensitive to evaluation by comparison. For example PALA subjects had average confidence scores of 60.7 points which are effectively identical to Control scores of 60.5 for N=76 and N=87 respectively. I am also a teacher of the subject matter with over 5000 hours of classroom time teaching adults and over 500 hours of classroom time teaching USPS courses. I conducted
163 surveys followed by interviews in this study, that confirm that the 10-100 ranking is proportional to my expert assessment of the subject’s confidence. When the survey scores are ranked in descending order, the list matches my professional assessment of the subjects’ relative confidence levels as observed during telephone contact. These assessments match the reactions of the subjects during their interviews, affirming that the course assists in building.

Along with evaluating confidence, the survey was designed to contrast day versus night confidence since many boaters are afraid of night boating. The answers were isolated into these two cases, and is the basis for this split in survey questioning. Confidence surveys include five identical questions for night and day, and a sum of night answers may match a sum of day answers. Dividing the day score by the night score yields a non-dimensionalized variable Daytime Preference Index (DPI : 0.0-4.0). PALA subjects were slightly less than Control subjects (DPI=1.66 versus DPI= 1.72) for N=78 and N=87 respectively.

Motivation Survey

The second survey asks about interest / motivation to get more training and mentoring. Wlodkowski (1999) explains how adult motivation can operate on integrated levels, with multiple feelings and thoughts occurring simultaneously. The highest level is when the adult experiences success, makes choices to do so, is satisfied with the value in the results and finds enjoyment in the process, in other words, the adult has experienced the learning as pleasurable and is motivated to continue. The PALA brings the subject to this level quickly, but only two survey questions is not a rich source of data to understand interest and motivation.

As an experienced teacher and interviewer, I conducted 163 surveys followed by interviews, and my observations confirm that the 10-100 ranking system yielded individual
scores that have wide variances, which are not in disagreement with my expert assessment of the subject’s interest and motivation during interviews. However, there are cases where the response is almost a knee-jerk reaction to what may be perceived an accusation that the subject “does not know as much as they should” or perhaps reflects some insecurity. Nonetheless, most subjects seemed to be open and honest about their confidence, so when PALA subjects have an average motivation score of 50.8 points, it can be shown that it is significantly different from Control scores of 40.8 for N=76 and N=87 respectively.

**Competency Quiz**

The quiz deals with competency in the content by testing the subject's understanding of the rules in a few simple scenarios that are standard fare for such courses and exams. The quiz rates an operational understanding of the rules and ability to handle scenarios on a comparative basis between groups, using a scoring rubric of 10-100 points.

I am considered an expert on the subject matter both as a teacher and an examiner, with over 5000 hours of classroom time and over 500 hours teaching USPS courses. As I conducted these quizzes, I specifically looked for reasons why an answer was right or wrong, and added comments to the form during the interview. Most of the quizzes confirm the level of knowledge of the individual as assessed by this approach. Less than 12% of the interviews show any doubt of the quiz score, or is reported as “simple error, confused, got it backward” or other explanatory remarks. As interviewing proceeded, a minor change in wording reduced the misunderstandings when I added, “based on the assumption that they will follow the rules of the road, as you are,” This suggests that the quiz reflects the level of competency on the material as intended, so when PALA subjects have an average competency score of 67.1 points, it can be shown that it is
significantly different from Control scores of 57.6 for N=76 and N=87 respectively.

Summer Experience

Researching summer experience was harder than expected with so many experienced boaters, and the depressed status of the economy in the 2009 recession. Even some people who were boating for decades did not move their boats that summer. Extracts from interviews reveal part of the problem; “[working] Not out all summer” “[gas prices, spent time] Socializing, Chesapeake Bay” “Not out at all, trying, but no luck” “Little bit. [just] Delaware. River” “No boat, no boating, land locked.” Some novices decided to delay buying their new boat, and many people with boats were too busy trying to save their jobs, so only 59 of 74 in the study used their boats. Therefore, a summer experience question was added to quantify what happened as the number of times on a boat in the last 90 days. All subjects had average SUMEXP of 7.9 points for N=74, but the variance is fairly high, with a range of 0 to over 30. Despite these limitations, this turns out to be a good instrument for the longitudinal analysis.

Interview Questions

The data collection process included three contacts starting with enrollment (DC0). The first interview (DC1) focused on short term effects and participants’ experiences and reactions to the class and PALA, which was done at the beginning of the boating season before additional boating experience. The second interview (DC2) targeted recent boating experiences, in order to understand the longer-term effects of the PALA and course. Over 800 responses were tabulated by questions and sources and sorted by intervention and experience for frequency and thematic analysis. The segmenting, subcategorizing and categorizing (slicing, splitting and splicing as per
Fielding and Lee (1991). Greater than 9 (10% of 89 subjects) similar responses are considered a theme, whereas collections greater than 26 (30% of 89 subjects) responses are significant themes. This yielded 508 useful comments and 16 thematic collections.

Questions are guide-posts to generate a worthwhile discussion, though I tried to keep the interviews to roughly the same content and length. The strategy was to minimize chances to do it wrong. Several risks were addressed, including distraction, mission creep, skipped points, pulled into teaching or administrator role, and other challenges. I used a standard question list designed to complete in ten minutes, combined with the discipline to remind interviewees that “I promised to take ten minutes of your time,” thereby opening a door to redirect or cut off the discussion.

*Sensitivity of Instruments*

This section examines the reliability and sensitivity of the instruments based on the data they generated. This strives to get some feel for the ‘behavedness’ of the datasets before a detail analysis, and gives an indication of how effective the statistical techniques are as tools to analyze this data. The less a histogram of a dataset resembles an ideal curve, the harder it is to fit the assumptions to assure statistical credibility. For example: Do we use an average, a median, a mode or some other calculation? In an ideal curve, average and median may be identical, whereas in small samples of ill-behaved data they may be different, which forces a choice on how to identify a suitable mean. With so many demographic and experimental variables, it is smart to use powerful tools such as the ANOVA. However, human behavior is notoriously bad at complying with statistical assumptions, and while scores are normalized to 100 points, the sensitivity of each instrument is different, so the similar change may be less notable for the motivation score than for the competency score, and even less for confidence.
Table 4 shows averages of Confidence, Motivation and Competency data fields for both DC1 and DC2, as well as a delta and mean error and ranges by intervention. This is shown for the full population (N=74), the NON-Salts population (N=50) and the Novices (N=18). The standard mean error is calculated using a T-Test for each set of conditions as guidelines for the analysis. Using the T-Test standard mean error and a confidence of 95% for the full population (N=74), then +1.7 points is a notable delta for the 95% confidence score, and +3.5 points is a notable delta for the motivation score, and +2.1 points is notable for the competency score.

Table 4

<table>
<thead>
<tr>
<th>group</th>
<th>N #</th>
<th>DC1</th>
<th>DC2</th>
<th>DEL CNF</th>
<th>Mean error</th>
<th>DC1 MTV</th>
<th>DC2 MTV</th>
<th>DEL MTV</th>
<th>Mean error</th>
<th>DC1 CMP</th>
<th>DC2 CMP</th>
<th>DEL CMP</th>
<th>Mean error</th>
</tr>
</thead>
<tbody>
<tr>
<td>FULL POP</td>
<td>74</td>
<td>62.49</td>
<td>58.40</td>
<td>-4.10</td>
<td>+1.7</td>
<td>44.22</td>
<td>44.54</td>
<td>0.32</td>
<td>+3.5</td>
<td>59.19</td>
<td>63.92</td>
<td>4.73</td>
<td>+2.1</td>
</tr>
<tr>
<td>PALA</td>
<td>34</td>
<td>62.92</td>
<td>56.82</td>
<td>-6.09</td>
<td>+1.7</td>
<td>49.71</td>
<td>50.06</td>
<td>0.35</td>
<td>+3.5</td>
<td>61.47</td>
<td>70.74</td>
<td>9.26</td>
<td>+2.1</td>
</tr>
<tr>
<td>CNTL</td>
<td>40</td>
<td>62.13</td>
<td>59.75</td>
<td>-2.40</td>
<td>+1.7</td>
<td>39.55</td>
<td>39.85</td>
<td>0.30</td>
<td>+3.5</td>
<td>57.25</td>
<td>58.13</td>
<td>0.88</td>
<td>+2.1</td>
</tr>
<tr>
<td>NON-SALTS</td>
<td>50</td>
<td>59.86</td>
<td>55.49</td>
<td>-4.38</td>
<td>+2.1</td>
<td>51.88</td>
<td>51.28</td>
<td>-0.60</td>
<td>+4.0</td>
<td>59.90</td>
<td>64.30</td>
<td>4.40</td>
<td>+2.5</td>
</tr>
<tr>
<td>PALA</td>
<td>26</td>
<td>61.54</td>
<td>55.06</td>
<td>-6.48</td>
<td>+2.1</td>
<td>55.46</td>
<td>51.54</td>
<td>-3.92</td>
<td>+4.0</td>
<td>60.96</td>
<td>73.08</td>
<td>12.12</td>
<td>+2.5</td>
</tr>
<tr>
<td>CNTL</td>
<td>24</td>
<td>58.04</td>
<td>55.95</td>
<td>-2.09</td>
<td>+2.1</td>
<td>48.00</td>
<td>51.00</td>
<td>3.00</td>
<td>+4.0</td>
<td>58.75</td>
<td>54.79</td>
<td>-3.96</td>
<td>+2.5</td>
</tr>
<tr>
<td>NOVICES</td>
<td>18</td>
<td>52.82</td>
<td>47.91</td>
<td>-4.93</td>
<td>+3.4</td>
<td>48.00</td>
<td>51.33</td>
<td>3.33</td>
<td>+7.3</td>
<td>60.00</td>
<td>64.17</td>
<td>4.17</td>
<td>+3.7</td>
</tr>
<tr>
<td>PALA</td>
<td>10</td>
<td>55.62</td>
<td>48.05</td>
<td>-7.57</td>
<td>+3.4</td>
<td>48.40</td>
<td>46.60</td>
<td>-1.80</td>
<td>+7.3</td>
<td>59.50</td>
<td>68.50</td>
<td>9.00</td>
<td>+3.7</td>
</tr>
<tr>
<td>CNTL</td>
<td>8</td>
<td>49.33</td>
<td>47.73</td>
<td>-1.63</td>
<td>+3.4</td>
<td>47.50</td>
<td>57.25</td>
<td>9.75</td>
<td>+7.3</td>
<td>60.63</td>
<td>58.75</td>
<td>-1.88</td>
<td>+3.7</td>
</tr>
</tbody>
</table>

For the Non-Salts (N=50) with the T-Test standard mean error and a confidence of 95%, then +2.1 points is a notable delta for the 95% confidence score, and +4.0 points is a notable delta for the motivation score, and +2.5 points is notable for the competency score. Differences greater than this may be considered notable differences and twice these values may be statistically significant. Results suggest notable changes over time and between PALA and Controls. This Table also suggests notable changes over time for the non-salt population (N=50).
The large gulf (16 and 10 points) between PALA and Controls in the competency scores is notable, especially the Non-Salts population compared to the Full population, which includes the Old Salts. Using the T-Test standard mean error and a confidence of 95% for Novices (N=18), then +3.4 points is a notable delta for the 95% confidence score, and +7.3 points is notable for a motivation score, and +3.7 points is notable for the competency score. The trend on competency dominance of PALA compared to Controls is still evident (16 and 10 and 12 points) and should be considered both notable and likely to be significant. There is also higher confidence that decreases among the PALA participants, that seems worth investigation.

**Limits of Instrument Reliability**

The wide ranges and variances of responses in the datasets constitutes a good reason to question the reliability of the findings. This variability is due in large part to the variety of subjects in the full population, but it challenges the assumptions of a normal distribution and weakens the value of some statistical methods. This is a particular challenge when interpreting the results of tools such as the Cronbach alpha, which is regarded as a useful indicator of instrument reliability, as shown in the selected calculations in Table 5. The Cronbach alpha was calculated for almost every category of data, but it never exceeds 0.5 for the full, multivariate population, which may hamper correlation with future studies.

This is particularly relevant in calculations involving the full population (N=74) but variances in smaller (more homogeneous) groups are suitable as seen in the “Non-Salts” (n=50) which shows weak alphas between 0.3 and 0.5, or “Novices” (N=18), in which the reliability improves to the range of 0.4 to 0.8, even though the population is smaller.

Focusing on Novices (N=18), the reliability improves to alphas in the range of (0.4 to
0.8), even though the population size is smaller yet, as seen in Table 5. It is reassuring that the reliability is improving as the population becomes less diverse, and in some cases exceed 0.5, which is regarded by some analysts as the lowest useful Cronbach alpha.

Table 5

<table>
<thead>
<tr>
<th>Novices Only [N=18]</th>
<th>Cronbach Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSI Vs. DC2 Competency</td>
<td>0.716</td>
</tr>
<tr>
<td>SumExp vs. DC2 Confidence</td>
<td>0.530</td>
</tr>
<tr>
<td>SumExp vs. DC2 Motivation</td>
<td>0.530</td>
</tr>
</tbody>
</table>

Other measures of reliability show similar patterns for the same reasons: large variances in the data collected which represents actual variations in the population.

Data Analysis by Source-Instrument: Observations

The following points summarize the observations resulting from the analysis of the data quality sensitivity and reliability, organized by instruments:

1. Sensitivity and confidence values differ for instruments as follows:
   a. for confidence data a +2.4 point difference is notable.
   b. for motivation data a +4.9 point difference is notable.
   c. for competency data a +2.8 point difference is notable.

2. There are differences by Intervention (PALA vs. Control); and by Boating Experience (Novice vs. Middy vs. Old Salts).

3. There are notable differences in confidence (+- 2.9) for all subjects (N=74) by Intervention (PALA vs. Control).

4. There are possibly significant differences in motivation(+10) and competency(+13) for
all subjects (N=74) by Intervention (PALA vs. Control).

5. There are notable differences in DC1 confidence (+-3.5) and motivation (+-4.4) for Non-Salts (N=50) by Intervention (PALA vs. Control):

6. There are possibly significant differences in DC2 competency (+18.2) for Non-Salts (N=50) by Intervention (PALA vs. Control).

7. There are notable differences in DC1 confidence (+-3.5) and motivation, (+-4.4) for Novices (N=18) by Intervention (PALA vs. Control).

8. There are possibly significant differences in DC2 competency (+18.2) for Novices (N=18) by Intervention (PALA vs. Control).

Organizing and Interpreting the Data

To get some sense of what the massive collection of multi-variant data means, and to understand those results, the multiple independent variables or categories and sub-categories that influence results must be examined. These factors include: Intervention (2 categories – PALA / control). class (13 categories - instructor/ location/ sponsor / etc); class type (2 categories - day vs. evening); boating experience (3 categories - <1 yr 1-15 yrs >15 yrs); boat type (3 categories reduced to 2 – power non-power); boat use (4 categories reduced to 3 fishing leisure cruising); gender( 2 categories - male /female ); age (2 categories - <45 / >45); and education (4 categories reduced to 3 – college grad voc/prof). Notable population differences exist, so the analysis presents PALA vs. Control values for the full population and non-salts for each factor examined.

The challenge is to examine the intersections of eight factors and thirty categories and identify the type and scale of the influence each represents. Since variables or categories can be combined, discarded or ignored, the problem can be simplified so a statistical analysis is done more efficiently. The next step examines how confidence, motivation and competency test scores
vary by groups. The survey and quiz data collected in the interviewing process address separate (but often related) issues, and each score is scaled to a base of 100 for discussion and analysis.

The interview data is organized by thematic similarities so the content can be grouped by common themes, so as to be better understood and prioritized. The survey and quiz findings is then organized and presented and some observations drawn from that data as well and tied to the interview responses. These observations are also organized along thematic lines.

This section examines the data and observations including the behavedness of each dataset, as can be seen with histograms. The data is organized around several basic selections: the total samples (N=163); the PALA samples (N=76) compared with Controls (N=87); two populations, the full-population (N=89 with one interview and N=74 with both interviews) and Non-Salts (N=50 with one or more interview and N=43 with both interviews). To determine what impact various demographic or experience factors may have on the results, appropriate sample groups are matched with the DC1 or DC2 Survey, Quiz or interview and DSI.

*Intervention (PALA vs. Control)*

There are seventy-four (74) individuals who completed the data collection, but there were a total of eighty-nine (89) subjects and a total of 163 separate samples for each instrument (74 participants contributed two samples each for a total of 148 samples, and 15 individuals contributed a single sample each for a total of 163 samples). Three different (74, 89 or 163) sample sets may be used when doing the analysis, depending on multiple instruments and data collection points, to create a complex data set with many samples. The data is treated different ways in order to evaluate the importance of various observations.
Table 6
Findings for all Samples (N=163) by Intervention

<table>
<thead>
<tr>
<th>Instrument</th>
<th>N</th>
<th>Confidence Survey</th>
<th>Motivation Survey</th>
<th>Competency Quiz</th>
</tr>
</thead>
<tbody>
<tr>
<td>PALA Samples</td>
<td>76</td>
<td>60.7</td>
<td>50.8</td>
<td>67.1</td>
</tr>
<tr>
<td>Control Samples</td>
<td>87</td>
<td>60.5</td>
<td>40.8</td>
<td>57.6</td>
</tr>
<tr>
<td>Avg Samples</td>
<td>163</td>
<td>60.6</td>
<td>45.4</td>
<td>62.0</td>
</tr>
</tbody>
</table>

The totals sample (N=163) is used for analytical work in which a data collection time-frame is not critical. The first analysis bundles all the data together as independent variables and treats all sample points equally as in Table 6 which shows how intervention intersects data type. There is little difference between Pala vs. Control for Confidence but notable differences between the groups regarding competency, suggesting that the PALA influences competency. Similar logic applies to intersections of intervention and boating experience as in Table 7.

Table 7
Findings for all Samples (N=163) by Intervention and Experience

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>N</th>
<th>Confidence Survey</th>
<th>Motivation Survey</th>
<th>Competency Quiz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novices</td>
<td>46</td>
<td>52.6</td>
<td>54.5</td>
<td>61.8</td>
</tr>
<tr>
<td>Middies</td>
<td>65</td>
<td>62.0</td>
<td>49.7</td>
<td>62.2</td>
</tr>
<tr>
<td>Old Salts</td>
<td>52</td>
<td>65.9</td>
<td>32.2</td>
<td>62.0</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>163</td>
<td>60.6</td>
<td>45.4</td>
<td>62.0</td>
</tr>
</tbody>
</table>

Later analyses examine categories, groups and longitudinal trends. Alternatively, data is also presented as time-dependent and used as longitudinal samples from the DC1 and DC2 data collection periods, approximately 60 days apart. This data is drawn from the full population with 74 subjects each of whom contributed two sets of samples. Differences in column three of Table 8 suggests that confidence gravitated downwards between interviews. A more detailed look
suggests that most of the down-ward trend was contributed by a drop in confidence of PALA participants. A key influence between contacts is experience gained in real-world boating activity, so perhaps that affected confidence.

The second survey element is two questions concerning the subject’s intent to seek more training and to join a boating organization, which produces the motivation column in Table 8. This shows little change between interviews, but there is a notable difference between PALA and Control subject responses throughout the timeframe of the study.

Table 8
Longitudinal Findings for Full Subjects (N=74) for each interview

<table>
<thead>
<tr>
<th>Instrument</th>
<th>N</th>
<th>Confidence Survey</th>
<th>Motivation Survey</th>
<th>Competency Quiz</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC1 PALA</td>
<td>34</td>
<td>62.3</td>
<td>48.6</td>
<td>61.5</td>
</tr>
<tr>
<td>DC2 PALA</td>
<td>40</td>
<td>56.8</td>
<td>50.6</td>
<td>70.7</td>
</tr>
<tr>
<td>Avg PALA</td>
<td>74</td>
<td>59.5</td>
<td>49.6</td>
<td>66.1</td>
</tr>
<tr>
<td>DC1 Control</td>
<td>34</td>
<td>62.1</td>
<td>39.1</td>
<td>57.3</td>
</tr>
<tr>
<td>DC2 Control</td>
<td>40</td>
<td>59.7</td>
<td>39.9</td>
<td>58.1</td>
</tr>
<tr>
<td>Avg Control</td>
<td>74</td>
<td>60.9</td>
<td>39.5</td>
<td>57.7</td>
</tr>
</tbody>
</table>

Analysis of quiz results in Table 8 reveals an improvement in quiz scores between the first and second interview, which may result from summer boating experiences. A close look suggests that the increase (15%) is mostly limited to PALA participants, with almost no increase in Controls. This begs investigation, with no obvious mechanism to differentiate these, other than the influence of the PALA over a long timeframe. Interview responses illuminate this idea:

**Confidence Data with Intervention**

The confidence data for all samples (N=163) vs. Controls (N=87) vs. PALA (N=76) seems to be reasonably well-behaved. The confidence data sets wrap around the median neatly as a nice bell curve, as seen in Figure 16 which compares all three histograms. There is very little difference between the PALA and Control sub-groups. This suggests that the confidence data is interpretable and consistent for these three populations.

**Figure 16**
Confidence Data Histograms: All samples (N=163) vs. Controls (N=87) vs. PALA (N=76)

Interviews corroborate this image, with an increase in confidence for PALA subjects:

“Reinforced common sense. Makes you think.” “More confident in planning, goals and objectives.” “Course helps my confidence.” “Comfortable, secure, better safety.” “Course made 50% increase in awareness, better focus, greater confidence.” “big help, more confidence.”

There were fewer reactions from control subjects, affirming that the course builds confidence, but the PALA accelerates that function. This matches other comments about the use of the PALA, including: “Course markers & NAV-AIDS big help.” “PALA marvelous. Actual practice. No hazards, & unique.” “Very hands-on - not big on book learning” “PALA big help” “PALA was helpful, it should be a standard part of class.”
Along with its primary function, the survey also contrasts day versus night activities to help respondents answer in a more critical fashion. This is a serious issue as stated by Interviewees “[I loved the] Stories of night time experience. [overcome my fears if I] Borrow experience” and “We NEVER go out after dark!”

Differences between day and night responses is expected, so each confidence survey included five identical questions for night and day, and the sum of answers for each should match for equal confidence. The disparity is indicated by dividing the Day score by the night score to yield the DPI (Daytime Preference Index), expressed as a fraction (0.0-4.0). This reveals notable differences in confidence for night vs. day (26 points vs. 17 points) as shown in the following analysis: (N=74) with a 95% confidence of 0.071. Like confidence in general, the DPI does not vary much between PALA and Controls, so these observation are additional confidence builders since it is systematically reasonable.

There are minimal differences in confidence between PALA subjects and controls., However, for nighttime operations, there are some notable differences in the way the DPI changes with time for different groups, as shown in Table 9.

Table 9
Day / Night differences by Intervention

<table>
<thead>
<tr>
<th>Population</th>
<th>Samp Les</th>
<th>Survey</th>
<th>Day Scr</th>
<th>Night Scr</th>
<th>Avg Dpi</th>
<th>Pal Dpi</th>
<th>Cntl Dpi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full pop</td>
<td>N=74 (0.071)</td>
<td>DC1</td>
<td>26</td>
<td>18</td>
<td>1.66</td>
<td>1.67</td>
<td>1.65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DC2</td>
<td>24</td>
<td>16</td>
<td>1.77</td>
<td>1.74</td>
<td>1.78</td>
</tr>
<tr>
<td>Non-salts</td>
<td>N=50 (0.095)</td>
<td>DC1</td>
<td>25</td>
<td>17</td>
<td>1.73</td>
<td>1.76</td>
<td>1.69</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DC2</td>
<td>24</td>
<td>15</td>
<td>1.77</td>
<td>1.77</td>
<td>1.78</td>
</tr>
<tr>
<td>Novices</td>
<td>N=18 (0.21)</td>
<td>DC1</td>
<td>23</td>
<td>14</td>
<td>1.95</td>
<td>2.28</td>
<td>1.61</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DC2</td>
<td>21</td>
<td>12</td>
<td>1.99</td>
<td>2.10</td>
<td>1.89</td>
</tr>
</tbody>
</table>

The general rule seems to be that DPI increases from DC1 to DC2 for every group except
the Novice PALA subjects. They became less night-time confident as they gained experience between DC1 and DC2, whereas PALA novices were more confident about nighttime activities as they gained experience. The difference is (-0.18) which is surprising since the control group increased (+0.29), which is greater than the standard error. This is a difference between groups of (0.47), which may be statistically significant. This suggests that there was a change in perception and awareness concerning night-time activities that is related to novices who participated in PALA with night simulation. This is amplified by the experience boaters had during the summer of 2009 from the DC2 interviews. A number of comments from the interviews add weight to the idea that PALA affects nighttime confidence, as in: “Stories of night time experience” “finally understood markers, enough for me at night.” “Nighttime boating is more confident.”

This hints at the mechanisms at work to cause the significant difference between PALA and Control subjects on confidence at night time. This is amplified with the data collected about the experience boaters had during the summer of 2009 from the DC2 interviews.

Motivation Data with Intervention

Two survey questions elicit data about motivation with “yes, no or maybe” responses are converted to a motivation score on a 100 point basis. There are only two questions and three possible answers, so the data naturally has large variances. The motivation data is not well-behaved, which may limit reproducibility in future studies, but it was tested in the Pilot study and scores are in agreement with an assessment of motivation / interest levels during interviews.

These scores are useful indicators since they do match related interview responses. such as: “Got Chapman's & opened it after course!” “course made me more aware of what I didn't know. I need more courses” “Boating community is good and helpful” “Learned a lot, wanted
more, realize I didn’t know it all.” Others indicated definite plans for the future, such as “I will upgrade my training.” “[I] want Captain license eventually.” “Next year [my son] motor boating merit badge” “Will take piloting course.” There is little difference between PALA and Controls, but notable differences between experience groups. The results suggest that Non-Salts are more motivated to get training and social support than Old Salts, which suggests that experienced boaters are less motivated to take additional training and join boating groups for social support.

*Competency Data with Intervention*

The competency quiz results are moderately well behaved, but much of the anomalous appearance in the histograms is related to differences in competency. The standard deviation for the overall population as well as the two subgroups are similar [24.5-25.2], though the means are very different [57.6 vs. 67.1]. However, the Control histogram shows a broad spread with a maximum of 12 samples in a category, whereas the PALA shows a pronounced shift toward high scores with 19 subjects in a category (score>90), which point to major differences in PALA vs. Control, so these are tested for significance as in Table 10 based on a 95% confidence level.

| Table 10 |
| Competency - One-Sample Statistics and Test |

<table>
<thead>
<tr>
<th>COMPE- TENCY</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev</th>
<th>Std. Error</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tail)</th>
<th>Mean Diff</th>
<th>Lower 95% Conf Interval</th>
<th>Upper 95% Conf Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Samples</td>
<td>163</td>
<td>62.0</td>
<td>25.2</td>
<td>1.97</td>
<td>31.43</td>
<td>162</td>
<td>.000</td>
<td>62.0</td>
<td>58.1</td>
<td>65.9</td>
</tr>
<tr>
<td>PALA</td>
<td>76</td>
<td>67.1</td>
<td>24.5</td>
<td>2.82</td>
<td>23.83</td>
<td>75</td>
<td>.000</td>
<td>67.1</td>
<td>61.5</td>
<td>72.7</td>
</tr>
<tr>
<td>Controls</td>
<td>87</td>
<td>57.6</td>
<td>25.0</td>
<td>2.68</td>
<td>21.45</td>
<td>86</td>
<td>.000</td>
<td>57.6</td>
<td>52.2</td>
<td>62.9</td>
</tr>
</tbody>
</table>

A notable aspect of these results is that the mean for the PALA group (67.1) is above the 95% interval of confidence for the full population: [58.1-65.9], while the Control group mean
(57.6) is below the 95% interval of confidence. This reinforces a significant difference as verified with a standard T-test at both 95% and 99% confidence as seen in Tables 11 and 12. The PALA and Control groups are distinctly different in Competency. The difference is substantial and consistent at both 95% and 99% confidence levels, and is statistically significant.

Table 11
PALA vs. Controls Competency Group Statistics

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev</th>
<th>Std. Err Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>87</td>
<td>57.6</td>
<td>25.0</td>
<td>2.68</td>
</tr>
<tr>
<td>PALA</td>
<td>76</td>
<td>67.1</td>
<td>24.5</td>
<td>2.82</td>
</tr>
</tbody>
</table>

Table 12
COMPSCORE - Independent Samples Test at 95% & 99% confidence

<table>
<thead>
<tr>
<th>PALA vs. Control</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tail)</th>
<th>Mean Diff</th>
<th>Std. Err Diff</th>
<th>95% Conf Int of Diff</th>
<th>99% Conf Int of Diff</th>
<th>Lower</th>
<th>Upper</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equal var</td>
<td>-2.44</td>
<td>161</td>
<td>.016</td>
<td>-9.52</td>
<td>3.89</td>
<td>-17.2</td>
<td>-1.82</td>
<td>-19.6</td>
<td>.638</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on this, it is worth examining the experience grouping and time dependencies in this data. Table 13 shows the similar and dramatic differences between the experience groupings and the overall population. The PALA seems to work for everybody.

Table 13
Novice vs. Middy vs. Old Salt Competency One-Sample Statistics and Test

<table>
<thead>
<tr>
<th>COMPETENCY</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev</th>
<th>Std. Error</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tail)</th>
<th>Mean Diff</th>
<th>Lower 95% Conf Interval</th>
<th>Upper 95% Conf Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOVICES</td>
<td>43</td>
<td>61.16</td>
<td>25.0</td>
<td>3.81</td>
<td>16.0</td>
<td>42</td>
<td>.000</td>
<td>61.2</td>
<td>53.5</td>
<td>68.8</td>
</tr>
<tr>
<td>MIDDIES</td>
<td>65</td>
<td>62.15</td>
<td>26.9</td>
<td>3.34</td>
<td>18.6</td>
<td>64</td>
<td>.000</td>
<td>62.1</td>
<td>55.5</td>
<td>68.8</td>
</tr>
<tr>
<td>Old Salts</td>
<td>52</td>
<td>62.01</td>
<td>23.9</td>
<td>3.31</td>
<td>18.7</td>
<td>51</td>
<td>.000</td>
<td>62.0</td>
<td>55.4</td>
<td>68.7</td>
</tr>
</tbody>
</table>
Breaking these out by the collection periods DC1 and DC2 with a One-Way ANOVA, the differences between the interventions and the control is significant at a high level of confidence as seem in Table 14.

Table 14
One Way ANOVAs DC1 and DC2 Collection Pala Vs Controls

<table>
<thead>
<tr>
<th>Competency Between Groups</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC1 PALA</td>
<td>78063</td>
<td>50</td>
<td>1561</td>
<td>2.33</td>
<td>.015</td>
</tr>
<tr>
<td>DC1 Control</td>
<td>70525</td>
<td>50</td>
<td>1410</td>
<td>2.68</td>
<td>.006</td>
</tr>
<tr>
<td>DC2 PALA</td>
<td>98850</td>
<td>56</td>
<td>1765</td>
<td>2.89</td>
<td>.009</td>
</tr>
<tr>
<td>DC2 Control</td>
<td>80138</td>
<td>56</td>
<td>1431</td>
<td>2.32</td>
<td>.029</td>
</tr>
</tbody>
</table>

Few factors compete with intervention differences, except for boating experience. The histogram shows that Old Salts data is inconsistent, but novice data is better-behaved while means and deviations are similar. This lack of differences is reinforced by the results shown in Table 14 which summarizes the T-test. This shows no competency differences based on boating experience. Even when grouped by Old salts and Non-salts, there are no major differences.

Comparing by intervention with experience, confirms the idea that the differences are due solely to intervention, and that boating experience is not a major contributor to differences. PALA has a significant effect on Competency versus presentation alone while competency quiz results are not related to Boating Experience.

Interview Data by Intervention

Comparing the frequency of different categories of interview responses by intervention provides a means to prioritize various themes relative to the research questions (Miles and Huberman, 1994). For example, focusing on just the Non-Salts (N=62) from the all-population (N=89) and classifying each comment into the following categories yields Table 15. This
suggests that the PALA participants were generally more positive and more up-beat about the courses, that more of them felt they had a real attitude change as a result of the course (13-6), and that many more (9 vs. 4) felt that their confidence had improved as a result of the course.

Table 15
Compilation of Non-Salts interview comments by Intervention

<table>
<thead>
<tr>
<th>Non-Salt Population</th>
<th>(N=62)</th>
<th>% Samples</th>
<th>PALA (N=31)</th>
<th>PALA %</th>
<th>Controls (N=31)</th>
<th>Controls %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storytelling is great</td>
<td>9</td>
<td>15%</td>
<td>4</td>
<td>44.4%</td>
<td>5</td>
<td>55.6%</td>
</tr>
<tr>
<td>Negative comments</td>
<td>14</td>
<td>22%</td>
<td>6</td>
<td>42.9%</td>
<td>8</td>
<td>57.1%</td>
</tr>
<tr>
<td>too much, too little time</td>
<td>10</td>
<td>16%</td>
<td>5</td>
<td>50.0%</td>
<td>5</td>
<td>50.0%</td>
</tr>
<tr>
<td>Positive comments</td>
<td>23</td>
<td>37%</td>
<td>13</td>
<td>56.5%</td>
<td>10</td>
<td>43.5%</td>
</tr>
<tr>
<td>attitude change</td>
<td>19</td>
<td>31%</td>
<td>13</td>
<td>68.4%</td>
<td>6</td>
<td>31.6%</td>
</tr>
<tr>
<td>confidence improved</td>
<td>13</td>
<td>21%</td>
<td>9</td>
<td>69.2%</td>
<td>4</td>
<td>30.8%</td>
</tr>
<tr>
<td>PALA is great</td>
<td>36</td>
<td>58%</td>
<td>25</td>
<td>69.4%</td>
<td>11</td>
<td>30.6%</td>
</tr>
</tbody>
</table>

The last item is harder to decipher, but 25 of 31 PALA participants spoke highly of the PALA (81%), and surprisingly, 11 of 31 Non-PALA Controls, suggested that the course could use an activity (perhaps a PALA), though they did not know about the PALA. Some Controls offered ideas to improve the course, as in: “Practical hands-on course would have been better” “Good for test. Course not enough for real world.” “have as class on a boat, visualize things better,” and “Have a class in the water.” Some Controls (not knowing a PALA exists) suggested activities: “Bring models of boats & use them” “Activity to visualize & remember would help. Role playing.” “would have liked an activity.” “Activities would help rather than PPT.”

*Intervention Data Observations*

The following points summarize the observations based on the intervention data analysis:

1. Confidence surveys and interviews suggest an increase in confidence for many subjects.
2. Experienced boaters are less motivated to get additional training and join boating groups.

3. PALA has a significant effect on Competency versus presentation alone.

4. Competency quiz results do not vary much by Boating Experience.

5. Non-Salts (N=62) who experienced the PALA preferentially identified greater awareness (50%) and confidence(33%) as outcomes of the curse.

6. 81% of PALA Non-Salts (N=62) ranked the PALA as good to exceptional, and 25% of the controls suggested an activity like a PALA would be helpful.

_Intersecting Intervention with other Categories_

This section examines each of the demographic categories seeking opportunities to eliminate variables or identify patterns and observations worthy of further analysis, starting with the classroom environment first in order to set the stage for the rest of the analysis.

*Intersection with Classes:*

Looking at the critical data by the thirteen different classes, there is a broad range in confidence (+-26), motivation(+-50), and competency (+ -37). However, there are no notable differences in class medians in confidence (+0.2), even though there are notable differences in motivation (+-10) and competency (+10). The interviews tell us little to be concerned about, since most subjects were quite pleased with their classes.

For example, forty-two (42) subjects out of 89 interviews (47%) evaluated the course to be good and to fit what they expected. A few comments give a feel for the reactions; “Good

Some subjects admitted they came only for the certification: “Needed Certification,” “Took for legal requirement.” “Information was well presented. OK to pass test.” “Overall good, baseline course. Test prep course. Deeper insight than book.” “I accomplished what I wanted.”

There were also some who had taken a course before, also with positive comments: “Refresh was good, 1 day” “Enjoyed the course. Took in 1999. 1 day perfect.” “Took as a teenager, now 38 yrs. Old.” “Did the job…. Good refresher.”


Forty-two (42 of 89) subjects (47%) evaluated the course to be good or excellent and as they expected. Twenty-two (22 of 89) subjects (25%) found the USPS instructors were worthy of notice or special praise and the use of multiple instructors generated many comments.

Since some attended the courses under duress, this observation is note-worthy in that so many openly praised the course. We must examine whether they are distorted by extreme numbers or outliers that may be related to identifiable events or people. For example, classes on 1/19 and 2/10 were early in the year during winter and were dogged by logistical and weather issues, and the results are similar though one was a PALA and the other Control. Three classes were taught by exceptional instructors and the researcher and the PALA contributed to each.

This comparison examines the effects on confidence, motivation and competency based on PALA or Control for each class in Table 16. Despite the sample size (12.5 per class) and
artificiality of individual comparisons there are patterns in class averages. Nonetheless, these variations are not critical, since dropping the outliers still preserve notable differences.

The most obvious things are the lack of difference in confidence results and the glaring differences in motivation and competency responses for PALA and Controls. The class on 5/30 was odd, and was treated as two classes, one a PALA and one a control because of crowd control and scheduling. Comparing these results with the differences by students based on intervention (PALA vs. Control) shows the results are almost identical: notable differences in confidence (+-2.9) and significant differences in motivation.(+-10) and competency.(+-13).

<table>
<thead>
<tr>
<th>Class date</th>
<th>PALA/Cntl</th>
<th># N</th>
<th>Conf Avg</th>
<th>Conf PALA</th>
<th>Conf Cntl</th>
<th>Mot Avg</th>
<th>Mot PALA</th>
<th>Mot Cntl</th>
<th>Cmp Avg</th>
<th>Cmp PALA</th>
<th>Cmp Cntl</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/10</td>
<td>P</td>
<td>12</td>
<td>63</td>
<td>63</td>
<td>-</td>
<td>48</td>
<td>47.5</td>
<td>-</td>
<td>55</td>
<td>55</td>
<td>-</td>
</tr>
<tr>
<td>2/18</td>
<td>P</td>
<td>7</td>
<td>63</td>
<td>63</td>
<td>-</td>
<td>40</td>
<td>40</td>
<td>-</td>
<td>58</td>
<td>58</td>
<td>-</td>
</tr>
<tr>
<td>2/24</td>
<td>P</td>
<td>11</td>
<td>59</td>
<td>59</td>
<td>-</td>
<td>25</td>
<td>25</td>
<td>-</td>
<td>69</td>
<td>69</td>
<td>-</td>
</tr>
<tr>
<td>3/11</td>
<td>P</td>
<td>13</td>
<td>55</td>
<td>55</td>
<td>-</td>
<td>36</td>
<td>35.5</td>
<td>-</td>
<td>67</td>
<td>67</td>
<td>-</td>
</tr>
<tr>
<td>3/26</td>
<td>P</td>
<td>14</td>
<td>63</td>
<td>63</td>
<td>-</td>
<td>54</td>
<td>54</td>
<td>-</td>
<td>73</td>
<td>73</td>
<td>-</td>
</tr>
<tr>
<td>4/2</td>
<td>P</td>
<td>11</td>
<td>62</td>
<td>62</td>
<td>-</td>
<td>75</td>
<td>75.5</td>
<td>-</td>
<td>74</td>
<td>74</td>
<td>-</td>
</tr>
<tr>
<td>5/30</td>
<td>P/C</td>
<td>14</td>
<td>68</td>
<td>62</td>
<td>74</td>
<td>48</td>
<td>74</td>
<td>23</td>
<td>55</td>
<td>73</td>
<td>37</td>
</tr>
<tr>
<td>1/19</td>
<td>C</td>
<td>10</td>
<td>63</td>
<td>-</td>
<td>63</td>
<td>36</td>
<td>-</td>
<td>36</td>
<td>49</td>
<td>-</td>
<td>49</td>
</tr>
<tr>
<td>3/2</td>
<td>C</td>
<td>8</td>
<td>48</td>
<td>-</td>
<td>48</td>
<td>39</td>
<td>-</td>
<td>38.5</td>
<td>64</td>
<td>-</td>
<td>64</td>
</tr>
<tr>
<td>3/31</td>
<td>C</td>
<td>14</td>
<td>70</td>
<td>-</td>
<td>70</td>
<td>55</td>
<td>-</td>
<td>55</td>
<td>62</td>
<td>-</td>
<td>62</td>
</tr>
<tr>
<td>3/17</td>
<td>C</td>
<td>12</td>
<td>60</td>
<td>-</td>
<td>60</td>
<td>54</td>
<td>-</td>
<td>54</td>
<td>55</td>
<td>-</td>
<td>55</td>
</tr>
<tr>
<td>5/2</td>
<td>C</td>
<td>22</td>
<td>53</td>
<td>-</td>
<td>53</td>
<td>36</td>
<td>-</td>
<td>36</td>
<td>69</td>
<td>-</td>
<td>59</td>
</tr>
<tr>
<td>5/16</td>
<td>C</td>
<td>15</td>
<td>63</td>
<td>-</td>
<td>63</td>
<td>29</td>
<td>-</td>
<td>29.5</td>
<td>64</td>
<td>-</td>
<td>64</td>
</tr>
<tr>
<td>AVG</td>
<td></td>
<td>12.5</td>
<td>60.6</td>
<td>60.7</td>
<td>60.5</td>
<td>45.8</td>
<td>49.9</td>
<td>39.7</td>
<td>62.3</td>
<td>67.1</td>
<td>57.6</td>
</tr>
</tbody>
</table>

This suggests that classes have little effect since the differences can be explained solely by the intervention. However, there is a trend of improving competence that suggests the investigator learned how to do the PALA more effectively over time.
This tells us little about student interests and motivation. Twenty one subjects (24%) linked their appraisal of the course to their reason for attending, which provides a unique insight into their motivations: “Wanted initiation and introduction” “Purpose…learn to sail… rules & Navigation & Safety.” “Brand new boater.” “We are getting big boat & course for that.” “Curious, concerned, do it right.” “Why? To learn how to sail.” “Wanted 4 week, near house.”

As noted elsewhere, there are many who attended because of the legal requirement: “Took for requirements.” “Come for test, not knowledge.” “Required. only reason. 40 years on the water.” “Need NJ SB Cert.” “Legal compliance: good learn vs. bad learn.”

However, many people highlighted the involvement with others as a motivator: “Main objective - certification, accomplished. Took with daughter.” “Took it before 1980…review & refresh with wife, son & brother.” “Got son Jet Ski, not on-line. Wanted lights learned correctly. Give him a feeling of responsibility” “Xmas gift to husband.” “It seems that for some people it was not worth their time to attend for their own sake, but it was important “for the kids.”

The most often heard complaint were 33 comments (37%) which only hinted of a feeling of too much in too little time. There was a strong feeling in almost every class that there was too much material and too little time to grasp it all, even with the recognition that the people voicing the complaint would not have attended the course if it were longer! In addition, there were 27 negative comments about the courses, ranging from minor to fairly serious. However, such insights are of little concern to this study. So few complaints is a pretty good performance.

When pressed for suggestion and ideas, many items came out that reflect individual interests and cannot be applied to all attendees at a public boating safety course. However, there are a number of legitimate issues that can be addressed, and some suggested alternatives that may be considered. These may improve the classes, but most of this is not pertinent to the study.
There is no surprise with the large range of responses and variety in the attendees, but that is not a major issue, since the PALA must be useful in a variety of environments with different audiences and instructors. Combining these observations, the differences between classes may be ignored and the variation accepted as part of the challenge. In a sense the only issue is whether the PALA can make a difference despite these variations. Obviously, it does, and we can safely assign the differences between classes to intervention (PALA vs. Controls).

*Intersection with Class Format*

The differences between classes based on experience can also be assigned strictly to experience, but the class format may also be significant since evening class format is different in execution (five evenings of 2 hours each) versus day class format (one day of seven hours) and the popularity of one-day classes means they have larger attendances than evening classes. If anything would affect the learning experience, it would seem the format would be it. Table 17 combines ten (10) multi-evening classes (112 participants) and three (3) single-day classes (51 participants) and compares results by intervention. The results show no notable differences in confidence (+-0.95) or in competency (+-2.9), but notable differences in motivation (+-15).

<table>
<thead>
<tr>
<th>CLASS FORMAT</th>
<th>MULTI EVES</th>
<th>SINGLE DAY</th>
<th>total</th>
<th>Confidence</th>
<th>Motivation</th>
<th>Competency</th>
</tr>
</thead>
<tbody>
<tr>
<td>N # PERCENT</td>
<td>112</td>
<td>51</td>
<td>163</td>
<td>60.7</td>
<td>49.9</td>
<td>67.1</td>
</tr>
<tr>
<td>% PALA</td>
<td>69%</td>
<td>31%</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% control</td>
<td>61%</td>
<td>16%</td>
<td>48%</td>
<td>60.7</td>
<td>49.9</td>
<td>67.1</td>
</tr>
<tr>
<td>Confidence</td>
<td>60.9</td>
<td>59.9</td>
<td>60.6</td>
<td>60.6</td>
<td>60.6</td>
<td>60.6</td>
</tr>
<tr>
<td>Motivation</td>
<td>91.5</td>
<td>75.7</td>
<td>44.3</td>
<td>44.3</td>
<td>62.11</td>
<td>62.11</td>
</tr>
<tr>
<td>Competency</td>
<td>62.9</td>
<td>60.0</td>
<td>62.11</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
At first glance it appears that they may be differences between the two class formats, but on closer inspection the mix of PALA and controls explains some differences.

The only item of interest in these results is the significant difference in motivation between the day and evening formats. Essentially the multi-evening participants were more motivated to take additional training, whereas one-day attendees were significantly less interested in more training. Recalling that the same teachers use the same material in both formats, this may have more to do with the attendees. It may be a self-selection criterion in which those who want the one day class want an in-and-out, no commitment option, and this is reflected in their choice and motivation levels.

This idea is given some support by the reactions of attendees, which were also different between the class formats. Here are some extracts from attendees of the multi-evening classes in their DC1 interviews: “Very informative. Too short, too much.” Lot more to it than I thought. Good” “Course very good. Went in depth, Well laid out.” Compare these reactions with those from the day courses: “Course needs to be longer.” “Split into two days not one day. Too much to retain.” Initially, RID262 commented that “I accomplished what I wanted [in] one day.” Later, he revised his opinion: “I recommend a longer course.”

Breaking out by classes actually impedes the analysis since a class is classified PALA or Control, not individuals. The Class Format proves to be the smallest unit we can profitably break out the classes as an independent variable.

Intersection with Boating Experience:

Common sense and theory support the idea that experience with the specific content in a real-world context will have a notable effect on confidence and competence. This was one of the
most earnestly examined categories for exactly those reasons, but the results are somewhat surprising. This is seen in Table 18 where confidence, motivation and competency scores are tabulated by boating experience (based on number of years boating) in three categories: Novice, Middies, and Old salts. Such classifications have limited utility as Ericsson and Lehmann (1996) pointed out in their work on expertise, and they observed that the number of years of experience in a domain is a poor predictor of attained performance. For these reasons, only three experience categories have been used. Based on boating experience, there are notable differences in confidence (+13.3) and motivation (+19.7), but none in competency (+0.95).

<table>
<thead>
<tr>
<th>Boating Experience</th>
<th>&lt;1 yrs</th>
<th>1-15 yrs</th>
<th>&gt;15 yrs</th>
<th>total</th>
<th>Confidence</th>
<th>Motivation</th>
<th>Competency</th>
</tr>
</thead>
<tbody>
<tr>
<td>N #</td>
<td>26</td>
<td>34</td>
<td>27</td>
<td>88</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PERCENT</td>
<td>30%</td>
<td>39%</td>
<td>31%</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% PALA</td>
<td>54%</td>
<td>47%</td>
<td>41%</td>
<td>0.48%</td>
<td>60.7</td>
<td>49.9</td>
<td>67.1</td>
</tr>
<tr>
<td>% Control</td>
<td>46%</td>
<td>53%</td>
<td>59%</td>
<td>0.53%</td>
<td>60.5</td>
<td>39.7</td>
<td>57.6</td>
</tr>
<tr>
<td>Confidence</td>
<td>52.7</td>
<td>62.0</td>
<td>66.0</td>
<td>60.6</td>
<td>60.6</td>
<td>44.3</td>
<td></td>
</tr>
<tr>
<td>Motivation</td>
<td>50.4</td>
<td>51.3</td>
<td>32.0</td>
<td>44.3</td>
<td>44.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competency</td>
<td>61.2</td>
<td>62.2</td>
<td>62.0</td>
<td>62.11</td>
<td></td>
<td></td>
<td>62.11</td>
</tr>
</tbody>
</table>

Number of years of activity is a weak measure of real world experience, but it is the only gauge available for an intelligent assessment. It seems that the experience groups Novices, Middies and Old Salts, all scored close to each other on competency, closely nestled around the average. However, they were notably different in their confidence and motivation (survey scores), registering a broad range somewhat related to their experience.

The idea of less confidence as a novice which increases with experience over a long term is intuitively reasonable and fits most of our personal observations. The idea is supported by the
observations of the interviewer, since novices were often less confident, yet conversely, the more experienced Old Salts were more comfortable. There were a number of people in the “Middies” that have some experience, between one and fifteen years, and are often middle-aged with children still at home. The variety of reactions, scores, grades and responses defies easy categorization, since both confidence and competency dropped slightly over time.

Based on these numbers and classroom observations by the investigator and the instructors, It seems that the more experienced boaters are less likely to volunteer to do the PALA, though still willing to volunteer for the study. There seemed to be a natural deference in the class to let the younger and less experienced people take the lead on the PALA.

Boating safety courses are designed for novices, so the analysis examines Novices versus larger groups. Statistics for PALA vs. Controls for novices (N=43) for all three instruments paint a different story as seen in Table 19. Novices not only benefitted from the PALA in competency, but they also responded favorably to the PALA: “Fantastic!” “Love the activity (PALA) More than expected.” “Boats as aids were great. Very helpful.” “helped create real understanding.” Even Old Salts liked the PALA, “Liked boats & stuff. Made me think… physical lets your retain more.” and “Very interesting, worked good!”

Table 19
Distribution and means for Novice Samples

<table>
<thead>
<tr>
<th>NOVICES N=43</th>
<th>PALA</th>
<th>CNTL</th>
<th>AVG</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAMPLES N</td>
<td>24</td>
<td>19</td>
<td>43</td>
</tr>
<tr>
<td>CONFIDENCE</td>
<td>54.0</td>
<td>51.0</td>
<td>52.7</td>
</tr>
<tr>
<td>MOTIVATION</td>
<td>66.3</td>
<td>54.7</td>
<td>61.2</td>
</tr>
<tr>
<td>COMPETENCY</td>
<td>66.3</td>
<td>54.7</td>
<td>61.2</td>
</tr>
</tbody>
</table>

There is greater variation in the PALA results than in the control classes because some
students in PALA classes did not participate, nor benefit from the PALA, while others were onlookers and some even left the area. It is the impression of the investigator and instructors that the voluntary nature of the offering diminished the potential impact of the PALA

Some subjects made the same observation: “should be compulsory for everyone!” and “especially the exercise” “very valuable” “could be longer” “hands-on in-water” “more exercises.” While homogeneity is preferable, the variance is not a serious problem since there is a large enough difference between samples to discriminate the PALA effects.

About twenty five percent of the subjects (N=23) highlighted that the course helped make them more confident. These subjects focused on their internal feelings and reflected improved confidence in more reliable assessments of the situation and a greater awareness of activity around them, or what is technically termed situation-awareness. They noticed more, paid more attention to what they noticed, and interpreted the data through a new set of ‘more confident’ lenses. This enhanced confidence is also evident in the survey results, but for novices it tends to diminish with time during the study. About 25 percent(N≈20) of the subjects indicated sincere surprise at the volume and importance of the data and ideas covered in the course and their own lack of knowledge. Most of these comments came from the first interview. ”Learned a lot, wanted more, realize I didn't know it all.” “learned a lot about what I don't know.” “Lot more to it than I thought.” The only real surprise came from the Old Salts that they were more ignorant than they expected as reflected in their interview comments: “Did make me aware…” “Learned a lot!” “Much better than I expected. Got more out of it than I thought I would” “I thought I knew more than I did” “After the course, I was impressed, it should be mandatory.”

Intersection with Boat Type
There is much contention in boaters attitudes about boat type, so it seems reasonable that this may have an impact of training activities. While well known in the boating community, it is also obvious from some of the comments from the interviews. RID314 offers us some insights with this statement ”[Instructors should] encourage power boaters to share [water] with fishermen.” (Almost all fishermen use powerboats.) Others contributed a variety of comments on the gulf between types of boaters, “Separate courses for BP/Sail/PWC” “No interest in PWC” “more tailoring/anchoring, tubing.” “[should focus on] Trailering and anchoring and seamanship and knotting.” “PWC (huge problem), & Kayaks (boring) & Sail (not pertinent)”

Essentially, many classes are exclusively power-boaters. With so few samples in the sail and human powered categories, those two are combined as ‘Non-power.’. There is also overlap since some boaters use several boats, so power and non-power are used, though even then, the results are not particularly enlightening. We can expect that the non-power boaters are somewhat less confident than power boaters because of the variety of skills and challenges they must face compared to power boaters who can ‘just turn the key and go’

However, 17% non-power (15 samples) is a small sample and since 5 of the 13 classes were 100% power-boaters, and three classes had more than 25% non-power-boaters, the effects of the variable are also distorted. There are notable differences in confidence (+-12) but there are no notable differences in motivation (+- 7.1). or competency. (+- 2.1). It seems prudent to ignore this variable in the analysis based on current data for Boat Type.

*Intersection with Boat Use*

There are seemingly very different attitudes and perceptions between different type of boat users, suggesting that this classification might be meaningful. However, there is little
discernable difference between them in our data that cannot more easily be explained by experience or intervention. This category has little value in the analysis since the population is overwhelmingly power boaters and evenly split between fishermen and leisure.

There were many comments from the interviews about boat use, and some are constructive criticism: “[much of the material] was interesting, but not pertinent to my needs. Not sailboats… Little boats.” “Too much time on outside stuff. Gear program to local area and needs.” Others focused on their particular use: “Need more tailoring, anchoring, tubing.” “[we only go on] lakes & rivers,[ therefore] Navigation is not relevant.” “Very beneficial, [but need] more offshore.” “need more sailing.” Despite these observations and suggestions, there was no consensus so these ideas may be useful to create courses but it is not pertinent to this study. The values for Confidence, Motivation and Competency are more reliably associated with other factors than boat use, so it is safe to ignore this variable in the analysis of current data.

*Intersection with Education:*

Education is another likely candidate as a major influence. However, confusion on the terms “vocational” and “professional” reduced the reliability of these two terms. These categories are added together to produce more balanced set of categories with which the analysis proceeds and treats them as one category. The results seem to support weak relationships between education and confidence and between education and competence. Both of these observations make sense in regards to people who can take advantage of higher education and the perceived benefits of higher education in our society. There is little in the interview notes to add insights to these observations, so there are no notable differences in confidence (+- 0.5) or competency (+- 4.9), but there are notable differences in motivation (+- 6.1) for Education.
Intersection with Gender

Gender would be a likely candidate to cause differences in the results, however, few couples volunteered to the study together, so we had a smaller percentage of women in the volunteer group than the minority that attended courses. There is little difference in competency or motivation between the genders, but notable differences in confidence. (+-9.3) by gender.

Because of the male-orientation in boating, gender is also related to the number of years of experience. This shows as (50%, 37%, 13%) for women classified as Novices, Middies and Old Salts versus (18%, 40%, 42%) respectively for men. In other words, 50% of the women subjects were novices, whereas only 18% of the men were. Therefore differences by gender seem to have less to do with gender than with experience.

A particular note is that no women commented on the legal requirement or attending to get a certificate, implying they attended for a different reason, as seen in these comments: “Xmas gift to husband. Boating frightens me. Don't like lack of Rules” “Beyond what I need. Just a lake, was informative & valuable” “As passenger, don't know that rules exist, makes sense and are learnable.” Women often referred to someone else, husband, child, grandchild as an element in their attendance, as well as some discomfort: “Me and my son. I have no knowledge, [I] did it for my son.” “Got son Jet Ski, [course] … Give him a feeling of responsibility” “Course helped to teach kids. Try to get them to a course.” In addition, women were more likely to do the PALA, yet were less likely to volunteer with the study, even filling out volunteer forms for their males!

Intersection with Age

There is little difference in competency or motivation between older and younger groups, with a slight disparity in confidence (+1.7) which can be attributed to age. Generally, age is a
negligible effect. However, it seems older people are less likely to join in the PALA, but are comfortable to volunteer to help out with the study. There was a deference in the class to let the younger or inexperienced people take the lead on the PALA. There is also significant overlap with experience. Of 27 people with > 15 years experience, 25 are over 45 as one would expect. However, for the 62 Non-Salts with less than 15 years experience, 24 were less than 45 and 38 were older than 45. As far as results that have meaning to this study, differences in age are more easily explainable by the differences in boating experience, so age is ignored in the analysis.

*Other Categories Observations*

The following points summarize the observations made in regard to the other categories:

1. Classes have a broad range in confidence (+-26), motivation (+-50) and competency (+ -37).
2. There are no notable differences in confidence (+-0.2) for classes, though there are notable differences in motivation(+10) and competency (+10).
3. Classes have little effect since the differences in confidence, motivation, or competency between classes can be explained solely by the intervention (PALA vs. Control).
4. There are no notable differences in confidence (+-0.95) or in competency (+ 2.9) for class format:, but there are notable differences in motivation(+15).
5. There are notable differences in confidence (+-13.3) and motivation (+-19.7) for Boating experience:, but none in competency (+-0.95).
6. There are notable differences in confidence (+-12) or boat type: but there are no notable differences in motivation (+- 7.1). or competency (+- 2.1).
7. There are notable differences in motivation (+- 6.1) for Education.
8. There are notable differences in confidence (+9.3) by gender.

9. There are no differences in confidence, motivation, or competency by age.

Longitudinal Analysis

Building on the framework of individual instruments measuring confidence, motivation, competency and direct interviewing responses, the longitudinal data is examined. There are three major events in the longitudinal axis, starting with the enrollment form and demographic data collection (DC0), an interview with a survey and quiz tied to the beginning of the boating season (DC1), an interview, survey and quiz at the end of the boating season (DC2).

Table 20
Longitudinal Findings for Full Subjects (N=74) for each interview

<table>
<thead>
<tr>
<th>SUBJECTS</th>
<th>N=74</th>
<th>CONFIDENCE SURVEY</th>
<th>MOTIVATION SURVEY</th>
<th>COMPETENCY QUIZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>PALA DC1</td>
<td>34</td>
<td>62.3</td>
<td>48.6</td>
<td>61.5</td>
</tr>
<tr>
<td>PALA DC2</td>
<td>34</td>
<td>56.8</td>
<td>50.6</td>
<td>70.7</td>
</tr>
<tr>
<td>AVG PALA</td>
<td>34</td>
<td>59.5</td>
<td>49.6</td>
<td>66.1</td>
</tr>
<tr>
<td>Control DC1</td>
<td>40</td>
<td>62.1</td>
<td>39.1</td>
<td>57.3</td>
</tr>
<tr>
<td>Control DC2</td>
<td>40</td>
<td>59.7</td>
<td>39.9</td>
<td>58.1</td>
</tr>
<tr>
<td>AVG Control</td>
<td>40</td>
<td>60.9</td>
<td>39.5</td>
<td>57.7</td>
</tr>
</tbody>
</table>

The population for the longitudinal study is summarized in Table 20, who responded to both interviews (N=74), which indicates several comparisons worthy of further investigation.

Correlations with Time Variables:

Differences in column three of Table 20 suggests that confidence went down between interviews. Column four shows no change in motivation between surveys, but a significant difference between PALA and Control subjects. Column five shows significant differences in
competency between PALA and Control subjects, and a significant change over time for PALA subjects, but not for the Controls. There are data collection events, DC0, DC1 & DC2, and time factors including Days Since Intervention (DSI) and Summer Experience (SumExp) against which we can correlate data. The results are shown in the large and densely populated table 21.

The correlations are pretty weak for the full population. (N=74), and the best correlations are about 0.40 between the average confidence score for PALA participants and their summer experience score, which is weak at best. Differences greater than 0.5 may be a general rule of thumb for notable differences and values greater that 0.75 may be statistically significant.

Table 21
Averages and Correlations of variables for Novice Population (N=18)

<table>
<thead>
<tr>
<th>CORRELATIONS</th>
<th>Time Var</th>
<th>DC1</th>
<th>DC2</th>
<th>AVG</th>
<th>DEL</th>
<th>DC1</th>
<th>DC2</th>
<th>AVG</th>
<th>DEL</th>
<th>DC1</th>
<th>DC2</th>
<th>AVG</th>
<th>DEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PALA</td>
<td>N=10</td>
<td>55.6</td>
<td>48.0</td>
<td>81.8</td>
<td>-7.57</td>
<td>48.4</td>
<td>46.6</td>
<td>47.5</td>
<td>-1.8</td>
<td>59.5</td>
<td>68.5</td>
<td>64.0</td>
<td>9.00</td>
</tr>
<tr>
<td>DC1DSI</td>
<td>75</td>
<td>-.45</td>
<td>.31</td>
<td>-.125</td>
<td>.062</td>
<td>-.267</td>
<td>-.093</td>
<td>-.188</td>
<td>.29</td>
<td>-.345</td>
<td>.61</td>
<td>.05</td>
<td>.51</td>
</tr>
<tr>
<td>DC2DSI</td>
<td>143</td>
<td>-.55</td>
<td>.19</td>
<td>-.26</td>
<td>.063</td>
<td>-.263</td>
<td>-.086</td>
<td>-.18</td>
<td>.29</td>
<td>-.269</td>
<td>.49</td>
<td>.05</td>
<td>.40</td>
</tr>
<tr>
<td>SUMEXP</td>
<td>5.4</td>
<td>.71</td>
<td>.49</td>
<td>.77</td>
<td>-2.44</td>
<td>.27</td>
<td>.21</td>
<td>.25</td>
<td>-.094</td>
<td>.17</td>
<td>.18</td>
<td>.34</td>
<td>-.042</td>
</tr>
<tr>
<td>CONTROL</td>
<td>N=8</td>
<td>49.3</td>
<td>47.7</td>
<td>48.5</td>
<td>-1.63</td>
<td>47.5</td>
<td>57.2</td>
<td>52.4</td>
<td>9.75</td>
<td>60.6</td>
<td>58.7</td>
<td>59.6</td>
<td>-1.88</td>
</tr>
<tr>
<td>DC1DSI</td>
<td>59</td>
<td>-.39</td>
<td>-.24</td>
<td>-.32</td>
<td>.34</td>
<td>-.408</td>
<td>.04</td>
<td>-.198</td>
<td>.59</td>
<td>-.324</td>
<td>.68</td>
<td>.36</td>
<td>.83</td>
</tr>
<tr>
<td>DC2DSI</td>
<td>124</td>
<td>-.20</td>
<td>-.05</td>
<td>-.13</td>
<td>.35</td>
<td>-.369</td>
<td>.05</td>
<td>-.170</td>
<td>.55</td>
<td>-.347</td>
<td>.65</td>
<td>.32</td>
<td>.82</td>
</tr>
<tr>
<td>SUMEXP</td>
<td>3.3</td>
<td>.41</td>
<td>.59</td>
<td>.51</td>
<td>.45</td>
<td>-.358</td>
<td>-.392</td>
<td>-.405</td>
<td>-.058</td>
<td>.60</td>
<td>.10</td>
<td>.37</td>
<td>-.275</td>
</tr>
<tr>
<td>NOVICE</td>
<td>N=18</td>
<td>52.8</td>
<td>47.9</td>
<td>50.4</td>
<td>-4.93</td>
<td>48.0</td>
<td>51.3</td>
<td>49.7</td>
<td>3.33</td>
<td>60.0</td>
<td>64.2</td>
<td>62.1</td>
<td>4.17</td>
</tr>
<tr>
<td>DC1DSI</td>
<td>68</td>
<td>-.36</td>
<td>.04</td>
<td>-.19</td>
<td>.43</td>
<td>-.304</td>
<td>-.078</td>
<td>-.200</td>
<td>.33</td>
<td>-.318</td>
<td>.66</td>
<td>.24</td>
<td>.61</td>
</tr>
<tr>
<td>DC2DSI</td>
<td>135</td>
<td>-.32</td>
<td>.08</td>
<td>-.15</td>
<td>.43</td>
<td>-.283</td>
<td>-.079</td>
<td>-.190</td>
<td>.30</td>
<td>-.278</td>
<td>.59</td>
<td>.22</td>
<td>.54</td>
</tr>
<tr>
<td>SUMEXP</td>
<td>4.4</td>
<td>.61</td>
<td>.50</td>
<td>.64</td>
<td>-.16</td>
<td>.10</td>
<td>.02</td>
<td>.06</td>
<td>-.163</td>
<td>.26</td>
<td>.16</td>
<td>.35</td>
<td>-.74</td>
</tr>
</tbody>
</table>

There are noteworthy differences in the means between groups, but there are no significant correlations for the entire population with any factor such as DSI or summer experience. However, stronger trends and correlations are more pronounced in smaller more homogeneous populations such as Non-Salts and Novices.
One of the best correlations (0.768) is between average (DC1-DC2) confidence of Novices and Summer Experience. This may be significant since it follows the pattern of larger populations and it is intuitively clear that following larger trends strengthens the credibility. However, a stronger correlation (0.82-0.83) shows between a change in competency and DSI (Days since Intervention) for Controls which is not found in the larger populations, and may be less credible than smaller correlations that appear in both levels.

Figure 17
Novice Competency vs. DSI - PALA vs. Control s (N=18)

Novice samples (DS2COMP vs. DC2DSI) in figure 17 shows trends, as these numbers suggest, and despite the small number of samples, the trend of increasing competence is clear. This suggests that Novice Controls improve as they get boating experience. There are no significant correlations for full population with DSI or summer experience. There are strong correlations between Novices’ summer experience, confidence and competence.
Correlation with Summer Experience

Most subject provided summer experience data (boat size and number of trips) but this data is not well behaved, and there are no trends in the full population. The variances are extreme in some correlations, so a graphical display as in Figure 18 can be helpful to detect trends.

Using this tool, we can examine the confidence and competency between populations based on experience and other factors including: summer experience vs. change in confidence and competence, summer experience versus total confidence and competence, and summer plus experience versus final confidence and competence.

Figure 18
Non-Salts Confidence vs. Summer Experience

Exchanging the smaller population of non-salts (N=43) provides more interpretable data by removing old salts and their large number of on-water experiences, the average dropped to 5.8 boating events and the mean held at 4 events, with 32 subjects that went boating at least once.
To make sense of these numbers, referral to the interviews is essential, since some subjects did not go boating at all during this summer, diminishing the value of the summer experience variable. Perhaps it is the fact this study was done during the summer of one of the darkest recessions in recent history, or perhaps it was pure coincidence, but an unusual number of people were “too busy” to use their boat this year. This observation comes from a number of sources, but it caused a deviation in summer experience values since 39% of novices and about 20% of the others had no boating experience the summer of 2009.

There is a diminishing range of changes in confidence and competency among more experienced boaters when compared with less experienced boaters: suggesting they change less with more experience, which may be worth a more detailed investigation in the future.

<table>
<thead>
<tr>
<th>Correlation</th>
<th>SUMEXP</th>
<th>DC1CONF</th>
<th>DC2CONF</th>
<th>AVGCONF</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOVICE PALA</td>
<td>5.40</td>
<td>55.62</td>
<td>48.05</td>
<td>51.53</td>
</tr>
<tr>
<td>N=10</td>
<td>0.708</td>
<td>0.491</td>
<td>0.768</td>
<td></td>
</tr>
<tr>
<td>NOVICE CONTROL</td>
<td>3.25</td>
<td>49.33</td>
<td>47.73</td>
<td>48.53</td>
</tr>
<tr>
<td>N=8</td>
<td>0.412</td>
<td>0.587</td>
<td>0.511</td>
<td></td>
</tr>
<tr>
<td>ALL NOVICES</td>
<td>4.44</td>
<td>52.82</td>
<td>47.91</td>
<td>50.36</td>
</tr>
<tr>
<td>N=18</td>
<td>0.615</td>
<td>0.502</td>
<td>0.639</td>
<td></td>
</tr>
</tbody>
</table>

The most notable observation from this analysis is the clear dominance of PALA subjects in the final competency category, with better Quiz scores at all levels of experience. This helps affirm the long term value of PALA for learning. A notable difference is that the PALA subjects were boating far more than the Controls on average. This seems odd, but with the small sample size a few PALA novices went out many times and drove the average up (two PALA subjects went out 20 times, and one Control went out 15 times and all others less than seven times).
which explains it. There is a general loss of confidence related to DSI and Summer Experience.

*Longitudinal Analysis of Confidence*

The Confidence data is examined in Table 24 which shows intervention and boating experience for DC1 and DC2, along with averages and changes. Confidence decreases between data collection cycles, for all groups, as a trend, but increases more strongly for the controls as experience goes up [50, 61, 67]. Compared to the PALAs, who gained confidence less rapidly with experience [52, 63, 63].

**Table 23**

<table>
<thead>
<tr>
<th>Confidence</th>
<th>PALA</th>
<th>Cntl</th>
<th>Novice</th>
<th>Middy</th>
<th>Old Salts</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL N=</td>
<td>34</td>
<td>40</td>
<td>17</td>
<td>31</td>
<td>25</td>
</tr>
<tr>
<td>DC1 AVG</td>
<td>63</td>
<td>62</td>
<td>54</td>
<td>64</td>
<td>67</td>
</tr>
<tr>
<td>DC1 AVDEV</td>
<td>31</td>
<td>31</td>
<td>19</td>
<td>31</td>
<td>30</td>
</tr>
<tr>
<td>DC2 AVG</td>
<td>57</td>
<td>60</td>
<td>49</td>
<td>60</td>
<td>64</td>
</tr>
<tr>
<td>DC2 AVDEV</td>
<td>28</td>
<td>30</td>
<td>17</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>ALL AVG</td>
<td>60</td>
<td>61</td>
<td>51</td>
<td>62</td>
<td>65</td>
</tr>
<tr>
<td>DELTA AVG</td>
<td>-6</td>
<td>-2</td>
<td>-5</td>
<td>-4</td>
<td>-3</td>
</tr>
</tbody>
</table>

This compares with trend lines generated by correlation with DSI, which is moderately related to confidence [-0.5] but the change is more strongly related [0.625], and also suggests that the confidence levels are dropping as a result of time away from the class rather than the time between the data collection cycles. This is compared with the trend lines generated by examining the correlation with DSI, which is moderately related to confidence [-0.5] but the change is more strongly related [0.625]. This suggests that confidence levels drop as a result of time away from the class rather than the time between the data collection cycles.
Confidence dropped across the board for all groups during the 60 days between DS1 and DS2. All groups lost confidence over this period, while PALA users were higher than controls and later they are equivalent. Perhaps the PALA induces an unsustainable degree of confidence.

Table 24
Detail of confidence with Intervention Intersected by Experience

<table>
<thead>
<tr>
<th>Confidence SAMPLES</th>
<th>&lt;1 PALA</th>
<th>&lt;1 cntl</th>
<th>&gt;1 PALA</th>
<th>&gt;15 PALA</th>
<th>&gt;15 cntl</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=</td>
<td>10</td>
<td>7</td>
<td>15</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>52</td>
<td>50</td>
<td>63</td>
<td>63</td>
<td>67</td>
</tr>
</tbody>
</table>

Table 25
Correlations for Days Since Intervention (DSI) vs. Confidence

<table>
<thead>
<tr>
<th>VAR</th>
<th>DC1DSI</th>
<th>DC2DSI</th>
<th>SUMEXP</th>
<th>DC1CONF</th>
<th>DC2CONF</th>
<th>DELCONF</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVG</td>
<td>74.70</td>
<td>143.40</td>
<td>5.40</td>
<td>55.62</td>
<td>48.05</td>
<td>-7.57</td>
</tr>
<tr>
<td>N</td>
<td>CORRELATE WITH DC1DSI</td>
<td>-0.451</td>
<td>0.307</td>
<td>0.623</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOVICE PALA SAMPLES</td>
<td>DC2DSI</td>
<td>-0.554</td>
<td>0.195</td>
<td>0.627</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This ‘over-confidence’ effect was noted in simulation studies, and it seems to carry over to PALA simulations as well. With a strong theoretical and experimental basis for this phenomenon, I conclude that over-confidence is the explanation of these trends. This conveniently reinforces that the instrument is measuring what we believe it measures.

Recalling that the Old Salts had significantly higher confidence scores than novices, we can speculate that confidence for these novices will grow over time as they become Middies and Old Salts. However more experienced subjects have higher confidence levels than novices. PALA subjects have higher confidence than Controls, but the data does not suggest when they reach such a point. All groups have a short term loss of confidence over the timeframe of the study. PALA has a short term effect on Confidence, that wanes more quickly with time.
Day vs. Night Confidence

This idea also ties in with night vs. day confidence levels as seen on Table 26. The DPI variable actually increased slightly during the summer period, which is in keeping with the overall trend of a decrease in confidence. Higher DPI represents greater fear of the night.

Table 26
Day Preference Index for DC1/DC2 by Intervention

<table>
<thead>
<tr>
<th>Confidence</th>
<th>PALA</th>
<th>ctrl</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL N=</td>
<td>34</td>
<td>40</td>
</tr>
<tr>
<td>DC1 AVG</td>
<td>0.77</td>
<td>0.89</td>
</tr>
<tr>
<td>DC2 AVG</td>
<td>0.79</td>
<td>0.96</td>
</tr>
</tbody>
</table>

However, the change is barely noticeable compared to the differences between the PALA and the Control (0.78 versus 0.93) which attests to a significant difference between the groups based on intervention and a surprising further loss over time for Controls vs. PALA. There are differences in how PALA and Controls deal with their perceptions and fears over time. PALA seems to have a short and long term effect on Day/Night preference and nighttime confidence.

Longitudinal Analysis of Motivation

If we examine motivation by the two major questions, taking courses and joining groups, and by intervention and experience groups, some observations are revealed in Table 27 suggests that novices maintain their original feelings between DC1 and DC2, while more experienced people have a wider range of responses with no clear trends that can be easily interpreted.

There are no remarkable changes based on time or summer experience for interest and motivation except for the Old Salts who show a different trend for the PALA vs. Control subjects. The controls went down significantly as might be expected, but the PALA went up. This seems to match the observation that some experienced subjects were surprised by the value and volume of the material covered in the course and their own lack of knowledge.
The evidence of the trends identified in Table 27, combined with these observations and some comments from the interviews suggest that some experienced subjects changed their minds about more training and social contact between DC1 and DC2.

Table 27
Motivation by Intervention and Experience

<table>
<thead>
<tr>
<th>Motivation To Take Course</th>
<th>AVG</th>
<th>NOVICE</th>
<th>MIDDY</th>
<th>OLD SALT</th>
</tr>
</thead>
<tbody>
<tr>
<td>PALA DC1</td>
<td>30</td>
<td>29.6</td>
<td>33.2</td>
<td>24.0</td>
</tr>
<tr>
<td>PALA DC2</td>
<td>33</td>
<td>29.6</td>
<td>35.2</td>
<td>34.7</td>
</tr>
<tr>
<td>Control DC1</td>
<td>22</td>
<td>30.3</td>
<td>31.3</td>
<td>11.4</td>
</tr>
<tr>
<td>Control DC2</td>
<td>27</td>
<td>34.6</td>
<td>32.8</td>
<td>15.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Motivation To Join Group</th>
<th>AVG</th>
<th>NOVICE</th>
<th>MIDDY</th>
<th>OLD SALT</th>
</tr>
</thead>
<tbody>
<tr>
<td>PALA DC1</td>
<td>20</td>
<td>18.8</td>
<td>24.8</td>
<td>13.3</td>
</tr>
<tr>
<td>PALA DC2</td>
<td>17</td>
<td>17.0</td>
<td>16.4</td>
<td>16.7</td>
</tr>
<tr>
<td>Control DC1</td>
<td>17</td>
<td>20.8</td>
<td>17.0</td>
<td>15.5</td>
</tr>
<tr>
<td>Control DC2</td>
<td>13</td>
<td>20.8</td>
<td>15.1</td>
<td>7.6</td>
</tr>
</tbody>
</table>

The scale and direction of the changes is related to intervention: so PALA subjects were more likely to change their minds, but controls were less likely. In addition, the thematic analysis suggests that half the subjects say that their attitude, perception or awareness changed because of the course. Perhaps the PALA helped change the experience-based confidence and motivation.

Longitudinal Analysis of Competency

The most basic question is does the PALA make a difference in what students learn and for how long does it matter? Table 28 goes to the heart of this question by dramatizing the changes between the first and second interviews for each group. The PALA subjects’ Competency are ahead of the Control subjects (61.5 vs. 57.3) at DC1. The competency scores tend to improve from DC1 to DC2, and the trends for Novices correlate well (0.5 to 0.8 ) with
DSI and SumExp, confirming that learning for novices improves as a result of experience.

Table 28
Competency Changes by Intervention & Experience

<table>
<thead>
<tr>
<th>Competency SAMPLES</th>
<th>PALA</th>
<th>Cntl</th>
<th>Novice&lt;1</th>
<th>Middy1&lt;15</th>
<th>Old salt&gt;15</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL N=</td>
<td>34</td>
<td>40</td>
<td>17</td>
<td>31</td>
<td>25</td>
</tr>
<tr>
<td>DC1 AVG</td>
<td>61.5</td>
<td>57.3</td>
<td>58.8</td>
<td>60.5</td>
<td>57</td>
</tr>
<tr>
<td>DC2 AVG</td>
<td>70.7</td>
<td>58.8</td>
<td>63</td>
<td>63</td>
<td>65</td>
</tr>
<tr>
<td>DELTA AVG</td>
<td>9.2</td>
<td>1.5</td>
<td>4.2</td>
<td>2.5</td>
<td>8</td>
</tr>
</tbody>
</table>

The Old Salts improved even more than Novices (8.0 vs. 4.2), related to greater boating experience and more summer experience after the course. Every group improved, but PALA subjects were even further ahead (70.7 vs. 58.8) of the Controls at the end of the season (DC2), which demonstrates a long term learning benefit that is a surprise.

Table 29:
ANOVA DC1 vs. DC2 with Pala vs. Controls

<table>
<thead>
<tr>
<th>Competency</th>
<th>DC1 F</th>
<th>DC1 Sig.</th>
<th>DC1 F</th>
<th>DC1 Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PALA</td>
<td>2.33</td>
<td>.015</td>
<td>2.89</td>
<td>.009</td>
</tr>
<tr>
<td>Control</td>
<td>2.68</td>
<td>.006</td>
<td>2.32</td>
<td>.029</td>
</tr>
</tbody>
</table>

The ANOVA tests give a credible basis to discriminate between groups. The results of this experimental test is measured by comparing results from DC1 and DC2 quizzes between PALA subjects and controls. The ANOVA results show little overlap in the two populations measured by their competency scores at the beginning and end of the season.

There is a moderate relationship between DSI and confidence for Novices with PALA, a weak relationship between DSI and motivation and a strong relationship between DSI and competency for Novices with Controls as seen in Table 29. Table 30 shows that decreasing competency for the control subjects is closely related to DSI, whereas PALA subjects’
improvement is more closely related to Summer Experience than DSI.

Table 30
Correlations for DSI vs. Novices for Competency

<table>
<thead>
<tr>
<th>CORRELATE NOVICES</th>
<th>TIME</th>
<th>SUMEXP</th>
<th>DC1 COMP</th>
<th>DC2 COMP</th>
<th>DEL COMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL NOVICES</td>
<td>SUMEXP</td>
<td>4.44</td>
<td>60.0</td>
<td>64.2</td>
<td>4.2</td>
</tr>
<tr>
<td>N=18</td>
<td>DC1DSI</td>
<td>67.9</td>
<td>-0.318</td>
<td>0.659</td>
<td>0.612</td>
</tr>
<tr>
<td></td>
<td>DC2DSI</td>
<td>134.9</td>
<td>-0.278</td>
<td>0.592</td>
<td>0.544</td>
</tr>
<tr>
<td>CONTROLS</td>
<td>SUMEXP</td>
<td>3.25</td>
<td>60.6</td>
<td>58.7</td>
<td>-1.9</td>
</tr>
<tr>
<td>N=8</td>
<td>DC1DSI</td>
<td>59.4</td>
<td>-0.324</td>
<td>0.678</td>
<td>0.831</td>
</tr>
<tr>
<td></td>
<td>DC2DSI</td>
<td>124.3</td>
<td>-0.347</td>
<td>0.653</td>
<td>0.821</td>
</tr>
<tr>
<td>PALAS</td>
<td>SUMEXP</td>
<td>5.40</td>
<td>59.5</td>
<td>68.5</td>
<td>9.0</td>
</tr>
<tr>
<td>N=10</td>
<td>DC1DSI</td>
<td>74.7</td>
<td>-0.345</td>
<td>0.607</td>
<td>0.506</td>
</tr>
<tr>
<td></td>
<td>DC2DSI</td>
<td>143.4</td>
<td>-0.269</td>
<td>0.486</td>
<td>0.401</td>
</tr>
</tbody>
</table>

_Longitudinal Analysis Observations_

The following points summarize the observations from the longitudinal analysis:

1. There are no significant correlations for full population with DSI or summer experience.
2. Strong correlations exist for novices’ summer experience vs. confidence and competence.
3. There is a general loss of confidence related to DSI and Summer Experience.
4. More experienced subjects have higher confidence levels than Novices.
5. PALA subjects have higher confidence than Controls.
6. There a loss of confidence during the summer, though trend must change later.
7. All groups have a short term loss of confidence over the timeframe of the study.
8. PALA has a short term effect on Confidence, that wanes more quickly with time.
9. The PALA has a short and long term effect on DPI and nighttime confidence.
10. Many subjects were surprised by the value and volume of the material in the course and the subject’s own lack of knowledge.

11. Half the subjects say that their attitude, perception or awareness of boating changed in a meaningful way as a result of the course.

12. There is a moderate relationship between DSI and confidence for Novices with PALA

13. There is a strong relationship between DSI and competency for Novice Controls.

Category Analysis of Interview Responses

Interview notes are used to help understand survey and quiz data, but they are invaluable as a source of data on their own. An in-depth review yielded 508 of 804 comments which were classified as indicative or supportive of a thematic idea, of which 240 comments were not relevant. This section groups those items into high priority collections for analysis based on the frequency of occurrence. The rule for inclusion is at least fifteen percent (15%) of the subjects (11 out of 74) must mention a theme to rank it as meaningful for this analysis. (Stead, 2001).

Thematic Analysis of First Interview Responses

The major collections of comments from the first interview are examined briefly. The comments from the first interview also help frame the environment, context and emotional posture of the subjects to better understand the ideas discussed in the second interview.

Course Evaluations.

Forty-five subjects out of 89 (51%) felt the course exceeded their expectations and praised or commented to that effect: “Great course, more than adequate.” “Course was
outstanding.” “Fantastic!” “course spot on!” “Course very good. Went in depth, Well laid out.”

Some came only for the certification: but there were a number of people who had taken a similar course before, who had positive comments as well. Considering that many subjects attended under duress, this is noteworthy as a lead-in to the fact that another forty-five subjects (51%) felt the course exceeded their expectations. Many had prior experience and gave positive reviews: A recurrent theme is that the course is not just for the individual: “Course worthwhile, teaching & intent with kids [such as] safety issues.” “Very good course, with 17 yr. old son.”

The subjects’ reactions often reflect two major facts: subjects were under duress to attend, and they had a low set of expectations. Both of these positions were confounded by the reaction to the class as being worthwhile and worth recommending to others, as one subject summed it up: “Everybody should be forced to go through it.”

Instructor Evaluations.

The reactions went further, since 22 of 89 (25%) found the instructors to be worthy of notice or praise: “Instructors were awesome.” “Instruction excellent.” “Instructor was great!” “Teacher was knowledgeable.” “Good job explaining stuff.” “Appreciate Hard Work.” “Good friendliness, good instructor.” “Like Instructor techniques.” The use of multiple instructors also got attention: “Multi-instructors” “Multiple instructors is good.” “Two instructors did a great job. Handled it well.” “Both instructors were good. Satisfied.” “Changed Instructors.”

This enthusiastic response to the instructors is not a surprise, but these comments came after subjects had a period of time to think about it, so they are considered and sincere. I agree with many of their observations and while they didn’t use the words sincerity and authenticity, these characteristics reflect much of what was discussed in the interview.
Involvement of Others as a Motivator

Twenty one subjects linked their appraisal of the course to the reason for attending, including the of legal requirements and involvement with others, friends or family, as a major motivator to attend the course: “Took with daughter.” “with wife, son & brother.” “did it for her son.” “Got son Jet Ski “ “Took sailboat course 1998. Son took class.” “Took course so son would.” “boating a long time, did it for son” “Xmas gift to husband.“ It seems that for some of these people it was not worth their time to attend for their own sake, but it was important for the kids and friends. This logic raised attention when used to appraise the value of training in the real world, where it related to family, friends or others. Teachers may forget that we are teaching a social group to which a student is a gateway to knowledge, example and critical thinking.

Suggestions and Complaints

Most subjects were positive about the course, but when pressed for suggestions and ideas, many ideas came out that reflect individual interests and cannot be applied to all attendees at a public boating safety course. However, there are a number of legitimate issues that can be addressed, and some interesting suggestions that may be considered. About half of the subjects (N=43 – 48%) had some constructive suggestions and ideas to share about the course, such as: “Need more time. More interaction & discussion.” “Would like more war stories & personal experiences.” “Forget PWC focus on larger boats.” “Safety issues are key.” “Teach courtesy.” “Need more time on docking.” “More detail on Navigation.” Such suggestions may improve the USPS classes, but most of these are not pertinent to the study.

In addition, there were 27 negative comments about the courses, ranging from minor to fairly serious, though they were offered by just 18 subjects (multiple comments per person).
Oddly, a total of fourteen (14-over 50%) came from two classes: one with two students who created problems for others in the class, and the other class had an instructor who taught too little and entertained too much. These observations are of little concern to this study. The number and distribution of complaints tends to confirm the satisfactory experience most subjects reported.

Too Much Material and Too Little Time

Thirty three (33) comments (37% of the subjects) were only the tip of the iceberg on a general feeling of too much material and too little time that was brought up in a number of ways. This was not a complaint of poor quality however, simply volume versus time. Essentially, there was a strong feeling in most classes that there was too much good material and too little time to grasp it all. The comments catch the idea fairly well though some focused on too much material, while others focused on too little time. Many related both time and amount of material together: “Too short, too much.” “Too much in short period of time.” “Lots stuff in short time frame.” “Lot to cram into short time. To much for a new guy. Could not grasp the first time.” “lotta material, short period of time, too much.” While this sounds negative, for many, it was a statement of fact allied with the statement that it was a well-done course. Many agreed that they would not have attended if the course were advertized as being longer. This is ironic since the complaint was voiced by those who admit that they would not have attended if it were longer!

Surprise at Value of Course and own Lack of Knowledge

About 25 percent of the subjects indicated sincere surprise at the volume and value of the data and ideas covered in the course relative to their own lack of knowledge. A number noted their surprise at the volume and content: ”Found out a lot of new info.” “Lot more to it than I
thought.” “Third time but still picked something up.” “Much better than expected. Got more out of it than I thought I would.” This even extended to very experienced boaters, who discovered things that were wrong. Others reacted more to their own lack of knowledge: “learned a lot about what I don't know.” “Lot of incidental stuff that I realized even though I am experienced…I thought I knew, but didn't.” “I thought I knew more than I did.” We are reminded that years of experience is a poor predictor of attained performance (Ericsson & Lehmann, 1996). This was more than a surprise and often placed them in the dilemma of facing their own deficiencies compared with the recognized danger and need for correct action. Many wanted to do something about their lack of knowledge: “Will upgrade training.” “Met my goals. Wife taking next course. Also had on-line.” “Got Chapman's & opened it after course.” “was refresher. Will take piloting course.” “Good results. Looking for Navigation course.” “Want to know how.” Some people felt very strongly as if ready to embark on a crusade: “After the course, was impressed, should be mandatory.” “Would come back.” “I am a trainer by nature. Surprised that people didn’t pass.” “Learned a lot, wanted more, realize I didn't know it all.”

There were many expressions of this sort in the interviews, and the planned action was the clearest testimony to their sincerity and concern. It seems that the course exceeded expectations in a number of ways, and conflicted with their view of the world. Some subjects decided to do something about it, and directed their new motivation toward something constructive, including more training or even major changes in attitude, as in the next theme.

Thematic Analysis of Second Interview Responses

This section discusses the collections of comments generated from the second interview, though some statements from the first interview that are more closely aligned with these are
included. The second interview is basically the end of the longitudinal study as well, and the interview and interviewer are looking for observations and conclusions from the subjects.

*Change in Attitude, Awareness or Understanding*

About half the subjects recognized a real change in attitude, awareness or understanding as a result of the course. Their comments reflect a variety of perceptions, and often came from the DC2 interview, which suggests that summer experience had a significant effect. The occurrence of this theme was much greater from the PALA subjects. For example, Non-Salts (N=62) who experienced the PALA preferentially identified a change in awareness (50%) as an outcome of the course, while the controls were only 25%. This observation is more surprising because there was no hint in the questions that suggested such a theme. The subjects contributed the ideas without prompting by the interviewer, suggesting that it was important to them.

A number of subjects referenced the general idea of a change in awareness and knowledge and recognition as in these comments: “Course 50% increased awareness, better focus, greater confidence.” “Change in perspective awareness” “Dramatic change in attitude. Willing to stop and move later.” “Reinforced common sense. Makes you think.” “More conservative than W/O course.” “Used to take things for granted, but now understand.”

Some comments seem to come straight from the course objectives: “Different outlook, Think more about safety.” “Took in a lot and took interest. Lot of little things & safety things.” “Share the water, respect.” “Changes: Better outlook, training & drill life jackets. Agenda to keep people safe.” “Course generally helpful. Better responsibility.” “course made me more aware of what I didn't know. I need more courses.”
Sometimes, basic feelings are expressed: “Make feel serious, maybe rules off a bit.”


People naturally notice wrong things, but after the course they realized that they know why things are wrong: “More aware of how things should be.” “Noticed: Camper @ Indian River. More aware of styles. Pretty darned amateurish.” “Realize poor use of rules in harbor and congested area & big boats hog fright of way.” “More aware crazy boater, learned what was wrong.” “100 yards away from swimmers. New habits. More observant."

Some focused more on the social aspects of a change in attitude; “Try to be more tutorial, mentoring, etc. Educational approach, exploring, etc. Boys are learning.” “Want people with me to feel I am competent.” “Course put me in touch with people who are boaters. camaraderie.” “More conscious about safety. Vocabulary, sound like an instructor.” “Education approach, Bigger lines & ground tackle.” “Trying to get daughter to course to operate.”

Some people really impressed the interviewer, talking at length as if they had undergone a very serious change in mindset: “As passenger, don't know that the rules exist, makes sense and are learnable.” “Aware need of danger. More safety conscious.” “[Realized} No marinas or supplies. Must plan to take care of self.” “Trust self, rather than instruments. Safety check list:“
Some people addressed the issue of attitude change directly and in a personal sense with a lot of emotional impact: "Needed attitude adjustment." "New culture, drill, procedures. Not play macho." "Close call: valuable to know when wrong / make a mistake / know you screwed up… denial," "Class contributed: my responsibility, not the other guy’s job. No right of way."

The simple fact is that many subjects felt they had undergone a change for the good as a result of the course, a change that was reflected in ways of thinking, seeing and acting.

Course Helped Make Them More Confident

About twenty five percent (25%) of the subjects claimed that the course made them more confident in their decisions and activities, as in these comments. "Course was big help/more confidence" "More confidence. Learned a lot." "more secure and confident." "Course helps my confidence level." "Yelled at brother. Improved confidence." "Made more confident."

This was noted more among the PALA subjects. For example, Non-Salts (N=62) who experienced the PALA preferentially identified confidence(33%) as outcomes of the course but only 10% of the controls did. This result is similar to the results of other studies concerning the effect of simulation on confidence (Lindsey, 2004; Kiser, 2000).

Some noted that they felt more confident in specific situations: “More confident in planning and goals and objectives.” “More confidence, more preparation, new fire extinguisher.” or “Maneuvering in wind lesson, greater confidence.” “Nighttime boating is more confident.” “More comfortable & confident, not run aground as much.” Some are subtle about a change in confidence, particularly in social situations as in these comments: “Instructed Brother.” “More sensitive on safety for passenger and self.” “More courteous and aware.” Others show their confidence in actions: “Going out already.” “USPS Course encouraged us to go on boat”
“Daughter took course too, go out alone.” “Want to go offshore.”

These subjects focused on their feelings of confidence that changed as a result of the course. They reflected that newfound confidence in the form of more reliable assessments of the situation and a greater awareness of what was happening around them, termed situation-awareness (Endsley, 1995). They noticed more, paid more attention to what they noticed, and seem to interpret the data through a new set of more confident lenses. Enhanced confidence is also evident in the survey results, but for novices it tends to diminish with time during the study.

*Praises for PALA*

Almost a hundred percent of the subjects who were in PALA classes (N=45) said things about the PALA, and most of them were very positive. ”Loved PALA Very good.” “Very creative. Good thing.” “Love the activity [PALA] More than expected.” “Great” “OK Very good.” “Liked PALA” “Scenarios were great. Make good use of props.” “PALA big help.” “OK Pretty Good.” “A lot…looking at book. Liked PALA” “Boats as aids were great. Very helpful.” “Very interesting, worked good.” “Pretty interesting, not sticks. PALA prefer studying first then do it.” “Very good exercise, clever.” “Very, very helpful & fun too.” “Interesting/ helped out/ absolutely.” “Very helpful, great exercise.” “Helpful, good!”

Some people were specific on why the PALA was important, as in these comments;

different element. Enhances memory.” “Teaching tool was helpful, made you think.“

Some tied the PALA to surprise at what they did not know: “Pretty cool: realized how much I did not know” “Never understood markers. Good. great.. Pretty good “ “especially the exercise… very valuable” “Made you think. Helped a lot of people.” Some affirmed that the PALA should be part of future classes, and can be broadened for other subjects, such as: “More scenarios.” “Need more depth on NAV-AIDS. PALA was helpful should be part of class.” “Helpful… have as class on a boat, Visualize things better.” “Highlight of course, terrific!”

There were suggestions to improve the PALA as well: “Good, [but] confined space.” “Hokey.” “Needed bigger area. Go into hallway.” “Hands on was good. Could use more talk about it than do it.” “PALA needs videos. Greater reality. Too much stuff.” “too congested, need space.” “Good demo, but a little embarrassing for some people. Disorganized.” “Cluttered - cool effect - needed more room.” “PALA helped. Needed more time.” “Not participant. Learned more by watching than doing. Scenario helpful. Chaos … Too many to learn.“

Enthusiasm about the PALA was expressed throughout the interviews. PALA subjects praised the PALA and 81% of PALA Non-Salts (N=62) ranked the PALA as good-exceptional. Even those who had suggestions or were somewhat critical were providing a back-handed complement that their specific PALA was not living up to its full potential, the way they saw it used. 25% of the Non-Salts (N=62) controls suggested an activity like a PALA would be helpful. In some ways, the variety of perceptions was unexpected, with many different reactions and a wide variety of things that inspired particular individuals. Non-Salts (N=62) who experienced the PALA preferentially identified greater awareness (50%) and confidence(33%) as outcomes of the course, whereas controls were only 25% and 10% respectively. PALA subjects praised the PALA enthusiastically, and some Controls suggested a PALA-like idea.
This collection focuses on a number of Control subjects (who were not aware of the PALA) but had suggestions on how to enhance the classes they attended. Their descriptions sound like the PALA, leading to this wistful name for the collections of comments as “A PALA would be nice.” I see this as the flip-side of those who had the PALA.

Some subjects complained or commented about the class as follows: “Lack of hands on.” “[Must] make it more interesting.” “Interactive would be more useful.” “Practical hands-on would have been better.” “More hands-on experience” “Wanted some hands-on stuff.” Some suggested that we should change the class “Bring models of boats & use them to more, handles rules & docking.” “Need activity to visualize and remember … Role playing.” “Use simulator or video rather than slide presentation.” In some cases, I described the PALA used in the non-control courses and they reacted: ’Would be cool.” “Need more practical time. Outside Textbook. Very beneficial more offshore.” “Neat Informative, Hands On.” “Visual, would have liked.” “liked PALA idea.” “Was good.” “Missed PALA, valuable.”

This was an interactive exchange that revealed criticisms of the courses that the PALA was intended to correct. However, the exchange was with control subjects who had no idea the PALA existed. The interviewer stepped out of character and interfered in a very real way in this dialogue, but it was so revealing that it seemed justified. A great deal of care was exercised to avoid influence on the subjects thoughts, but there is no way to pretend it was objective and uninvolved. Nonetheless, I believe the general theme and observation is valid and worth noting.

Storytelling and Sharing of Experiences

Over 30 percent of the subjects (N=26) praised storytelling and sharing of experiences as
a major contributor to the class. This was somewhat slanted toward the Control subjects, who volunteered that comment 40% more often than the PALA subjects. They praised the teachers for using story-telling: “Presentation using personal experiences was great.” “Boring to hear book read, but experience & stories are better.” “Very well run course, experienced people, stories were good.” “Teachers stories were great & useful. Anecdotal was most useful. Stories, they stick.” “Liked old guys' stories, stories make a difference. Fleshed out whole picture“ The subjects complained when story-telling and discussion were missing: “Need more discussion, more involvement.” “Not just listen. Need to discuss, be interactive.“

Most subjects identified story-telling in a general sense, not as a specific teaching technique: “Pretty good job, lots of scenarios & stories.” “conversations & discussion, interaction with other boaters & instructor.” “few interesting stories.” “Good experience, enthusiastic stories. Real World experience.” “Hearing the stories was very helpful.” “More valuable knowledge at her experiences.“ Specificity is an important part of storytelling: “Stories of night time experience. Borrow experience.” “To have backup & mutual knowledge. Testimonial. Emergency, going sideways.” Many subjects pointed out that the community of learning was valuable: “Boating community, good, helpful. Like motorcycle.” “Every time learned some-thing after 27 years. Conversation with others,” “Experiences was favorite part.” “I enjoyed experience, atmosphere. I liked it.“

This strong reaction was somewhat unexpected, and in a sense does not relate to the key point of this study. However, it is such a strong influence on the style and delivery of the courses and ties to the value of the course and the instructors, that it is major element in what the course is about. I have observed this many times and it is a key component of the USPS Boating Safety Courses (Spaulding 2007) As such it creates the framework within which the PALA operates and
provides a tie to reality that is critical to the effectiveness of all else offered in the course. This stands as a major contribution of the study outside the planned activities. Many subjects (30%) praised story-telling / exchange of experiences as a major contributor to course.

Really Made a Difference

Over a third of the interviewees (N=33) stated that the course really made a difference and was helpful: “Course big help.” “Course markers and NAV-AIDS big help.” “3 x. Chester, Chestertown, 23’ cab cutty, Cruising, history Lot of PWC. Course very helpful.” “Been out a few times. Course made me more cautious.” “Course paid for itself.“ Some had specific things that they felt better about: “Emergency Preparedness - fire prevention, greater comfort level.” “Overall navigation & rules.” “Tried to help.” “Checked Equipment.” “Anchoring and towing.”

Many noted how it helped others: “Course helped to teach kids. Try to get them to a course.” “third time with grand children. Teaching the grand children.” “took course for son (12 years old with 4 ft johnboat) course was a good deal” “Helped to train others in family. Wished it was longer and more depth.” “I was giving way, flip-flopped gave you THE Look, serious.” Some gave back-handed complements “Helped as a refresher & markers.” “[just] Safety tips, general knowledge.” “None, [except] docking and wakes.”

Transfer to the Real World

The general consensus was that the course really made a difference, but over a third of the subjects (N=32) claimed the course made a difference in a real world event, and identified learning transferred to the real world: “Real-world getting away from dock.” “Cross a wake - good deal.” “Aids to Navigation.” “Practical for docking, avoids surprises. Pay attention.”
“NAV-AIDS were big help.” “Came across divers & knew about it, took notice.” “Course made him aware of size of PFD.” “Very helpful. Right of way.” “Based on course, fixed use PFD.”


Sometimes, the subjects observed events or had a close call that helped them realize that they actually knew something they did not know or grasp before: “Saw capsize wake, big boat reverse” “Very close call with sailboat, scary…anchor” “.Thunderstorm, fast boat, veered off.” “Course helped others, spotter, team” “Went fishing bowrider a lot. Almost hit wall. 2 anchors” “A lot learned. Went out ten times off Chincoteague in a 24’ center console. Fishing for flounder and tuna 45 miles off shore - safety check.” “Learned a lot about towing & tubing, [upset] Friend’s daughter & her friend were running with an override on kill switch.“

Sometimes they had a problem or challenge, and after dealing with it, realized they would not have done it that way without the course: “Had what looked like a fire, but family worked together and it was very reassuring.” “Lots at night. 2 weekend ago lost our lights, and used GPS onboard with flashlights.” Some subjects admit to making a mistake but were able to learn from it since they knew what they did wrong: RID217 was self-critical with a close call: “Blew it! Too fast, missed wake. No official lookout, and I was going too fast, except Delaware Bay was rough. Hit a big wake hard. And my passenger fell and hurt self.”

Their stories demonstrate that the course is effective and transfers to the real world, but there were many threatening stories I heard during the interviews: “2nd trip last Sunday/ son/

Many highlighted what they learned about Nav-Aids and navigation, with comments such as: “Navigation was a challenge.” “Problem navigation at Toms River intersection.” “Most helpful thing from the course was using NAV AIDS to go South. Safety issues were big help.“ Some subjects tied these events specifically to the PALA: “Finally understood markers, enough for me even at night. Next year motor boating merit badge.” “Reading markers was big deal. Lights on boats. Anchoring.” “Course helped at Cape Hatteras because buoys moved paid attention to odds and even.” “Buoys & Navigation helped. Stay out of trouble” “Few times to Inlet. No trouble navigating / piloting. Have to think what is my rule? I tend to slow up.“

Taken in the context of the evidence at hand and the sense of the interviews, testimony suggests that the course is effective and transfers to the real world. This is the most important finding. Since the course is effective, then PALA improvements make a real difference.

*Interview Observations*

The following points summarize my observations from the interviews:

1. Most subjects felt the courses were good-excellent in structure, delivery, and results.
2. Most subjects felt the instructors were good-excellent and 25% praised them.
3. Over 30% of subjects felt the courses had too much material to cover in allotted time.
4. The small number complaints confirms the satisfactory experience most subjects had.
5. At least 25% of subjects reported that the course helped improve their confidence.

6. Half the subjects say that their attitude, perception or awareness of boating activity changed in a meaningful way as a result of the course.

7. Many subjects were surprised by the value and volume of the material covered in the course and the subject’s own lack of knowledge.

8. PALA subjects praised the PALA enthusiastically, and some Controls suggested a PALA-like idea as a useful addendum to their courses.

9. Many subjects (30%) praised story-telling / exchange of experiences as a major contributor to the success and meaningfulness of the course.

10. Most subjects (65%) claimed the course had a major impact on their boating experience and many had detailed stories to confirm their claim.

11. Non-Salts (N=62) who experienced the PALA preferentially identified greater awareness (50%) and confidence(33%) as outcomes of the course.

Graphical Representation of Major Findings

Figure 19 shows Major Thematic Elements of the Survey findings about Confidence and Motivation. Figure 20 shows a Major Thematic Elements of the Quiz findings for Competency. Figures 21 and 22 show a Mappings of Major Thematic Elements of the interviews.
Looking for minimum of 95% confidence level on N=163 samples on N=74 total subject population.

**SURVEY RESPONSE FROM DC1 & DC2**
- Confidence building & retention
- Motivation for training & experience

**boating experience is substantively & significantly related to long-term confidence.**

**PALA affects confidence more than controls, including fear of night, water & storms.**

**PALA is strongly related to short-term confidence, but long-term confidence relates to experience.**

**Novices & Middies exploit a PALA experience more effectively, suggesting ways to teach groups.**

**Novices and Middies have higher motivation than Old Salts.**
There are no substantive differences in competency based on demographic groups. Novices & Middies exploit a PALA experience more effectively.

PALA participants benefit more from summer experience than controls.

PALA participation is strongly related to differences in competency for all groups.

Novices & Middies benefit more than experienced boaters from PALA.

Looking for minimum of 95% confidence level on N=163 samples on N=74 total subject population.

QUIZ RESPONSES FROM DC1 & DC2

Knowledge, skill building & retention
Figure 21: First Interview Findings: Thematic Elements

- Frustration with too much material in the course, but too little time to cover it thoroughly
- Impressed with course, content, teaching techniques, materials, administration and courseware.
- Involvement with others, friends or family, as major motivator to attend course.
- Surprise reaction at value and volume of data, and subject’s own lack of knowledge.
- Impressed with expertise, quality, professionalism and authenticity of instructors.

Themes derived from common ideas noted by investigator and shared by at least 10% of 89 DC1 Interviewees (9 subjects).

OBSERVATIONS & NOTES FROM FIRST INTERVIEW

Discuss the course, how it was run, plus content, techniques, teachers and how the subject felt about it.

Interview results influence ongoing interviews
Figure 22: Second Interview Findings: Thematic Elements

Subjects praised the PALA & use of story-telling & experience–sharing as teaching techniques

Course & PALA have a major effect on short- & long-term confidence which is affected by summer experience.

Course affects interactions and advantages to others in communication & mentoring – more a team or crew.

Subjects notice changes in sensitivity, perception & attitude, with greater awareness & more observation on safety issues.

PALA generated many enthusiastic reactions, while many controls suggested something like a PALA is needed.

Subjects claim the course really made a difference & gave examples of transfer to real-world situations.

Interview results influence ongoing interviews

OBSERVATIONS & NOTES FROM SECOND (DC2) INTERVIEW

Discuss how course relates to subject's personal boating experience during the summer.

Themes derived from common ideas noted by investigator and shared by at least 10% of 74 DC2 Interviewees (7 subjects).
Summary of Findings

This chapter examined the results of the instrument and the populations that relate to various observations and how they differ from each other, while building a better understanding of how variables are related. The data-sets generated by the data collection around these factors were examined for key characteristics, including variance and behavedness, and judgments made on the value of each dataset. In this process, relationships between the data were examined and many useful observations were produced to enable a more thorough evaluation of the PALA as a useful tool for adult classes and a better understanding of playfulness in experiential learning.

The effects of classes and class formats, along with boat type and use, as well as age and education are cautiously set aside and treated as trivial or non-controllable. This permits the analysis to focus on intervention (PALA vs. Control) and Boating Experience (Novice vs. Middy vs. Old Salts) which yielded more significant and meaningful observations than other factors. These key factors are also examined as changes over time, including the data collection cycles (DC1 and DC2), as well as Days Since Intervention (DSI), and Summer Experience (SUMEXP). This permits useful conclusions to be drawn, but may sublimate less important observations.

Selected interview comments were used as part of the analysis, and they were also grouped into useful thematic collections to clarify preferences and positions on frequently occurring ideas. Last but not least, some ideas, observations and themes have lost something by being pulled out of the context of the interview, or ignoring between the lines of interviewer’s notes. To help overcome this, some major themes derived from the interviews are revisited and restated as key Interviewer’s observations somewhat independent of the mixed method analysis.
CHAPTER FIVE: DISCUSSION AND CONCLUSIONS

This chapter provides a background of the study and a discussion of findings organized by research questions, followed by a concept map of major findings, conclusions, theoretical considerations, applications beyond this study, suggestions for future research, and close.

Background of Study

A Playful Adult Learning Activity (PALA) was developed in 2007 as an experiential learning activity with minimal technology and a touch of playfulness. This simple and inexpensive intervention induces playfulness in an adult classroom in an effective and socially acceptable fashion. It sparked a spontaneous group response that was unexpected in scope and intensity which caused the level of engagement to grow rapidly, and energized the learning and social aspects of the class. Investigations of the phenomenon showed several effects working together, including situated learning, aided by embodiment, framed in a micro-world with a minimal set of rules related to the learning content (Spaulding, 2008).

An excellent experimental opportunity was presented by the United States Power Squadrons’ Boating safety courses which devote a block of time and energy to teach navigation rules, aids and lights. Using this opportunity, an action research project refined a PALA for Nav-rules, aids and lights, that fit nicely into these boating safety courses (Spaulding, 2008).

PALA is a framework for experiential learning activities, that became a key part of an edutainment activity for over a hundred USPS members at a district conference in Ocean City Md. Many experienced instructors focused on the PALA and contributed expert opinions and suggestions to better reflect learners’ and instructors’ needs. This was validated in a Pilot Study
in Fall 2008 with seven classes. After many hours of use in a variety of situations, the refined PALA was incorporated into classes in 2009 to examine the efficaciousness of the PALA as a teaching tool in this study. Approximately half the adult learners participated in the PALA and the others were controls. The study was not intended as a rigorous large-scale experiment, but rather a credible investigation of the PALA as a practical tool for Adult Education.

Summary Organized by Research Questions

This research project started with a simple question: Can hard-to-learn subjects be taught to a group of adult learners better with PALA than with presentation techniques alone? This study concludes that the answer is yes: PALA subjects scored significantly higher in competency quizzes than control subjects; PALA was well received by learners and instructors with over 85% positive reviews; and the study found other documented benefits as well.

Confident that the experimental results would be positive, the study was also chartered to explore the short- and long-term effects of the PALA. Starting with a demographic survey during enrollment in the classes, the experiment extended longitudinally across two more contacts: early in the boating season, and toward season’s end, during which subjects gain boating experience.

This study uses surveys and quizzes backed up with interviews to measure confidence, motivation and competency over time. For this purpose, confidence describes the subjects self-appraisal of their knowledge and competency to handle tasks, while motivation is the interest or drive to commit to a path of action within the next year, and competency is seen as a unifying concept that integrates everything needed to perform in an on-the-water situation.

Two questions are of primary interest to this study: How does a PALA compare with lecture / presentation in classroom learning? and How does a PALA and playfulness affect adult
learning during and after class? The first question suggests a quantitative methodology, while the latter suggests qualitative techniques, so a mixed methodology study was executed. Quantitative results show that the PALA compares favorably by every measure compared to presentation alone. Qualitative data shows that the PALA has a number of significant effects on adult learning and the learning experience. These basic questions were refined into a hypothesis and five specific questions that guided the data collection and analysis.

The hypothesis guiding this study is: A PALA in a boating safety course affects learner confidence, motivation, and competency during and following the course, and is affected by boating experience after the course. The study confirms the hypothesis. The next few sections address each of the questions in order, based on the study findings.

**Question #1: Effect on Competency -**

*Does a PALA in a boating safety course have a positive impact on the ability of learners to answer Nav-Rules, Aids and Lights quiz questions after the course?*

According to Illeris (2004) competency is a “unifying concept that integrates everything it takes in order to perform in a given situation or context” (p. 47). Competency was assessed using standard USPS exams in the courses and two quizzes on Nav-rules, aids and lights, early in the boating season and late in the season after the course.

The conclusions drawn from this research is that participation in the PALA is notably and substantially related to differences in competency (66.1 vs. 57.7) when compared with controls for all demographic and class groupings for both short-term and long-term trends. The results were determined by comparing grades from quizzes between PALA subjects and controls. The ANOVA results show little overlap in the two populations measured by their competency scores
at the beginning and end of the season at confidence levels of 95% and 99%.

Except for intervention, there are no substantive differences between the various groups defined by class or demographics that relate to competency. However, as expected for novices, (the targeted audience of boating safety courses) the PALA significantly affects learning, understanding and retention and has even greater effects on competency scores (66.3 vs. 54.7). This suggests that more change and learning is going on for novices than for others.

Such collateral changes and learning may be the result of what Aikenhead and Jegede (1999) conceptualized as a cultural border crossing. The middies and Old salts have some boating experience and some conceptual framework to organize their experience and learning around: advantages the novices do not enjoy. The novice is thrown into a new environment without understanding the boating jargon being used, which suggests the concept of a cultural border crossing. Aikenhead and Jegede (1999) also suggest that playfulness assists learners through such periods of cognitive conflicts, which these results support. Hung (2002) sees this as a process of apprenticeship, beginning with an experience of not knowing what to do next, and finding answers through collaborative inquiry with fellow learners, a process that is well documented in the PALA history, and again, these results support.

The PALA is also strongly related to continuing improvement in competency as a result of additional experience, such as the first summer of boating experience. This is evident from the faster improvement of PALA subjects than Controls during the summer. This may be a result of collateral learning in the PALA, in which they learned how to learn about boating.

PALA is related to a number of immediate and long-term effects including improved confidence, and greater awareness of situations on the water. PALA subjects had a stronger and
more intense reaction about these effects than controls, and were generally more positive and more up-beat about the courses. More of them felt they had a real attitude change (13 vs. 6), and that many more (9 vs. 4) felt that their confidence improved as a result of the course. Twenty five (25 of 31) PALA subjects spoke highly of it (81%), and 11 Non-PALA Controls (35%), suggested an activity even though they did not know about PALA! Perhaps these learners know what Lave (1988) meant when suggesting that learning is naturally tied to authentic activity, context, and culture, such as the PALA simulate well enough to have a real impact on learners.

The study concludes that PALA participants retained learning longer and improved with the aid of boating experience at an accelerated rate compared to controls. In addition, PALA subjects were more confident and motivated and less afraid of night-time boating. The PALA subjects also developed greater confidence and awareness of their situation and responsibilities and interacted with their family, friends and crew more effectively.

Question #2: PALA Effects -

What significant effects does the PALA have on different subjects’ confidence, motivation, and competency during and after a course compared to controls?

PALA subjects exhibit higher short-term confidence, that drops over time to be comparable to the Controls by the end of the summer, with higher confidence for nighttime boating both short and long-term. In addition, there is also a slightly higher motivation level to get additional training and mentoring exhibited by PALA users. However, PALA subjects’ competency is significantly better at the start of the season, and improves faster than the Controls, to end even stronger. In other words, the PALA subjects are significantly more competent and are improving at a significantly higher rate than the Controls.
The examination of confidence, motivation and competency scores between DC1 and DC2 shows that confidence drops, but competency improves, during this period. This inverse relationship between changes in confidence and changes in competence requires explanation, since there was an increase in confidence and competence in the course, and enhanced confidence is evident in the survey results too.

The short-term confidence is attested to by these subjects as new feelings of confidence in the form of more reliable assessments of the situation as they noticed more, paid better attention to what they noticed, and interpreted the data through a new set of more confident lenses. The analysis of confidence for the boating experience category shows that long-term confidence grows as novices eventually become Old Salts. The anomaly suggests that there may be two types of confidence reflected in these results: a ‘blush’ of confidence associated with novelty and longer term confidence based on in-depth knowledge and experience. Participation in the PALA is related to differences in short-term confidence, but over time such differences diminish, while long-term confidence is related to experience and grows over a period of years.

Pursuing this idea further, there may also be some over-confidence created by the PALA, since PALA subjects initially had higher confidence than controls, which helps explain why confidence drops more for PALA than the controls. This drop in confidence may also inspire more effort, noting the higher motivation of PALA users, to improve competence to regain that confidence (Ivancic & Hesketh, 2000). And a number of interview responses suggest that the PALA caused greater surprise and more novel learning.

Many comments from the interviews support the value of the PALA, including some secondary benefits. For example, changes in attitude is twice as likely to be commented on by
PALA users than controls, and increased confidence is three times as likely for PALA users. One observation concerns the acceptance of personal responsibility by PALA subjects, versus assigning blame to others. For example: RID217 said “Close call: valuable to know you are wrong make a mistake/ know that you screwed up!” and RID225 said “Trust self, rather than instruments, tide, stuff and depth. Safety check list.” This is a subtle but meaningful change in perception that did not occur with a single controls but did with a half dozen PALA subjects.

These subjects attest to the idea that experiential learning includes a reflective element, since they have obviously thought about their own learning in a self-aware fashion. Such sentiments make sense when Kolb (1984) tells us that learners must engage with the experience and reflect on what happened, how it happened and what it means, since EL is not simply incidental learning. Bruner (1961) expanded this idea, “Practice in discovering for oneself teaches one to acquire information in a way that makes that information more readily available in problem solving” (p.26). Personal responsibility is needed to exploit EL or to become an expert, and the PALA helps to draw this out as a worthy outcome.

**Question #3: Experiences of Subjects -**

*What personal changes do subjects identify as a result of their learning experiences during and after the course?*

Many subjects (21%) and many PALA subjects (29%) reported greater confidence. Yet, at the same time, some experienced boaters were surprised to learn that what they believed before class, was wrong, shaking their confidence to some degree. Some were surprised to learn that the reality of boating was worse than they imagined, further shaking their confidence after the class. This up and down effect, combined with novel learning experiences and the pressure of
absorbing a lot of data in a short period, contributed to some angst and confusion.

These observations are suggestive of cognitive dissonance, which refers to the discomfort felt at a discrepancy between what you already know or believe, and new information or interpretation in learning. Neighbour (1992) encouraged this as a benign teaching tool, and based on the interview comments it seems that it worked during these classes and shortly thereafter. On the flip side, if someone is called upon to learn something which contradicts what they already think they know, they are likely to resist the new learning. We have evidence of such resistance with some of the Old Salts who did not benefit as much as others during the course. The benefits of cognitive dissonance must be balanced against any resistance created when learners find themselves in a situation in which they are in conflict (Illeris, 2004).

This discomfort then was extended into the boating season with onboard experiences, which were not always positive and reinforcing. Most people dealt with these challenges, learning through the experience that which they were still uncomfortable with during the class. This school of hard knocks approach corresponds with research that shows that transfer of learning is more effective when learners make-and-correct errors during a learning process (Ivancic & Hesketh, 2000). RID217 even stated something almost identical “Close call: valuable to know you are wrong… make a mistake… know that you screwed up…” This is evident in Bruner (1961), “Practice in discovering for oneself teaches one to acquire information in a way that makes that information more readily available in problem solving" (p.26). The resulting confidence shaking process seems to be essential to the individuals taking corrective action and increasing their awareness and focus on the issues, and seems to result in higher competency scores in the final data collection cycle.
Many subjects (31%) report a new way of looking at things with a greater awareness of courtesy, rules, care of environment. For example, some took the course since it was required, but realized later that “I see things differently and the course really changed my attitude, awareness and understanding.” They reported more caution and awareness and better observation and recognition of safety issues. This sounds like the goals Goulielmos et al. (2008) suggested to bring greater safety to the shipping industry, “The culture of the ship should be transformed … to a Safety Culture, and even more to an Informed Culture” Such work attitudes and ongoing awareness are as appropriate for a fifty foot leisure boat as a five hundred foot transport ship. These reactions or greater awareness and attitude changes occurred more than twice as often with PALA subjects as in Controls, and seems to fit very nicely with the other data from the study. The PALA seems to have a distinct effect on developing better awareness and better attitudes in the subjects. This adds more evidence to support Cailliois (2001) when he said, “Play … does not teach facts but rather develops attitudes” (p. 167).

A prominent theme was seeing with a new pair of eyes… a new way of looking at things, an awareness of courtesy, rules, stupidity, care of environment. This seems related to observing through a different lens, which is often allied with a feeling of greater confidence, so they interpret what is seen through more confident lenses. Cailliois (2001) tells us that “play is like education of the body, character or mind, without the goals being determined” (p 167). So the less realistic play is, the more educational it is. The study findings support this idea by revealing a range of effects of playfulness, including changes in confidence, perception and awareness.

One theme was repeated in a number of ways, including better cooperation, respect, and interactions with family, friends and crew. It is also seen as advantages to others around the subjects, producing an epiphenomenon (spin-off or rub-off) value to crew, friends and family
and even others in the marina. It was repeated in a number of fashions, a helping hand, a little mentoring, some advice or direction, even outright instruction. Bandura (1977) tells us that social interaction is a key facet of learning by experience, and these examples tend to suggest better cooperation, respect, and a willingness to help and mentor. Not only was the social sharing an obvious component of the class, but there were more abstract indicators as well. For example, there were references to shared resources and a community of boaters from more PALA subjects than controls, which complements my observations of a community of learners during a PALA.

This social activity is not a pleasant emotional supplement, but an important component of a successful learning and expertise developing program for any learner. Demands of the real world will challenge any individual, but Jablokow (2008) tells us “No one problem solver can possibly manage such problems … we must collaborate with other problem solvers” (p. 2). The PALA provides an informal way for classmates to collaborate in a very interactive fashion, and then, validated by that experience, to replicate it in the real world. The study findings support writers who claim that play is a key ingredient in personal and social development and learning (Gee, 2007; Piaget, 1962; Rieber, 1996; Vygotsky, 1966).

**Question #4: Outcomes, Retention & Transfer**

*What outcomes do participants identify from the course and PALA?*

*How long do PALA effects last with and without real-world experience?*

*How well do PALA effects transfer to the real world?*

The PALA is strongly related to a continuing improvement in competency as a result of additional experience, and is also related to greater confidence. This result is similar to what others have found concerning the effect of simulation on confidence (Lindsey, 2004; Kiser,
The longitudinal study suggests however, that the initial confidence tends to wane over a few months, yet long-term confidence is more closely related to experience than to training.

This is another area where the PALA has a dramatic effect. Since the PALA subjects experienced more in the class, they often had an easier time on the water, enabling them to learn more effectively in both environments. The magnitude of this effect is far greater than was expected, and it is evident in the statistical work from the surveys and quizzes, that the PALAs did better in both environments. The interview responses add lots of proof as well as better insights into the details of the process for the individuals involved.

Glynn (1988) demonstrated that defining (framing) a task as play or a game can yield more creative and complex task performance than the framing of a task as work. She also found that the play orientation created more focus on process during task performance, while the work orientation created more focus on outcomes. This observation suggests that the PALA subjects learned the process of integrating relevant data concerning Nav-Rules, aids and lights during the PALA, which enabled further development of that skill, based on experience. Sutton-Smith (1997) explains this concept in slightly different terms, “Fantasies are not meant to replicate the world… they are meant to fabricate another world… more emotionally vivid than mundane reality” (p.158). The PALA enabled users to experience simulated events in a more vivid way, in a compressed timeframe and safe environment that is easier and less dangerous than reality. This play framing permitted the subjects to create a more useful process oriented way of using their learning, which they could then transfer to the real world easier.

Over a third of the subjects (N=32) explained how the course made a specific difference in a real world event. Many subjects offered proof of transfer from the course to the real world in their stories and opinions. They spoke of their recognition of such transfer, but a number related
stories of good and bad things that they tied to their experience with the course. Some had a problem, and after handling it, realized they did it that way because of the course. These show the type of in-depth learning seen in other studies with transfer of simulation based learning. The results of this study are similar to what Finkelstein, Adams, Keller, Kohl, Perkins, Podolefsky, Reid, and LeMaster (2005) reported about simulation-based learners. Their simulation subjects not only had better mastery, but retained it for up to sixty days, and did a better job on the real-world tasks and stated and documented their understandings better than the controls.

PALA has significant effects on learning, understanding and retention compared with control subjects. PALA offers a number of other immediate and long-term notable and even significant effects compared with controls. PALA subjects(70%) enthusiastically praised the PALA, while some controls (31%) suggested a PALA-like idea as a good addendum to course. Recognizing that these are goal-oriented adults, this is overwhelming evidence of successful outcomes, based on the subjects’ value system.

*Question #5: Variation by Population*

*How does the effect of the PALA differ for different population?*

The focus of the study is the comparison between the experiences of PALA participants versus the Controls. However, there are other meaningful sub-groups worth designing activities for, such as experience levels, age, gender, boat type or boat use and education. There were many comments from the interviews about boat type or use preference, such as “not pertinent to my needs. Not sailboats… Little boats.” “Gear program to local area and needs.”: “Need more tailoring, anchoring, tubing.” “ need more offshore.” “need more sailing.” Despite such ideas, there was no consensus, so these ideas may be useful to create courses for fishermen, trailer-
boaters, ocean users or sailors instead of power boaters, but it is not pertinent to this study.

The longitudinal study suggests however, that the initial confidence tends to wane over the next few months, yet long-term confidence is more closely related to age and experience than to training. The fact that competency improves during the same period suggests a complex set of inter-relationships that address retention of confidence and competency. For example, the Non-salts subjects exploit the PALA experience more effectively than the Old Salts which suggests important differences based on experience or age. Ericsson and Lehmann (1996) noted the complexity of dealing with different levels of experience in learners. They noted that most individuals who start as beginners in a domain change their behavior and increase their performance for a limited time until they reach an acceptable level. Beyond this point, however, further improvements are unpredictable and the number of years of experience in a domain is a poor predictor of attained performance (Ericsson & Lehmann, 1996). This may explain why the Old Salts do not benefit as much, since they already have experience and have formed habits that must be changed, before accepting a new way to do a specific task. Following this line of reasoning, the Middies benefit more from the PALA than Novices, but both of them do better than the Old Salts, so experience is useful to a point, and helps apply the PALA better.

It is telling that experienced people were surprised by how little they knew compared to the value of new knowledge, and were shocked when something they previously believed turned out to be wrong. Such events may help get the attention of those who need an attitude change, but playfulness seems to help the learners make such changes, as Caillois (2001) says, “Play … does not teach facts but rather develops attitudes” (p. 167). Some effects are more noticeable with novices rather than experienced boaters, and some groups seem to exploit the PALA more effectively than others, such as Novices and Middies. This may be tied to their willingness to
participate in the PALA. Sutton-Smith (1997) notes that “higher forms of play… are … correlated with higher forms of school-related social and educational success” (p. 39).

The findings seem to support the idea that some groups are responding differently to the same stimuli, akin to what is seen with different learning preferences. Silverman (2002a-2002b) suggests that playfulness may help drive participation and more effective adult learning when dealing with a classroom filled with different preferences. These observations yield tantalizing suggestions of differences that may be important to teaching different groups, but the findings simply affirm that intervention is the single largest influencer examined, and that experience has a major effect of many learning issues, and everything else is of limited significance.

A final observation on the multiple groups would be that the broad appeal and lack of homogeneity seems to have been a positive rather than a negative for these classes, and was generally good for the learners. The fact that most of the differences were emotionally real, takes nothing away from the fact that most of the differences had no significant effect.

Supplemental Findings

The interviews provided a pool of data and some insights that the quantitative data was not sensitive to. Interviewees recognized their lack of knowledge and experience, as well as their own growth and how the course transferred to their experiences on the water. There was a tangible difference in the way novices related to boating experiences, a feeling of self-assuredness and self-awareness, with a fragility borne of real-world events as they describe a constructivist process of personal meaning-making (Fenwick, 2000). Most of the interview data was organized by thematic similarities, while contributing to validation. Some comments were not sought by the study, but yielded supplemental data that is nonetheless important and
meaningful. Two ideas stand out as worth discussing briefly and as potential research subjects.

**Instructor Authenticity**

Many subjects commented on the high quality of the course and the expertise and sincerity of instructors and their willingness to share experience, stories and knowledge. The dramatic results from this study were surprising since the instructors are all volunteers with little formal training, offering an overwhelming mass of data in a restricted timeframe.

The elusive quality of teacher ”authenticity” could be a potential driver for the positive reactions. Cranton and Carusetta (2004) tells us that authenticity in teaching can perform such miracles, and as these instructors are examined against the criteria, it matches well. Specifically, authenticity includes at least four parts: being genuine, which these boaters turned instructors are; showing consistency between values and actions, which they do; at least in the classroom; relating to others in such a way as to encourage their authenticity, and true again; and living a critical life, which is much harder to evaluate. However, my observations support the idea that these instructors think hard about what they do and worry about what went wrong or right, and what could have been better. For this purpose, this qualifies as living a critical live vis-à-vis the role of USPS instructor. The fact is that the subjects generously praised the instructors and felt they did a good to excellent job. Understanding this phenomenon in terms of such informal classes and instructors may be an excellent research opportunity in the future.

**Storytelling and Experience Sharing**

The subjects contributed an over-whelming endorsement of storytelling as a teaching technique, which feeds into a number of other observations from this study. These are simulation
narratives which Cole et al (2001) described as “Unfolding story of an actual event that either had the potential to or actually evolved into a serious injury event or disaster. Each simulation exercise story has a plot, characters … and predicaments that cause well-rehearsed protocols to break down” (p. 15). USPS instructors seem to have developed a similar technique that was quite valuable to the adult learners as the result of decades of informal teaching generations feeding one into the next. It could not work much better, and seems like a great research opportunity.

Final Conclusions

The analysis clearly shows that the PALA is not only an excellent substitute and supplement for presentations, but has many other potential benefits as well. Of immediate importance to teachers is the short-term effects in the classroom, including awakening learners and encouraging enthusiasm, discourse, debate and engagement. There are indirect classroom benefits such as greater social interaction, engagement and interactivity after the PALA as well as long term benefits such as longer retention and better transfer for learners. The primary recommendations is that experiential learning with playfulness should be more widely adopted in the classroom for safety, compliance, and certification training. To get maximum efficiency, it is important that the instructor be properly trained and practiced in the use of such techniques.

Graphical Representation of Major Findings

All the findings and thematic elements were examined in detail for how they relate to each other to create figure 24 as a compilation of key findings in a concept mapping diagram.
Figure 23: Study Findings - Concept Map

Differences in competency & retention NOT related to demographics or class.  
Inter-related aspects

Notable differences in confidence & motivation related to demographics.

Motivation to take course is social, family & friends, as well as legal requirement.

General recognition of too much good material to cover in too little time in course.

Story-telling, sharing experiences & teacher authenticity have major effect on adult learners.

Course & PALA related to short-term confidence… long-term confidence related to experience.

Course helps focus safety issues and catalyze changes in understanding situation.

Surprise reaction at data value & volume in course & lack of own knowledge.

Subjects aware of new attitude, perspective change, & new way of looking at things.

Reported greater situation awareness on the water & stronger feelings on safety.

PALA significantly improves both short- & long-term competency for all groups.

PALA significantly improves competency as a result of summer experience.

Novices & Middys exploit PALA experience more effectively than Old Salts.

PALA benefits social Interactions, communicating, mentoring & team-building.

Surprise reaction at data value & volume in course & lack of own knowledge.

Subject aware of new attitude, perspective change, & new way of looking at things.

Reported greater situation awareness on the water & stronger feelings on safety.

Story-telling, sharing experiences & teacher authenticity have major effect on adult learners.

General recognition of too much good material to cover in too little time in course.

Motivation to take course is social, family & friends, as well as legal requirement.

Notable differences in confidence & motivation related to demographics.

Differences in competency & retention NOT related to demographics or class.

Inter-related aspects

Course & PALA related to short-term confidence… long-term confidence related to experience.

Course helps focus safety issues and catalyze changes in understanding situation.

Surprise reaction at data value & volume in course & lack of own knowledge.

Subjects aware of new attitude, perspective change, & new way of looking at things.

Reported greater situation awareness on the water & stronger feelings on safety.

Story-telling, sharing experiences & teacher authenticity have major effect on adult learners.

General recognition of too much good material to cover in too little time in course.

Motivation to take course is social, family & friends, as well as legal requirement.
The evidence offered by this study is generally supportive of the theoretical framework. The areas of agreement were far too frequent to present in detail, but a few surprises jump out. For example, Kolb (1984) suggests that learners need a good skill-set to exploit EL, including observational, analytical, reflective, decision making and problem solving skills, as well as a willingness and commitment to invest time and resources in the learning process. There is plenty of anecdotal evidence to support that idea from this study, but one observation is significant: the PALA subjects learned more from their experience boating during the summer than the Controls did. This is exactly what Kolb is talking about: the twenty minute PALA experience helped the learner make the decision to learn and helped activate the skill-set needed to learn in that context, both of which came to bear in an ever-increasing learning curve as summer progressed.

Our observations and experiences in this study support Rodriguez (2006) who claims: “Playing consists in a trans-individual process of action and reaction, which often takes on a to-and-fro quality reminiscent of dance” (p.3). As with dance, an attempt to explain what the evidence tells us is a serious challenge, since there are far more dimensions to the experience than to any of the theories. Wilson and Beard’s (2003) Experiential Learning Model and Marsick and Watkins (2001) Incidental learning model hints at some mechanisms. Particularly relevant is the idea of triggers that signal dissatisfaction with the current way of seeing things, and the process of choosing how to act based on the interpretation of the event. We may think about how to respond (cognitive), we may make an emotional response (affective); and finally, we may physically respond (behavioral). Unfortunately, these EL models do not allow for the social and affective domain sufficiently to explain what we see. These facts demand a model that ties the
learning together with socially inspired play and experiential activity.

The theoretical models examined in the literature search do not explain the dramatic effects of playfulness as demonstrated by the PALA in a classroom environment. Perhaps the bicycle lock model (Wilson & Beard 2003) could be modified to allow for group dynamics and playfulness and link diverse elements together. However, a serious constraint is the expectation that there is one combination that works. In this study, combinations of various factors (classes, class-formats, age groups, boating experience, etc.) yielded similar outcomes. There is also the assumption that someone (teacher or designer) dials a combination that works. However, we clearly see that the learners have a major, if not dominant, position of control in adult learning.

These limitations suggest future research, perhaps using a grounded theory approach to a theory that fits the facts (Dick, 2005). Perhaps an alternative model with a variety of selectable elements including playfulness and group dynamics that supports multiple solutions would satisfy the goal of a holistic theory. Such a model may have characteristics of a serious game where players / team control their own fate, with many pathways through a learning maze. In such a maze, it is not just the goal that counts, but rather growth in the learners’ confidence, motivation and competence, that is important.

A course designer might design a learning curriculum with multiple pathways through a maze, which the learners traverse in their quest to gain the certificate or grade. As they fulfill each task in the quest, they gain points and status and tools with which to tackle other tasks in the quest. Each pathway might have different sets of challenges and tools, so that learners with the gift of free will can traverse the maze in different ways, succeeding or failing in a task to learn what they can take away from the experience, with some probability that it is what the designer wishes them to learn. Small, flexible groups of learners might traverse the maze together, sharing
and exploiting each others’ skills and observations, illuminated and even occasionally guided by the teacher. The model can add-in the concept of social or peer pressure and emotion as force fields that may accelerate or impede progress along sections of any pathway.

Such a model comes closer to representing reality while acting as an activity design tool. The basic concept is not novel, and many learning and play models incorporate some of these elements. The benefit is how well such a model can potentially represent reality, but complexity and a huge range of options and variables is problematic for a manual system. In recent years, computer modeling has encouraged the use of exotic and complex models, which have become everyday tools in some disciplines. Perhaps this learning model could be implemented within the framework of a computer driven-modeling system to be realistic and practical as a design tool for teaching and learning activities, curricula and agenda. Such a system would incorporate a powerful Graphical User Interface (GUI) with a structured and flexible database of learning objects, tools and protocols that are easily selectable by a designer, and an elegant library system to manage the snippets of design work into larger elements that can be used as activities, agendas and curricula. Instructional designers would be empowered as never before by such a practical design tool, which can benefit adult learners as the PALA does.

Applications beyond this Study

The PALA is more effective as a teaching technique than presentation techniques, and it is preferred by students. The PALA empowers adult learners to turn a task into a fun activity, and in a social setting, this can become contagious. As Polaine (2005) observed, the flow principle can be applied to interactivity in groups and engagement may begin and end with playful experiences that are satisfying in their own right. Playfulness helps the adult rise to the
challenge by mobilizing their resources for a difficult task in a social situation. The PALA with its focus on situational learning, social involvement, embodiment, playfulness and micro-world design makes sense for such learning needs and makes it easy to apply the PALA to other transportation classes. If one examines the design of the PALA as a teaching tool, there are lessons involving adult learning and playfulness that can be applied in many environments. The challenge is how to incorporate these elements into an adult classroom at a practical level by empowering teachers to design and apply the techniques effectively.

Suggestions for Future Research

Accepting PALA as a teaching tool, it seems that playfulness can be applied in many adult learning environments. For example, a series of Action Research Design studies could expand the PALA technique to teach sailing, docking, maneuvering and navigation in boating classes. Similar research can apply the PALA to other transportation classes such as auto and truck driver education as well as heavy equipment and military vehicle operator training.

The social learning theme raises attention to training in the real world, where it often related to family and friends. Perhaps teachers must reaffirm that we do not just teach students, but a social group to which that student is a gateway to knowledge, good or bad example, and critical thinking. This is worthy of research to guide enrollment and teaching practices. This is also related to the issue of a homogenous learning group. The study was focused on Novices, but many Old Salts showed up and contributed immensely with their stories and questions. They also benefited by getting a chance to correct their own bad habits and in some cases reinvent a safer attitude. The idea of seeking more homogenous groups should be researched in more depth.

Though confidence erodes during this study, Old Salts have higher confidence scores
than novices. It seems likely that the confidence for the novices will begin growing over time to match the greater confidence levels of Middies and Old Salts. There is no evidence of how long it may take to reach that turning point, but this should be researched with longer term studies.

Final Thoughts

Wlodkowski (1999) tells us that “Every adult wants to be joyful in the pursuit of valued learning” (p.14). The most notable observation from this study is the dominance of the PALA participants in the final competency category at all levels of experience, during the course, after the course, and for months following the course. The most important lesson from this study is that we should not be asking why we should incorporate playfulness when teaching adults; rather we should be asking why we have been excluding playfulness from adult education?
REFERENCES


www.educ.msu.edu/DWongLibrary/CEP991/Dewey-PlayImagination.doc


Donne, J. (1624). *Devotions upon emergent occasions, meditation xvii*.


Finkelstein, N., Adams, W., Keller, C., Kohl, P., Perkins, K., Podolefsky, N., Reid, S., &


APPENDIX A: UNIVERSITY APPROVAL OF THE STUDY

Original study approval

Date: Fri, 29 Aug 2008 10:00:07 -0400
From: "Young, Laura" <lfs105@psu.edu>
Subject: IRB#29132 - Evaluation of Playful Adult Learning Activity (PALA)
X-Originating-IP: [128.118.141.35]
To: <jts11@psu.edu>
Cc: <pac23@psu.edu>, <kw13@psu.edu>

Hi James,
The Office for Research Protections (ORP) has reviewed the above-referenced study and determined it to be exempt from IRB review. You may begin your research. This study qualifies under the following category:

**Category 1:** Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods. [45 CFR 46.101(b)(1)]

**PLEASE NOTE THE FOLLOWING:**
Include your IRB number in any correspondence to the ORP.
The principal investigator is responsible for determining and adhering to additional requirements established by any outside sponsors/funding sources.

**Record Keeping**
The principal investigator is expected to maintain the original signed informed consent forms, if applicable, along with the research records for at least three (3) years after termination of the study.
This will be the only correspondence you will receive from our office regarding this
exemption determination.

MAINTAIN A COPY OF THIS EMAIL FOR YOUR RECORDS.

Consent Document(s)
The exempt consent form(s) will no longer be stamped with the approval/expiration dates.
The most recent consent form(s) that you sent in for review is the one that you are expected to use.

Follow-Up
The Office for Research Protections will contact you in three (3) years to inquire if this study will be on-going.
If the study is completed within the three year period, the principal investigator may complete and submit a Project Close-Out Report.
(http://www.research.psu.edu/orp/areas/humans/applications/closeout.rtf)

Revisions/Modifications
Any changes or modifications to the study must be submitted to the Office for Research Protections on the Modification Request Form - Exemption available on our website:
http://www.research.psu.edu/orp/areas/humans/applications/modrequest.rtf

Modifications will not be accepted unless the Modification Request Form is included with the submission.

Please do not hesitate to contact me if you have any questions or concerns.

Thank you,

Laura S. Young
The Pennsylvania State University
Office for Research Protections
201 Kern Graduate Building
University Park, PA 16802
Phone: (814) 863-1459
Fax: (814) 863-8699
www.research.psu.edu/orp
Hi James,

The Office for Research Protections (ORP) has reviewed the modification for the above referenced study. This request does not change the exemption status and this study continues to be exempt from IRB review. You may continue with your research.

MODIFICATION REVIEW CATEGORY:

Category 1: Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods. [45 CFR 46.101(b)(1)]

COMMENT: Approval of the January 26, 2009 modification request has been granted.

PLEASE NOTE THE FOLLOWING:

Include your IRB number in any correspondence to the ORP.

The principal investigator is responsible for determining and adhering to additional requirements established by any outside sponsors/funding sources.

Record Keeping

The principal investigator is expected to maintain the original signed informed consent
forms, if applicable, along with the research records for at least three (3) years after termination of the study.

This will be the only correspondence you will receive from our office regarding this modification determination.

MAINTAIN A COPY OF THIS EMAIL FOR YOUR RECORDS.

Consent Document(s)
The exempt consent form(s) will no longer be stamped with the approval/expiration dates.
The most recent consent form(s) that you sent in for review is the one that you are expected to use.

Follow-Up
The Office for Research Protections will contact you in three (3) years from the date of original determination to inquire if this study will be on-going.
If the study is completed within a three year period from the date of original determination, the principal investigator may complete and submit a Project Close-Out Report. (http://www.research.psu.edu/orp/areas/humans/applications/closeout.rtf)

Revisions/Modifications
Any changes or modifications to the study must be submitted to the Office for Research Protections on the Modification Request Form - Exemption available on our website: http://www.research.psu.edu/orp/areas/humans/applications/modrequest.rtf

Modifications will not be accepted unless the Modification Request Form is included with the submission.

Please do not hesitate to contact me if you have any questions or concerns. Thank you,

Laura Sabolchick Young
The Pennsylvania State University | Office for Research Protections | 201 Kern Graduate Building | University Park, PA 16802 | Phone: (814) 863-1459 | Fax: (814) 863-8699 | www.research.psu.edu/orp

Second modification to original approval
Hi James,

The Office for Research Protections (ORP) has reviewed the modification for the above referenced study. This request does not change the exemption status and this study continues to be exempt from IRB review. You may continue with your research.

**MODIFICATION REVIEW CATEGORY:**

**Category 1:** Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods. [45 CFR 46.101(b)(1)]

**COMMENT:** The April 21, 2009 modification request has been reviewed. It has been determined that the changes to your research protocol do not change the determination of exemption. The changes to your research protocol that were reviewed include: revised data collection instruments for use with new participants.

**PLEASE NOTE THE FOLLOWING:**

Include your IRB number in any correspondence to the ORP.

The principal investigator is responsible for determining and adhering to additional requirements established by any outside sponsors/funding sources.

**Record Keeping**

The principal investigator is expected to maintain the original signed informed consent forms, if applicable, along with the research records for at least three (3) years after
termination of the study.
This will be the only correspondence you will receive from our office regarding this modification determination.

**MAINTAIN A COPY OF THIS EMAIL FOR YOUR RECORDS.**

**Consent Document(s)**
The exempt consent form(s) will no longer be stamped with the approval/expiration dates.
The most recent consent form(s) that you sent in for review is the one that you are expected to use.

**Follow-Up**
The Office for Research Protections will contact you in three (3) years from the date of original determination to inquire if this study will be on-going.
If the study is completed within a three year period from the date of original determination, the principal investigator may complete and submit a **Project Close-Out Report**. ([http://www.research.psu.edu/orp/areas/humans/applications/closeout.rtf](http://www.research.psu.edu/orp/areas/humans/applications/closeout.rtf))

**Revisions/Modifications**
Any changes or modifications to the study must be submitted to the Office for Research Protections on the **Modification Request Form - Exemption** available on our website: [http://www.research.psu.edu/orp/areas/humans/applications/modrequest.rtf](http://www.research.psu.edu/orp/areas/humans/applications/modrequest.rtf)

**Modifications will not be accepted unless the Modification Request Form is included with the submission.**

Please do not hesitate to contact me if you have any questions or concerns. Thank you,

**Laura Sabolchick Young**
The Pennsylvania State University | Office for Research Protections | 201 Kern Graduate Building | University Park, PA 16802
Phone: (814) 863-1459 | Fax: (814) 863-8699 | [www.research.psu.edu/orp](http://www.research.psu.edu/orp)
APPENDIX B DATA COLLECTION FORMS

Instructor Forms
DC1 - Implied Consent and Enrollment Form: USPS Instructor
DC1 – Instructor Interview following the Course

Adult Learner Forms
DC0 - Implied Consent And Enrollment Form: Adult Learner

Quiz Group # 1 – Adult Learner forms
QG1 - DC1 – (2-sided)
QG1 - DC2 – (2-sided)

Quiz Group # 2 – Adult Learner forms
QG2 - DC1 – (2-sided)
QG2 - DC2 – (2-sided)

Quiz Group # 3 – Adult Learner forms
QG3 - DC1 – (2-sided)
QG3 - DC2 – (2-sided)

Quiz Group # 4 – Adult Learner forms
QG4 - DC1 – (2-sided)
QG4 - DC2 – (2-sided)

Quiz Group # 5 – Adult Learner forms
QG5 - DC1 – (2-sided)
QG5 - DC2 – (2-sided)

Data Collection Instructions
Dear Volunteer Instructor,

Please read the attached Implied Consent form and confirm your agreement before filling in this form.

Instructor __________________________ Nickname ____________________

The investigator will call you on the telephone next week for a short survey and interview.

Preferred phone #? (_____) _______ - ______________ Alternate #? (_____) _______ - 

Please PRINT your e-mail address __________________________ __________________________

Please fill out the demographic and course evaluation data below, attach the student enrollment forms and send it to James Spaulding 406 Lloyd Ave. Downingtown Pa. 19335 in the stamped envelope provided with the forms. After data is collected, above contact data is removed and the study uses only non-personal data.

---

**DEMOGRAPHIC DATA:** I am an Instructor: < 5 years [ ] 5-15 years [ ] > 15 years [ ]
My USPS grade is S [ ] P [ ] AP [ ] JN [ ] N [ ]
My gender is; male [ ] female [ ] My age is: 18-45 [ ] >45-70 [ ] >70 [ ]
My boat preference is: Powerboat [ ] Sailboat [ ] Human Powered Boat [ ]
My boating interest is Fishing [ ] Cruising [ ] Racing [ ] Leisure [ ]
My boating experience is: < 5 years [ ] 5-25 years [ ] > 25 years [ ]
My education includes: Vocational [ ] Professional [ ] College [ ] Graduate [ ]

**COURSE EVALUATION DATA:** This was an (ABC) (USPS) course with ____ students.
This course started ________________ (date) for ____ (#) classes and a total of ____ (#) hours.
The facility / classroom / seating was (poor) (fair) (good) (excellent) (Please circle.)
The students were (poor) (fair) (good) (excellent) and learned the material (poor) (fair) (good) (excellent).
The students received the following percentage grades on the exams (no names or ids): ___, ___,
___________, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ___, ___,
DC1 – INSTRUCTOR INTERVIEW - What do you think about the course? RID 

Unlike survey questions, interview questions invite discussion and examination. These are just starter questions. How effectively do you think the students can use what they learned about Boating? At night?

___________________________________________________________________________________________

___________________________________________________________________________________________

How effectively do you think the students can use what they learned about Nav-Aids in daylight? At night?

___________________________________________________________________________________________

___________________________________________________________________________________________

How effectively do you think the students can use what they learned about Nav-Lights on boats? On ships?

___________________________________________________________________________________________

___________________________________________________________________________________________

How effectively do you think the students can use what they learned about Sound Signals?

___________________________________________________________________________________________

___________________________________________________________________________________________

How effectively do you think the students can use what they learned about the Rules of the Road?

___________________________________________________________________________________________

Are there any changes to the Boating Safety Course you would suggest? __________________________

___________________________________________________________________________________________

___________________________________________________________________________________________

Next questions only for those in a PALA class (not the controls)
Was the PALA activity helpful to what the students will remember now about COLREGS? Or Nav-Aids? Or Lights?

___________________________________________________________________________________________

___________________________________________________________________________________________

Final Question: Any other points, stories, observations, ideas or comments? __________________________

___________________________________________________________________________________________

___________________________________________________________________________________________

Thank You. I may call you back in August to discuss what we have learned and get your thoughts on it!

DC1- Interviewer ______________ Date ______ DSI ____ Time _____ Comment __________________________
Dear Volunteer Adult Learner,

Please read the attached Implied Consent form and confirm your agreement before filling in this form.

Adult Learner ___________________________________________ Nickname ____________________

If you volunteer, an investigator will call you on the telephone three times to collect data. Each time will take about ten minutes for a short quiz, survey and interview; the first will be in the next few weeks, then again in May / June, and then one last time in July / August.

You may note a vacation period NOT to call you: ____________________________.

Please select the most convenient day and time to call you...

Please circle preferred day(s) to call:  Sun Mon Tue Wed Thu Fri Sat

Please circle preferred time(s) to call: Morning Noon Afternoon Evening Night

Preferred phone #? (____) _____ - __________________ Alternate #? (____) _____ - __________________

May we send you an e-mail at ____________________________ a few days before calling, to confirm the contact? (please PRINT your e-mail address.)

After data is collected, above contact data is removed and the study uses only RID# and non-personal data.

Demographic Data: (Please check box.)

I am a male [ ] female [ ] adult learner. My age is: <18 [not eligible] 18-45 [ ] >45 [ ]

My boat preference is: Powerboat [ ] Sailboat [ ] Human Powered Boat [ ]

My boating interest is Fishing [ ] Cruising [ ] Racing [ ] Leisure [ ]

My boating experience is: < 1 year [ ] 1-15 years [ ] > 15 years [ ]

My education includes: Vocational [ ] Professional [ ] College [ ] Graduate [ ]

Please do not fill in this section - Investigator use only.

RID# (Random ID No.) _______ Quiz Group (circle) QG1 QG2 QG3 QG4 QG5

Class Type: ___________________________ Class Date ___________________________

Tracking: (RID# and Quiz Group must appear on all Data Collection forms)

DC1 after course Interviewer _______________ Date _____ Time ____ Comment _________

DC2 May / June Interviewer _______________ Date _____ Time ____ Comment _________

DC3 July / August Interviewer _______________ Date _____ Time ____ Comment _________

DC4 July / August Interviewer _______________ Date _____ Time ____ Comment _________
DC1 - SURVEY: (Baseline survey) QG1 RID #

Looking for a baseline. Survey rating scale of 0-10 (zero is uncomfortable- 10 is r very confident)

1. {_____} How confident (uncomfortable, confident, great) do you feel about Boating on a scale of 0-10?
2. {_____} How confident do you feel about Boating at night on a scale of 0-10?
3. {_____} How confident do you feel about Nav-Aids in daylight on a scale of 0-10?
4. {_____} How confident do you feel about flashing Nav-Aids Lights at night on a scale of 0-10?
5. {_____} How confident do you feel about Nav-Lights on boats on a scale of 0-10?
6. {_____} How confident do you feel about Nav-Lights on ships on a scale of 0-10?
7. {_____} How confident do you feel about Sound Signals on a scale of 0-10?
8. {_____} How confident do you feel about the Rules of the Road on a scale of 0-10?
9. {_____} How likely are you to get more boating experience this coming season on a scale of 0-10?
10. {_____} How likely are you to get more boating training in the next year on a scale of 0-10?

DC1 - QUIZ: (QG1 Quiz Group: Scenarios A&B)

Sample Scenario: You are standing in the cockpit looking forward, toward the pointy-end of the boat.

{n/a} Question: What do boaters call the right-hand side of the boat?
   Correct Answer (Starboard) Alternate correct answer: (Larboard)

Scenario A: Right crossing: You are cruising at fifteen knots and another boat is approaching you at about the same speed from the right-hand side. The two of you will be way too close in about sixty seconds…

{____} Q1: What should you do?
   (Correct answer: slow down to let them pass.)
   (Alternate answer: steer behind them.)

{____} Q2: What should they do?
   (Correct answer: They should hold course and speed.)

{____} Q3: How do you know that is right? What is the rule?
   (Correct answer: Boat on port side is give-way boat, I am on their port side.)
   (Alternate answer: Boat on starboard has right of way.)

Scenario B: Nose to nose: You are leaving the harbor at ten knots and another boat is approaching you head on at about the same speed. The two of you will be way too close in about sixty seconds…

{____} Q1: What should you do?
   (Correct answer: blow horn once and bear right.)
   (Alternate answer: blow horn twice and wait for them to blow twice and bear left.)

{____} Q2: What should they do?
   (Correct answer: respond to my signal with the one horn signal and bear right.)
   (Alternate answer: respond to my signal with two horn signals and bear left.)

{____} Q3: How do you know that is right? What is the rule?
   (Correct answer: Both boats are give-way boats and must signal and confirm intentions.)
   (Alternate answer: usually bear right unless signal otherwise.)

DC1 - Interviewer ________________ Date ______ DSI ___ Time _____ Comment ____________________
Unlike survey questions, interview questions invite discussion and examination.

Did you think the survey and quiz was fair and meaningful? Any Changes or suggestions? ____________________________________________

Did you think the Boating Safety Course was worthwhile, well-done and meaningful? ____________________________________________

Why did you take the course? Did it do what you wanted? ____________________________________________________________

How useful was the course to you? Or your family? ____________________________________________________________

Do you expect to really use what you learned from the course? Where? When? How? ____________________________________________

Are there any changes to the course you would suggest? ____________________________________________

Next question only for those who participated in a PALA class (not the controls)

Did you enjoy the PALA? Was it useful? How? Why? Should we use it more? ____________________________________________

Was the PALA activity helpful to what you remember now about COLREGS? Or Nav-Aids? Or Lights? ____________________________________________

Will you join the Power Squadron or another boating organization? ____________________________________________

Final Question: Any other points, stories, observations, ideas or comments? ____________________________________________

Thank You, it was nice talking to you again. I’ll call you back in 3 or 4 weeks!

DC1- Interviewer _____________ Date ______  DSI _____ Time _____ Comment ____________________________
DC2 - SURVEY: (Early Season survey)   QG1  RID #________________
Looking for changes since the last time we spoke to compare with baseline. Survey rating scale of 0-10

1.  {___} How confident (uncomfortable, confident, great) do you feel about Boating on a scale of 0-10?
2.  {___} How confident do you feel about Boating at night on a scale of 0-10?
3.  {___} How confident do you feel about Nav-Aids in daylight on a scale of 0-10?
4.  {___} How confident do you feel about flashing Nav-Aids Lights at night on a scale of 0-10?
5.  {___} How confident do you feel about Nav-Lights on boats on a scale of 0-10?
6.  {___} How confident do you feel about Nav-Lights on ships on a scale of 0-10?
7.  {___} How confident do you feel about Sound Signals on a scale of 0-10?
8.  {___} How confident do you feel about the Rules of the Road on a scale of 0-10?
9.  {___} How likely are you to get more boating experience this coming season on a scale of 0-10?
10. {___} How likely are you to get more boating training in the next year on a scale of 0-10?

DC2 - QUIZ: (QG1 Quiz Group: Quiz #2. Scenarios C&D)

Sample Scenario: You are in the channel entering the Harbor from the Ocean.

{ n/a }Question: What color is the Navigation Buoy on your right hand side?
   Correct Answer (Red)

Scenario C: Lights: You are cruising at ten knots at night and you see a green light ahead with two yellow lights above and a white light. The two of you will be close in a few minutes…

{___} Q1: What are you looking at?
   (Correct answer: a tug boat with a barge towed behind them.)

{___} Q2: What should you do?
   (Correct answer: slow down and bear left, looking to pass behind the barge.)

{___} Q3: What should they do?
   (Correct answer: maintain course and speed.)

Scenario D: Passing: You are leaving the harbor at ten knots and another boat is going the same direction at six knots. The two of you will be way too close in about sixty seconds so you decide to pass…

{___} Q1: What should you do?
   (Correct answer: blow horn once and bear right.)
   (Alternate answer: blow horn twice and wait for them to blow twice and bear left.)

{___} Q2: What should they do?
   (Correct answer: respond to my signal with one horn signal and hold course and speed.)
   (Alternate answer: respond to my signal with two horn signals and hold course and speed)

{___} Q3: How do you know that is right?
   (Correct answer: I am give-way boat and must signal and confirm before passing.)
   (Alternate answer: usually pass on right unless signal otherwise.)

DC2- Interviewer ________________ Date ______ DSI ___ Time _____ Comment ____________________
DC2 - INTERVIEW – Plans for the boating season? : (watch the time!) RID #

Unlike survey questions, interview questions invite discussion and examination. First, current situation after course…

So, how is the boat and your boating plans working out? ?


How much time do you expect to get on the boat this summer? ?

Are you planning any long trips or special activities?

Have you done any additional learning about boating since the course?

Are you using what you learned from the course? Where? When? How?

What is the most exciting new thing you have realized or learned since the course?

Will you join the Power Squadron or some other boating organization?

Final Question: Any other points, stories, observations, ideas or comments?

Thank You, it was nice talking to you again. I’ll call you back in July or early August. We may take a bit longer next time, so when is the best time to call you during that period?

DC2 Interviewer __________ Date ______ DSI_ ______ Time ___ Comment __________
DC1 - SURVEY: (Baseline survey)  QG2  RID 
Looking for a baseline. Survey rating scale of 0-10 (zero is uncomfortable- 10 is r very confident)
1. {____} How confident (uncomfortable, confident, great) do you feel about Boating on a scale of 0-10?
2. {____} How confident do you feel about Boating at night on a scale of 0-10?
3. {____} How confident do you feel about Nav-Aids in daylight on a scale of 0-10?
4. {____} How confident do you feel about flashing Nav-Aids Lights at night on a scale of 0-10?
5. {____} How confident do you feel about Nav-Lights on boats on a scale of 0-10?
6. {____} How confident do you feel about Nav-Lights on ships on a scale of 0-10?
7. {____} How confident do you feel about Sound Signals on a scale of 0-10?
8. {____} How confident do you feel about the Rules of the Road on a scale of 0-10?
9. {____} How likely are you to get more boating experience this coming season on a scale of 0-10?
10. {____} How likely are you to get more boating training in the next year on a scale of 0-10?

DC1 - QUIZ: (QG2 Quiz Group: Quiz #1. Scenarios D&E)
Sample Scenario:  You are standing in the cockpit looking forward toward the pointy-end of the boat.

{n/a }Question: What do boaters call the right-hand side of the boat?
Correct Answer (Starboard)
Alternate correct answer: (Larboard)

Scenario D: Passing: You are leaving the harbor at ten knots and another boat is going the same direction at six knots. The two of you will be way too close in about sixty seconds so you decide to pass…

{____} Q1: What should you do?
(Correct answer: blow horn once and bear right.)
(Alternate answer: blow horn twice and wait for them to blow twice and bear left,)

{____} Q2: What should they do?
(Correct answer: respond to my signal with the one horn signal and hold course and speed.)
(Alternate answer: respond to my signal with two horn signals and hold course and speed)

{____} Q3: How do you know that is right?
(Correct answer: I am give-way boat and must signal and confirm before passing.)
(Alternate answer: usually pass on right unless signal otherwise.)

Scenario E: Nav-Aids: You cruise down the river at night and you see a flashing green light ahead on the right and a flashing red light dead ahead, but you see shore lights across open water further to the left…

{____} Q1: What are you looking at?
(Correct answer: safe channel markers.)

{____} Q2: What should you do?
(Correct answer: stay between the red and green lights.)

{____} Q3: Why?
(Correct answer: Navigation aids mark channels with red lights on the left and green lights on the right going downstream.)

DC1- Interviewer ________________ Date______ DSI____ Time ____ Comment ____________________
DC1 - INTERVIEW - How did your learning experience in the course go? (Watch the time!) RID #

Unlike survey questions, interview questions invite discussion and examination.

Did you think the survey and quiz was fair and meaningful? Any Changes or suggestions? 

Did you think the Boating Safety Course was worthwhile, well-done and meaningful? 

Why did you take the course? Did it do what you wanted? 

How useful was the course to you? Or your family? 

Do you expect to really use what you learned from the course? Where? When? How? 

Are there any changes to the course you would suggest? 

Next question only for those who participated in a PALA class (not the controls)

Did you enjoy the PALA? Was it useful? How? Why? Should we use it more? 

Was the PALA activity helpful to what you remember now about COLREGS? Or Nav-Aids? Or Lights?

Will you join the Power Squadron or another boating organization? 

Final Question: Any other points, stories, observations, ideas or comments? 

Thank You, it was nice talking to you again. I’ll call you back in 3 or 4 weeks!

DC1- Interviewer ______________ Date ______ DSI ___ Time _____ Comment ____________________
Looking for changes since the last time we spoke to compare with baseline. Survey rating scale of 0-10

1. {___} How confident (uncomfortable, confident, great) do you feel about Boating on a scale of 0-10?
2. {___} How confident do you feel about Boating at night on a scale of 0-10?
3. {___} How confident do you feel about Nav-Aids in daylight on a scale of 0-10?
4. {___} How confident do you feel about flashing Nav-Aids Lights at night on a scale of 0-10?
5. {___} How confident do you feel about Nav-Lights on boats on a scale of 0-10?
6. {___} How confident do you feel about Nav-Lights on ships on a scale of 0-10?
7. {___} How confident do you feel about Sound Signals on a scale of 0-10?
8. {___} How confident do you feel about the Rules of the Road on a scale of 0-10?
9. {___} How likely are you to get more boating experience this coming season on a scale of 0-10?
10. {___} How likely are you to get more boating training in the next year on a scale of 0-10?

Sample Scenario: You are in the channel entering the Harbor from the Ocean.

{n/a} Question: What color is the Navigation Buoy on your right hand side?
Correct Answer (Red)

Scenario B: Nose to nose: You are leaving the harbor at ten knots and another boat is approaching you head on at about the same speed. The two of you will be way too close in about sixty seconds…

{___} Q1: What should you do?
(Correct answer: blow horn once and bear right.)
(Alternate answer: blow horn twice and wait for them to blow twice and bear left.)

{___} Q2: What should they do?
(Correct answer: respond to my signal with the one horn signal and bear right.)
(Alternate answer: respond to my signal with two horn signals and bear left.)

{___} Q3: How do you know that is right?
(Correct answer: Both boats are give-way boats and must signal and confirm intentions.)
(Alternate answer: usually bear right unless signal otherwise.)

Scenario C. Lights: You are cruising at ten knots at night and you see a green light ahead with two yellow lights above and a white light. The two of you will be close in a few minutes…

{___} Q1: What are you looking at?
(Correct answer: a tug boat with a barge towed behind them.)

{___} Q2: What should you do?
(Correct answer: slow down and bear left, looking to pass behind the barge.)

{___} Q3: What should they do?
(Correct answer: maintain course and speed.)
Unlike survey questions, interview questions invite discussion and examination. First, current situation after course…

So, how is the boat and your boating plans working out? ____________________________________________________________

___________________________________________________________________________________________


___________________________________________________________________________________________

How much time do you expect to get on the boat this summer? ?________________________________________

___________________________________________________________________________________________

Are you planning any long trips or special activities?_________________________________________________

___________________________________________________________________________________________

___________________________________________________________________________________________

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Have you done any additional learning about boating since the course?_______________________

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___________________________________________________________________________________________

Are you using what you learned from the course? Where? When? How? __

___________________________________________________________________________________________

___________________________________________________________________________________________

What is the most exciting new thing you have realized or learned since the course? ________________________

___________________________________________________________________________________________

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___________________________________________________________________________________________

Will you join the Power Squadron or some other boating organization? ________________________

___________________________________________________________________________________________

___________________________________________________________________________________________

Final Question: Any other points, stories, observations, ideas or comments? ______________________________

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Thank You, it was nice talking to you again. I’ll call you back in July or early August. We may take a bit longer next
time, so when is the best time to call you during that period? _______________________________________________

DC2 Interviewer __________________ Date ______ DSI_____ Time _____ Comment ____________
DC1 - SURVEY: (Baseline survey)  QG3 RID # __________

Looking for a baseline. Survey rating scale of 0-10 (zero is uncomfortable - 10 is very confident)

1. {_____} How confident (uncomfortable, confident, great) do you feel about Boating on a scale of 0-10?
2. {_____} How confident do you feel about Boating at night on a scale of 0-10?
3. {_____} How confident do you feel about Nav-Aids in daylight on a scale of 0-10?
4. {_____} How confident do you feel about flashing Nav-Aids Lights at night on a scale of 0-10?
5. {_____} How confident do you feel about Nav-Lights on boats on a scale of 0-10?
6. {_____} How confident do you feel about Nav-Lights on ships on a scale of 0-10?
7. {_____} How confident do you feel about Sound Signals on a scale of 0-10?
8. {_____} How confident do you feel about the Rules of the Road on a scale of 0-10?
9. {_____} How likely are you to get more boating experience this coming season on a scale of 0-10?
10. {_____} How likely are you to get more boating training in the next year on a scale of 0-10?

DC1 - QUIZ: (QG3 Quiz Group: Quiz #1. Scenarios A&C)

Sample Scenario: You are standing in the cockpit looking forward toward the pointy-end of the boat.

{n/a }Question: What do boaters call the right-hand side of the boat?
Correct Answer (Starboard)
 Alternate correct answer: (Larboard)

Scenario A. Right crossing: You are cruising at fifteen knots and another boat is approaching you at about the same speed from the right-hand side. The two of you will be way too close in about sixty seconds…

{____} Q1: What should you do?
  (Correct answer: slow down to let them pass.)
  (Alternate answer: steer behind them.)

{____} Q2: What should they do?
  (Correct answer: They should hold course and speed.)

{____} Q3: How do you know that is right?
  (Correct answer: Boat on port side is give-way boat, I am on their port side.)
  (Alternate answer: Boat on starboard has right of way.)

Scenario C. Lights: You are cruising at ten knots at night and you see a green light ahead with two yellow lights above and a white light. The two of you will be close in a few minutes…

{____} Q1: What are you looking at?
  (Correct answer: a tug boat with a barge towed behind them.)

{____} Q2: What should you do?
  (Correct answer: slow down and bear left, looking to pass behind the barge.)

{____} Q3: What should they do?
  (Correct answer: maintain course and speed.)

DC1- Interviewer ______________ Date_______ DSI____ Time _____ Comment ____________________
DC1 - INTERVIEW - How did your learning experience in the course go? (Watch the time!) RID #________

Unlike survey questions, interview questions invite discussion and examination.

Did you think the survey and quiz was fair and meaningful? Any Changes or suggestions? ____________________________

___________________________________________________________________________________________

___________________________________________________________________________________________

Did you think the Boating Safety Course was worthwhile, well-done and meaningful? ____________________________

___________________________________________________________________________________________

___________________________________________________________________________________________

Why did you take the course? Did it do what you wanted? ______________________________________________

___________________________________________________________________________________________

___________________________________________________________________________________________

How useful was the course to you? Or your family? ________________________________________________

___________________________________________________________________________________________

___________________________________________________________________________________________

Do you expect to really use what you learned from the course? Where? When? How? ______________________

___________________________________________________________________________________________

___________________________________________________________________________________________

Are there any changes to the course you would suggest? ______________________________________________

___________________________________________________________________________________________

___________________________________________________________________________________________

Next question only for those who participated in a PALA class (not the controls)

Did you enjoy the PALA? Was it useful? How? Why? Should we use it more? ________________________________

___________________________________________________________________________________________

___________________________________________________________________________________________

Was the PALA activity helpful to what you remember now about COLREGS? Or Nav-Aids? Or Lights? _______

___________________________________________________________________________________________

___________________________________________________________________________________________

Will you join the Power Squadron or another boating organization? _____________________________________

___________________________________________________________________________________________

___________________________________________________________________________________________

Final Question: Any other points, stories, observations, ideas or comments? ______________________________

___________________________________________________________________________________________

___________________________________________________________________________________________

___________________________________________________________________________________________

Thank You, it was nice talking to you again. I'll call you back in 3 or 4 weeks!

DC1- Interviewer ____________ Date ______ DSI ___ Time ____ Comment ____________________________
Looking for changes since the last time we spoke to compare with baseline. Survey rating scale of 0-10

1. {____} How confident (uncomfortable, confident, great) do you feel about Boating on a scale of 0-10?
2. {____} How confident do you feel about Boating at night on a scale of 0-10?
3. {____} How confident do you feel about Nav-Aids in daylight on a scale of 0-10?
4. {____} How confident do you feel about flashing Nav-Aids Lights at night on a scale of 0-10?
5. {____} How confident do you feel about Nav-Lights on boats on a scale of 0-10?
6. {____} How confident do you feel about Nav-Lights on ships on a scale of 0-10?
7. {____} How confident do you feel about Sound Signals on a scale of 0-10?
8. {____} How confident do you feel about the Rules of the Road on a scale of 0-10?
9. {____} How likely are you to get more boating experience this coming season on a scale of 0-10?
10. {____} How likely are you to get more boating training in the next year on a scale of 0-10?

Sample Scenario: You are in the channel entering the Harbor from the Ocean.

{n/a} Question: What color is the Navigation Buoy on your right hand side?
Correct Answer (Red)

Scenario B: Nose to nose: You are leaving the harbor at ten knots and another boat is approaching you head on at about the same speed. The two of you will be way too close in about sixty seconds…

{___} Q1: What should you do?
(Correct answer: blow horn once and bear right.)
(Alternate answer: blow horn twice and wait for them to blow twice and bear left,)

{___} Q2: What should they do?
(Correct answer: respond to my signal with the one horn signal and bear right.)
(Alternate answer: respond to my signal with two horn signals and bear left,)

{___} Q3: How do you know that is right?
(Correct answer: Both boats are give-way boats and must signal and confirm intentions.)
(Alternate answer: usually bear right unless signal otherwise.)

Scenario E: Nav-Aids: You cruise down the river at night and you see a flashing green light ahead on the right and a flashing red light dead ahead, but you see shore lights across open water further to the left…

{___} Q1: What are you looking at?
(Correct answer: safe channel markers.)

{___} Q2: What should you do?
(Correct answer: stay between the red and green lights.)

{___} Q3: Why?
(Correct answer: Navigation aids mark channels with red lights on the left and green lights on the right going downstream.)
DC2 - INTERVIEW – Plans for the boating season? : (watch the time!) RID # __________

Unlike survey questions, interview questions invite discussion and examination. First, current situation after course…

So, how is the boat and your boating plans working out? __________________________

________________________________________________________________________________________


________________________________________________________________________________________

How much time do you expect to get on the boat this summer? ?__________________________

________________________________________________________________________________________

Are you planning any long trips or special activities? __________________________

________________________________________________________________________________________

Have you done any additional learning about boating since the course? __________________________

________________________________________________________________________________________

Are you using what you learned from the course? Where? When? How? __________________________

________________________________________________________________________________________

What is the most exciting new thing you have realized or learned since the course? __________________________

________________________________________________________________________________________

Will you join the Power Squadron or some other boating organization? __________________________

________________________________________________________________________________________

Final Question: Any other points, stories, observations, ideas or comments? __________________________

________________________________________________________________________________________

Thank You, it was nice talking to you again. I’ll call you back in July or early August. We may take a bit longer next time, so when is the best time to call you during that period? __________________________

DC2 Interviewer __________________ Date ________ DSI _______ Time _____ Comment _________________
DC1 - SURVEY: (Baseline survey)   QG4 RID #
Looking for a baseline. Survey rating scale of 0-10 (zero is uncomfortable- 10 is r very confident)

1. {____} How confident (uncomfortable, confident, great) do you feel about Boating on a scale of 0-10?
2. {____} How confident do you feel about Boating at night on a scale of 0-10?
3. {____} How confident do you feel about Nav-Aids in daylight on a scale of 0-10?
4. {____} How confident do you feel about flashing Nav-Aids Lights at night on a scale of 0-10?
5. {____} How confident do you feel about Nav-Lights on boats on a scale of 0-10?
6. {____} How confident do you feel about Nav-Lights on ships on a scale of 0-10?
7. {____} How confident do you feel about Sound Signals on a scale of 0-10?
8. {____} How likely are you to get more boating experience this coming season on a scale of 0-10?
9. {____} How likely are you to get more boating training in the next year on a scale of 0-10?

DC1 - QUIZ: (QG4 Quiz Group: Quiz #1. Scenarios C&F)
Sample Scenario: You are standing in the cockpit looking forward toward the pointy-end of the boat.

{n/a} Question: What do boaters call the right-hand side of the boat?
Correct Answer (Starboard)
 Alternate correct answer: (Larboard)

Scenario C. Lights: You are cruising at ten knots at night and you see a green light ahead with two yellow lights above and a white light. The two of you will be close in a few minutes...

{___} Q1: What are you looking at?
(Correct answer: a tug boat with a barge towed behind them.)

{___} Q2: What should you do?
(Correct answer: slow down and bear left, looking to pass behind the barge.)

{___} Q3: What should they do?
(Correct answer: maintain course and speed.)

Scenario F: Left Crossing: You are cruising at fifteen knots and another boat is approaching you at about the same speed from the left-hand side. The two of you will be way too close in about sixty seconds...

{___} Q1: What should you do?
(Correct answer: I should hold my current course and speed.)

{___} Q2: What should they do?
(Correct answer: they should slow down to let me pass.)
(Alternate answer: they should steer behind me.)

{___} Q3: How do you know that is right?
(Correct answer: Boat on port side is give-way boat, they are on my port side.)
(Alternate answer: Boat on starboard has right of way.)

DC1- Interviewer ___________ Date _______ DSI ___ Time _____ Comment ______________________
DC1 - INTERVIEW - How did your learning experience in the course go? (Watch the time!) RID #

Unlike survey questions, interview questions invite discussion and examination.

Did you think the survey and quiz was fair and meaningful? Any Changes or suggestions?  

Did you think the Boating Safety Course was worthwhile, well-done and meaningful? 

Why did you take the course? Did it do what you wanted? 

How useful was the course to you? Or your family? 

Do you expect to really use what you learned from the course? Where? When? How? 

Are there any changes to the course you would suggest? 

Next question only for those who participated in a PALA class (not the controls)

Did you enjoy the PALA? Was it useful? How? Why? Should we use it more? 

Was the PALA activity helpful to what you remember now about COLREGS? Or Nav-Aids? Or Lights? 

Will you join the Power Squadron or another boating organization? 

Final Question: Any other points, stories, observations, ideas or comments? 

Thank You, it was nice talking to you again. I’ll call you back in 3 or 4 weeks!

DC1- Interviewer ___________ Date ______ DSI ___ Time ____ Comment ________________
DC2 - SURVEY: (Early Season survey)  QG4  RID #
Looking for changes since the last time we spoke to compare with baseline. Survey rating scale of 0-10

1. {____} How confident (uncomfortable, confident, great) do you feel about Boating on a scale of 0-10?
2. {____} How confident do you feel about Boating at night on a scale of 0-10?
3. {____} How confident do you feel about Nav-Aids in daylight on a scale of 0-10?
4. {____} How confident do you feel about flashing Nav-Aids Lights at night on a scale of 0-10?
5. {____} How confident do you feel about Nav-Lights on boats on a scale of 0-10?
6. {____} How confident do you feel about Nav-Lights on ships on a scale of 0-10?
7. {____} How confident do you feel about Sound Signals on a scale of 0-10?
8. {____} How confident do you feel about the Rules of the Road on a scale of 0-10?
9. {____} How likely are you to get more boating experience this coming season on a scale of 0-10?
10. {____} How likely are you to get more boating training in the next year on a scale of 0-10?

DC2 - QUIZ: (QG4 Quiz Group: Quiz #2. Scenarios A&E)

Sample Scenario: You are in the channel entering the Harbor from the Ocean.

{ n/a }Question: What color is the Navigation Buoy on your right hand side?
Correct Answer (Red)

Scenario A. Right crossing: You are cruising at fifteen knots and another boat is approaching you at about the same speed from the right-hand side. The two of you will be way too close in about sixty seconds…

{___} Q1: What should you do?
(Correct answer: slow down to let them pass.)
(Alternate answer: steer behind them,)

{___} Q2: What should they do?
(Correct answer: They should hold course and speed.)

{___} Q3: How do you know that is right?
(Correct answer: Boat on port side is give-way boat, I am on their port side.)
(Alternate answer: Boat on starboard has right of way.)

Scenario E: Nav-Aids: You cruise down the river at night and you see a flashing green light ahead on the right and a flashing red light dead ahead, but you see shore lights across open water further to the left…

{___} Q1: What are you looking at?
(Correct answer: safe channel markers.)

{___} Q2: What should you do?
(Correct answer: stay between the red and green lights.)

{___} Q3: Why?
(Correct answer: Navigation aids mark channels with red lights on the left and green lights on the right going downstream.)

DC2- Interviewer ________________ Date ______ DSI ____ Time _____ Comment ____________________
DC2 - INTERVIEW – Plans for the boating season? : (watch the time!) RID # ________

Unlike survey questions, interview questions invite discussion and examination. First, current situation after course…

So, how is the boat and your boating plans working out? ?______________________________________________
____________________________________________
_____________________________________________________________________________________

_____________________________________________________________________________________

How much time do you expect to get on the boat this summer? ?________________________________________
_____________________________________________________________________________________

Are you planning any long trips or special activities?_________________________________________________
_____________________________________________________________________________________

Have you done any additional learning about boating since the course?________________________________
_____________________________________________________________________________________

Are you using what you learned from the course? Where? When? How? ________________________________
_____________________________________________________________________________________

What is the most exciting new thing you have realized or learned since the course? ________________________
_____________________________________________________________________________________

Will you join the Power Squadron or some other boating organization? ________________________________
_____________________________________________________________________________________

Final Question: Any other points, stories, observations, ideas or comments? ______________________________
_____________________________________________________________________________________

Thank You, it was nice talking to you again. I’ll call you back in July or early August. We may take a bit longer next
time, so when is the best time to call you during that period? ________________________________

DC2 Interviewer __________________ Date________ DSI____ Time _____ Comment ____________________
DC1 - SURVEY: (Baseline survey)  QG5 RID # __________
Looking for a baseline. Survey rating scale of 0-10 (zero is uncomfortable - 10 is very confident)
1. {____} How confident (uncomfortable, confident, great) do you feel about Boating on a scale of 0-10?
2. {____} How confident do you feel about Boating at night on a scale of 0-10?
3. {____} How confident do you feel about Nav-Aids in daylight on a scale of 0-10?
4. {____} How confident do you feel about flashing Nav-Aids Lights at night on a scale of 0-10?
5. {____} How confident do you feel about Nav-Lights on boats on a scale of 0-10?
6. {____} How confident do you feel about Nav-Lights on ships on a scale of 0-10?
7. {____} How confident do you feel about Sound Signals on a scale of 0-10?
8. {____} How confident do you feel about the Rules of the Road on a scale of 0-10?
9. {____} How likely are you to get more boating experience this coming season on a scale of 0-10?
10. {____} How likely are you to get more boating training in the next year on a scale of 0-10?

DC1 - QUIZ: (QG5 Quiz Group: Quiz #1. Scenarios B&F)
Sample Scenario: You are standing in the cockpit looking forward toward the pointy-end of the boat.

{n/a} Question: What do boaters call the right-hand side of the boat?
Correct Answer (Starboard)

Scenario B: Nose to nose: You are leaving the harbor at ten knots and another boat is approaching you head on at about the same speed. The two of you will be way too close in about sixty seconds…

{___} Q1: What should you do?
(Correct answer: blow horn once and bear right.)
(Alternate answer: blow horn twice and wait for them to blow twice and bear left,)

{___} Q2: What should they do?
(Correct answer: respond to my signal with the one horn signal and bear right.)
(Alternate answer: respond to my signal with two horn signals and bear left,)

{___} Q3: How do you know that is right?
(Correct answer: Both boats are give-way boats and must signal and confirm intentions.)

Scenario F: Left Crossing: You are cruising at fifteen knots and another boat is approaching you at about the same speed from the left-hand side. The two of you will be way too close in about sixty seconds…

{___} Q1: What should you do?
(Correct answer: I should hold my current course and speed.)

{___} Q2: What should they do?
(Correct answer: they should slow down to let me pass.)
(Alternate answer: they should steer behind me,)

{___} Q3: How do you know that is right?
(Correct answer: Boat on port side is give-way boat, they are on my port side.)
(Alternate answer: Boat on starboard has right of way.)

DC1- Interviewer ________________ Date ______  DSI ___ Time _____ Comment _____________________
Unlike survey questions, interview questions invite discussion and examination.

Did you think the survey and quiz was fair and meaningful? Any Changes or suggestions? __________________________

Did you think the Boating Safety Course was worthwhile, well-done and meaningful? __________________________

Why did you take the course? Did it do what you wanted? __________________________

How useful was the course to you? Or your family? __________________________

Do you expect to really use what you learned from the course? Where? When? How? __________________________

Are there any changes to the course you would suggest? __________________________

Next question only for those who participated in a PALA class (not the controls)

Did you enjoy the PALA? Was it useful? How? Why? Should we use it more? __________________________

Was the PALA activity helpful to what you remember now about COLREGS? Or Nav-Aids? Or Lights? ______

Will you join the Power Squadron or another boating organization? __________________________

Final Question: Any other points, stories, observations, ideas or comments? __________________________

Thank You, it was nice talking to you again. I’ll call you back in 3 or 4 weeks!

DC1 - Interviewer ____________ Date ______ DSI ____ Time ____ Comment ________________
DC2 - SURVEY: (Early Season survey) QG5 RID #
Looking for changes since the last time we spoke to compare with baseline. Survey rating scale of 0-10

1. {____} How confident (uncomfortable, confident, great) do you feel about Boating on a scale of 0-10?
2. {____} How confident do you feel about Boating at night on a scale of 0-10?
3. {____} How confident do you feel about Nav-Aids in daylight on a scale of 0-10?
4. {____} How confident do you feel about flashing Nav-Aids Lights at night on a scale of 0-10?
5. {____} How confident do you feel about Nav-Lights on boats on a scale of 0-10?
6. {____} How confident do you feel about Nav-Lights on ships on a scale of 0-10?
7. {____} How confident do you feel about Sound Signals on a scale of 0-10?
8. {____} How confident do you feel about the Rules of the Road on a scale of 0-10?
9. {____} How likely are you to get more boating experience this coming season on a scale of 0-10?
10. {____} How likely are you to get more boating training in the next year on a scale of 0-10?

DC2 - QUIZ: (QG5 Quiz Group: Quiz #2. Scenarios A&D)
Sample Scenario: You are in the channel entering the Harbor from the Ocean.

{n/a} Question: What color is the Navigation Buoy on your right hand side?
Correct Answer (Red)

Scenario A. Right crossing: You are cruising at fifteen knots and another boat is approaching you at about the same speed from the right-hand side. The two of you will be way too close in about sixty seconds…

{____} Q1: What should you do?
(Correct answer: slow down to let them pass.)
(Alternate answer: steer behind them.)

{____} Q2: What should they do?
(Correct answer: They should hold course and speed.)

{____} Q3: How do you know that is right?
(Correct answer: Boat on port side is give-way boat, I am on their port side.)
(Alternate answer: Boat on starboard has right of way.)

Scenario D: Passing: You are leaving the harbor at ten knots and another boat is going the same direction at six knots. The two of you will be way too close in about sixty seconds so you decide to pass…

{____} Q1: What should you do?
(Correct answer: blow horn once and bear right.)
(Alternate answer: blow horn twice and wait for them to blow twice and bear left.)

{____} Q2: What should they do?
(Correct answer: respond to my signal with one horn signal and hold course and speed.)
(Alternate answer: respond to my signal with two horn signals and hold course and speed)

{____} Q3: How do you know that is right?
(Correct answer: I am give-way boat and must signal and confirm before passing.)
(Alternate answer: usually pass on right unless signal otherwise.)

DC2- Interviewer ______________ Date_______ DSI____ Time ____ Comment ____________________
DC2 - INTERVIEW – Plans for the boating season? : (watch the time!) RID 

Unlike survey questions, interview questions invite discussion and examination. First, current situation after course…

So, how is the boat and your boating plans working out? ?

_____________________________________________

_________________________________________________________________________________________


_________________________________________________________________________________________

How much time do you expect to get on the boat this summer? ?

_____________________________________________

_________________________________________________________________________________________

Are you planning any long trips or special activities?

_____________________________________________

_________________________________________________________________________________________

Have you done any additional learning about boating since the course?

_____________________________________________

_________________________________________________________________________________________

What is your preferred way to learn things?

_____________________________________________

_________________________________________________________________________________________

Are you using what you learned from the course? Where? When? How?

_____________________________________________

_________________________________________________________________________________________

What is the most exciting new thing you have realized or learned since the course?

_____________________________________________

_________________________________________________________________________________________

Will you join the Power Squadron or some other boating organization?

_____________________________________________

_________________________________________________________________________________________

Final Question: Any other points, stories, observations, ideas or comments?

_____________________________________________

_________________________________________________________________________________________

Thank You, it was nice talking to you again. I’ll call you back in July or early August. We may take a bit longer next time, so when is the best time to call you during that period?

DC2 Interviewer __________________ Date ______ DSI _____ Time _____ Comment ___________________
DATA COLLECTION INSTRUCTIONS:
ENROLLMENT FORMS

Implied consent form (read & retain) with signup sheet (sign & return) with name and contact number(s), preferred contact times and demographic data. Forms are encoded with class number, date, random ID number as well as a randomly assigned Quiz group. All results are coded onto several forms and at end, name and contact data are removed and anonymous form with RID# only is used for analysis. The participant agrees to one to four contacts by telephone or face-to-face; coded as Data Collection Index when they fill out the Enrollment form (DC0);

1. DC1 - interview with Instructors a few days after the class ends (1-3 weeks after the enrollment)
2. DC1- approximately 10-140 days after the enrollment during May or Early June 2009
3. DC2 - approximately 90-200 days after the enrollment during Late July or early August 2009

Interviewer should try to match the day of the week and the timing as closely as possible when placing the calls and then should start out the call in a gracious and friendly fashion, and confirm the participant can take the time to do the survey and quiz by offering to call back later if that would be better.

ADMINISTERING SURVEY: (same survey repeated all data collection period)

Each telephone contact is associated with a survey designed to ascertain progress or lack thereof and long term reactions to the experience using a rating system (scale of 0-10). After a short opening, the interviewer must be extremely non-committal during the survey and quiz portion, (without prompting or volunteering hints or clarifications) so as to have the least possible influence on the outcome.

Survey rating system: On a scale of 0-10 (zero being none - 10 being an expert)

Same questions each time, so we can see how situation may have changed as time passes.

SURVEY SCORING: Adding up the last ten answers would yield a score between zero and one hundred (0-100), which we are interpreting as a “Boating Confidence.” Comparing this with the age, education, experience and the PALA experience may yield some interesting data. We can hypothesize that the PALA should increase the boating aptitude relative to the number of years boating and be education and age related.

QUIZZES; (same quiz for each data collection period but with randomly assigned questions)

The standardized USPS tests are not suitable as an assessment tool therefore an assessment tool was designed for this content, short enough to be done on the telephone to help measure and assess retention levels. The quizzing scenarios are designed to assess retention, depth and transferability. The quizzes will be field-tested and edited by a team of expert instructors prior to use, and the interview will include questions to evaluate the effectiveness of quizzes as an assessment tool. If any problems are identified with the quizzes as we go along, they will be modified “on the fly.”

Each quiz starts with a sample scenario, with one simple question, which is not graded. Sample Scenarios help the quiz participants to get into the mood. The quizzing is based in six different scenarios, each one with three questions, for a total of eighteen questions which will be spread over three quizzes as follows:

Scenario A: Right crossing scenario - You are cruising at fifteen knots and another boat is approaching you at about the same speed from the right-hand side. The two of you will be way too close in about sixty seconds...
Q1: What should you do?
(Correct answer: slow down to let them pass.)
(Alternate answer: steer behind them.)
Q2: What should they do?
(Correct answer: They should hold course and speed.)
Q3: How do you know that is right?
(Alternate answer: Boat on starboard has right of way.)

Each quiz consists of two scenarios or six questions, based on the estimated time it takes to execute on the telephone. There are three quizzes for each person and every person must be asked every scenario. This can be organized into five quiz groups of three quizzes without redundancy, so as to assure that each quiz group includes each of six scenarios. It seems reasonable to use two scenarios with six questions for each quiz since it is short and simple and should tell us if the key learning points are retained or not. In this scheme, there are fifteen pairs of six different scenarios. There are five Quiz Groups created from six scenarios to cover three-quizzes for three different intervals, as follows:

<table>
<thead>
<tr>
<th>Quiz Groups (5)</th>
<th>QG1</th>
<th>QG2</th>
<th>QG3</th>
<th>QG4</th>
<th>QG5</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC1 Quiz #1</td>
<td>A &amp; B</td>
<td>D &amp; E</td>
<td>A &amp; C</td>
<td>C &amp; F</td>
<td>B &amp; F</td>
</tr>
<tr>
<td>DC2 Quiz #2</td>
<td>C &amp; D</td>
<td>B &amp; C</td>
<td>B &amp; E</td>
<td>A &amp; E</td>
<td>A &amp; D</td>
</tr>
</tbody>
</table>

Each participant is randomly assigned to a quiz group; which should balance any bias induced by specific scenarios or timing issues. The order of the quizzes are different for different people.

**ADMINISTERING QUIZ:**
Investigator should tell the participant to relax, there is no rush. There are three questions for each of two scenario, and everything is something learned in class. It is fine if you do not know, so if you don’t know, just say so. If you think you remember, then do the best you can, but please do not guess.
Read the sample scenario and give the participant a few seconds to absorb it. Ask “Do you understand the scenario?”
Read the question and allow time to answer. If they ask for clarification, re-read the question more carefully.
After they answer, reassure them that they did well, and that there is no grade for the first answer.
Answer any questions and then say “Thank you, we will start now!” and go to the first quiz scenario.
Read each quiz scenario and give the participant a few seconds to absorb it. Ask do you understand the scenario?
Read the each question and allow time to answer… do not prod, encourage or hint. If they ask for clarification, reread the question more carefully. Do not comment or react to the answer, just say, “Thank you!”
Then record the mark (-5, 0, +5, +10) and go to the next question.
Each wrong answer is worth minus 5 points
An “I don’t know.” Answer is worth zero (0) points
Each partial answer is worth plus 5 points
Each fully correct answer is worth plus 10 points
When you are completed, thank them again, and proceed to the interview.
GRADING QUIZ:
Add up the score when the interview is over and the phone call is finished.
Just taking the quiz is worth 40 points, and then add in the following:
Each wrong answer is worth minus 5 points
An “I don’t know.” Answer is worth zero (0) points
Each partial answer is worth plus 5 points
Each fully correct answer is worth plus 10 points

FINAL SCORE IS BETWEEN 10 POINTS AND 100 POINTS
Wile the score has little meaning, the general sense of the score is as follows;
- 10 points is awful… every question had the wrong answer
- 40 points is not good… every question had no answer or good and bad answers evened out
- 70 points is fine… most answers are partial
- 100 is great… every answer is correct

In reality the primary individual thing is how does each quiz score stack-up against other individuals? And between classes? And against the same participant’s previous and next scores? Analytically, only differences between the group scores will have great significance.

ADMINISTERING INTERVIEW:
At the end of the survey and quiz, the interviewer should return to a friendly tone to interview the participant briefly to find out more information about how the learning and boating experiences are going. Interview questions are different than survey questions. Interview question are open and looking for discussion and examination. Feel free to expand or interact so as to learn something from the participant, and if they introduce an idea, pursue it. Keep an eye on the clock and make sure they want to continue if goes beyond ten minutes. Example starter question is, “So, have you done any additional reading or studying or practicing since the course?” There is also a key question for participants in the PALA… DO NOT ASK THOSE IN THE CONTROL GROUP! Key Question: Do you believe the Playful Adult Learning Activity was helpful to what you remember right now about the Collision Regulations and collision situations? … Navigation Aids? …lights on boats?

NOTE-TAKING, OBSERVATIONS & SCORING:
When finished, the interviewer must complete the notes, adding observations and scores where appropriate, and fill out both the closing line and the contact line on the Enrollment form

Contact # 3 Interviewer __________________ Date______ Time _____ Comment __________________
APPENDIX C: IRB DOCUMENTATION

Guidelines For Developing A Social Science Informed Consent Form ...............218
Exemption Determination Form.......................... ...................................... ...221
Implied Consent Form: Exempt Studies.......................... ............................ 229
In-Class Enrollment Verbal Script..... ................................................. ....... ....230
DC0 - Implied Consent And Enrollment Form: Adult Learner ............ ............ ....231
GUIDELINES FOR DEVELOPING A SOCIAL SCIENCE INFORMED CONSENT FORM
EXEMPT STUDIES:


<table>
<thead>
<tr>
<th>The Informed Consent Form must include the following elements:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. All wording must be at an 8th grade reading level or below. Someone unfamiliar with your research should easily understand the consent form. Avoid highly technical terms, jargon, etc.</td>
</tr>
<tr>
<td>2. The informed consent form must be written in the second person.</td>
</tr>
<tr>
<td>3. Title of the study, preferably as it appears on the IRB application and grant (if applicable)</td>
</tr>
<tr>
<td>4. Affiliation with The Pennsylvania State University</td>
</tr>
<tr>
<td>5. Principal investigator’s (PI) contact information to include name, office/mailing address, email address, telephone number</td>
</tr>
<tr>
<td>6. Advisor’s contact information to include name, office/mailing address, email address, telephone number [REQUIRED IF PI IS A STUDENT]</td>
</tr>
<tr>
<td>7. Statement that the study involves research</td>
</tr>
<tr>
<td>8. Purpose of the study</td>
</tr>
<tr>
<td>9. Procedures to be followed</td>
</tr>
<tr>
<td>10. Time/duration of procedures and study</td>
</tr>
<tr>
<td>11. Confidentiality assurances and procedures including information related to storage and location, accessibility and destruction of data as well as use of identifiers and publishing/presentation of research</td>
</tr>
<tr>
<td>[The following paragraph may be used] “Your participation in this research is confidential. The data will be stored and secured (location) in a (locked/password protected) file. In the event of any publication or presentation resulting from this research, no personally identifiable information will be disclosed.”</td>
</tr>
<tr>
<td>12. Who to contact with questions, complaints or concerns about the study</td>
</tr>
<tr>
<td>[Use the following statements] “Please contact _______ at XXX-XXXX with questions, complaints or concerns about this research study.”</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>13. <strong>Payment for participation</strong> (if applicable) – See Point 5 and Point 6 below</td>
</tr>
<tr>
<td>14. Statement that <strong>participation is voluntary</strong></td>
</tr>
<tr>
<td>15. Statement that <strong>participants may withdraw</strong> their participation at any time (if data collection is not anonymous)</td>
</tr>
<tr>
<td>16. Statement that participants can <strong>decline to answer specific questions</strong></td>
</tr>
</tbody>
</table>

*Items 14 – 16 can be combined into the following statements*

“Ih your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer.”

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>17. Statement that participants must be <strong>18 years of age or older</strong> (if applicable)</td>
<td>x</td>
</tr>
<tr>
<td>18. Provide <strong>signature and date lines</strong> at the end of the document <strong>unless</strong> using implied informed consent for the following individuals.</td>
<td>na</td>
</tr>
<tr>
<td>a. Research participant or parent(s), legally authorized representative</td>
<td>na</td>
</tr>
<tr>
<td>b. Person(s) present during the consenting process – for example, the principal investigator, person obtaining consent, or research staff</td>
<td>na</td>
</tr>
<tr>
<td>19. <strong>Connecting page numbers</strong> if the document is longer than one page (e.g., Page 1 of 2, Page 2 of 2)</td>
<td>na</td>
</tr>
<tr>
<td>20. A <strong>parental informed consent form</strong> used when children are involved must also contain the above elements BUT will need to be reworded to reflect that the parents are consenting for their child(ren) to participate and include a statement including the name of the child</td>
<td>na</td>
</tr>
</tbody>
</table>

*Use the following statement*

“I give permission for my child, ____________________, to participate in this research study.”

**Additional Considerations that may need to be included in the Informed Consent Form:**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. If using implied informed consent OR verbal consent, one of the following statements may be used:</strong></td>
<td>x</td>
</tr>
<tr>
<td>“Completion and return of the survey implies your consent to participate in this research. Please keep this form for your records.”</td>
<td></td>
</tr>
<tr>
<td>“Completion and submission of the survey implies your consent to participate in this research. Please keep this form for your records.”</td>
<td></td>
</tr>
<tr>
<td>“Completion of the interview implies your consent to participate in this research. Please keep this form for your records.”</td>
<td></td>
</tr>
<tr>
<td><strong>2. If audio-recording, video-recording or photographs will be used,</strong> participants must be informed of taping and photographs and given the option to agree. Additional, please state:</td>
<td>x</td>
</tr>
<tr>
<td>a. Where recordings/photographs will be stored;</td>
<td>x</td>
</tr>
<tr>
<td>b. When recordings/photographs will be destroyed (within a definitive timeframe such as “by the year 2005”); and</td>
<td>x</td>
</tr>
<tr>
<td>c. Who will have access to the recordings/photographs</td>
<td>x</td>
</tr>
<tr>
<td><strong>3. If researchers would like to keep the recordings/photographs indefinitely,</strong> please see IRB Guideline XI</td>
<td>na</td>
</tr>
</tbody>
</table>
“Research Involving Audio, Video or Digital Recordings of Research Participants”. Additional information will need to be added to the informed consent form for participants to decide if researchers may keep the tapes indefinitely.

4. ** If study is administered electronically/on-line, additional statements will be required. Please see IRB Guideline X, “Guidelines for Computer and Internet Based Research Involving Human Participants.” **

<table>
<thead>
<tr>
<th>Use the following statement in the confidentiality section</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Your confidentiality will be kept to the degree permitted by the technology being used. No guarantees can be made regarding the interception of data sent via the Internet by any third parties.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use the following statement at the end of the document</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Please print off this form to keep for your records.”</td>
</tr>
</tbody>
</table>

5. If participants will be involved in a **focus group**, use the following statement:

| If you speak about the contents of the focus group outside the group, it is expected that you will not tell others what individual participants said. |

6. If **extra credit or course credit is offered** as payment for participation, the informed consent form must state the amount of extra/course credit that will be offered as well as the alternatives to participation for equivalent extra/course credit. (This is not applicable for the Psychology Subject Pool, the CAS 100A Subject Pool, or the Penn State Behrend Psychology Subject Pool.)

<table>
<thead>
<tr>
<th>Use the following statement for the Psychology Subject Pool, the CAS100A Subject Pool, or Penn State Behrend Psychology Subject Pool</th>
</tr>
</thead>
<tbody>
<tr>
<td>“You will receive course credit for participating as specified in the syllabus provided by your instructor. Alternative means for earning this course credit are available as specified in the syllabus.”</td>
</tr>
</tbody>
</table>

7. If compensation is offered, please see CR2078 (PDF) for additional information. If **participants will receive more than $25** in cash, check or gift certificate, use the following statement:

| “Total payments within one calendar year that exceed $600 will require the University to report these payments to the IRB annually. This may require you to claim the compensation that you receive for participation in this study as taxable income.” | **

[Use the following statement in the confidentiality section]

[Use the following statement at the end of the document]
EXEMPTION DETERMINATION FORM

Form Instructions:
- To complete the form, press TAB or SHIFT TAB between boxes and enter an ‘X’ or text. For assistance, contact the Office for Research Protections.
- Submit recruitment materials, informed consent forms, and all other materials as attachments to the application. Do NOT include within the application.
- Handwritten applications will NOT be accepted.

Project Title: Playful Adult Learning Activity (PALA) Evaluation - IRB# _______

Exemption Screening Questions:

PLEASE ANSWER ALL OF THE SCREENING QUESTIONS. If you answer ‘Yes’ to any of the following questions A through D below, then STOP and use one of the Applications for the Use of Human Participants – Expedited & Full Reviews for initial IRB review.

If you answer ‘No’ to all of the questions A through D below, continue to complete this Exemption Determination Form.

A. For research involving special populations, interventions or manipulations
   1. Does your research involve prisoners? □ Yes X□ No
   2. Does your research involve using survey or interview procedures with children? □ Yes X□ No
   3. Does your research involve the observation of children in settings where the investigator(s) will participate in the activities being observed? □ Yes X□ No
   4. Does your research involve the use of deception? □ Yes X□ No

B. For research using survey procedures, interview procedures, observational procedures, and questionnaires
   1. If data are to be audio or video recorded, is there potential harm1 to participants if the information is revealed or disclosed? □ Yes X□ No
   2. If participants will be identified either by name or through demographic data, is there potential for harm to participants if the information is revealed or disclosed? □ Yes X□ No
   3. Is the research regulated by the FDA and is NOT a food or taste study as outlined in category 6? □ Yes X□ No

C. For research using existing2 or archived data, documents, records or specimens only
   1. Will any data, documents, records or specimens be collected from participants after the submission of this form? □ Yes X□ No
   2. If the data, documents, records or specimens are originally labeled in such a manner that the □ Yes X□ No

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1 Harm to participants means that any disclosure of the human participants’ responses outside the research could reasonably place the participants at risk of criminal or civil liability or can be damaging to the participants’ financial standing, employability, or reputation.

2 Existing means the items exist before the research was proposed or was collected prior to the research for a purpose other than the proposed research.

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This form is available electronically at http://www.research.psu.edu/orp/areas/humans/samples/index.asp.
participants can be identified, directly or indirectly through identifying links, is the investigator recording the data for the purposes of this research in such a manner that participants can be identified, directly or indirectly through identifying links (e.g., demographic information that might reasonably lead to the identification of individual participants – name, phone number, or any code number that can be used to link the investigator’s data to the source record – medical record number or hospital admission number)?

3. If genetic tests are conducted on specimens, are the specimens and/or results linkable to participants or contain identifiable information (coded)?

4. Would the data, documents, records or specimens being used in this study be classified as a “restricted usage” dataset?

D. For research using protected health information
1. Will the research involve the use or disclosure of individually identifiable health information including: names, dates (other than years), telephone numbers, fax numbers, electronic email addresses, social security numbers, medical record numbers, health plan beneficiary numbers, account numbers, certificate/license numbers, device identifiers and serial numbers, web URLs, internet addresses, biometric identifiers, full face or comparable images, or any unique identifying number, characteristic or code?

Yes ☐ No ☑

Principal Investigator: James T. Spaulding
PSU User ID (e.g., abc123): jts11

University Status (Faculty, Staff, Student, etc.): student
Telephone Number: 610-269-6802

Email Address: jts11@psu.edu
Dept: Adult Education

College: Graduate School
Campus: Harrisburg

Mailing Address: 406 Lloyd Ave. Downingtown, Pa. 19335

Faculty Advisor, if PI is a student: Dr. Patricia Cranton
PSU User ID (e.g., abc123): pac23

E-Mail address pac23@psu.edu
Telephone Number (717)-948-6450

Dept: Adult Education
College: Education

Mailing Address: School for Behavioral Sciences and Education W331-B Olmsted Bldg. Middletown, PA 17057
Campus: Harrisburg

Is there anyone you wish to include on correspondence related to this study (e.g., a study coordinator, etc.)?

Name: PSU User ID (e.g., abc123):

University Status (Faculty, Staff, Student, etc.): Telephone Number:

Email Address: Dept: Engineering

College: Engineering
Campus: Great Valley

Mailing Address: Role in this study:

1. Funding Source: Indicate the name and mailing address of internal and external sources of funding. If the study is not funded, indicate such. If applicable, a copy of your grant proposal must be included with this application.
2. Class Project: Is this a class project?

☐ Yes → Provide the following information:
   - Instructor’s Name: Dr. Patricia Cranton
   - Course Title and Number: Independent Study EDUC 596
   - Semester course is being offered: Spring 2009

☐ No

3. Conflict of Interest: Do you or any individual who is associated with/responsible for the design, the conduct, or the reporting of this research have an economic interest in or act as an officer or a director for any outside entity whose financial interests would reasonably appear to be affected by this research project?

☐ Yes → Refer to Penn State Policy RA20 AND HR91 for additional information

☐ No

4. Exempt Research Categories: Read the following categories and choose one or more that apply to your research. Your research must fit in at least one category in order to be considered for an exemption determination.

☐ Category 1: Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods. (This category may include children. This category may NOT include prisoners or be FDA-regulated.)

☐ Category 2: Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observations of public behavior unless: (i) information obtained is recorded in such a manner that human participants can be identified, directly or through identifiers linked to the participants; and (ii) any disclosure of the human participants' responses outside the research could reasonably place the participants at risk of criminal or civil liability or be damaging to the participants' financial standing, employability, or reputation. (This category may NOT include prisoners or be FDA-regulated.)

  ♦ Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement) for which participants cannot be identified, or release of the information would not be harmful to the participant. (This category may include children.)

  ♦ Research involving the use of survey procedures or interview procedures or observation of public behavior for which participants cannot be identified, or release of the information would not be harmful to the participant. (This category may NOT include children except for research involving the observation of public behavior of children, when the investigator does not participate in the activities being observed.)

  ♦ PLEASE NOTE: This category CANNOT include the use of diaries, journals, or asking participants to perform a task(s) [e.g., conducting searches on the Internet & then completing a questionnaire]. The entire study must fit into a category not just portions of it.

☐ Category 3: Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observations of public behavior that is not exempt under #2 of this section, if: (i) the human participants are elected or appointed public officials or candidates for public office; or (ii) Federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter. (This category may NOT include prisoners or be FDA-regulated.)

☐ Category 4: Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that participants cannot be identified, directly or through identifiers linked to the participants. (This category may include children. Existing data means the items exist [are 'on the shelf'] before the research was proposed or were collected prior to the research for any purpose. This category may NOT include prisoners or be FDA-regulated.)

☐ Category 5: Research and demonstration projects that are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; (iv) possible changes in methods or levels of payment for benefits or services under those programs. (This category may include children. This category may NOT include...
prisoners or be FDA-regulated.)

☐ Category 6: Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture. (This category may include children. This category may NOT include prisoners.)

NOTE:

- The Principal Investigator is responsible for ensuring that all individuals conducting procedures described in this application are trained adequately prior to involving human participants.
- All personnel listed on this application who (1) are responsible for the design/conduct of the study, (2) will have access to the human participants (i.e., will consent participants, conduct the study), or (3) will have access to identifying AND confidential information must successfully complete the IRB’s Training on the Protection of Human Participants or provide verification of training from their home institution. PSU’s training may be located at http://www.research.psu.edu/orp/education/modules/irb/index.asp. Approval will NOT be granted until all individuals have successfully completed the training. Verification of training does NOT need to be sent in if the individual completed the Penn State’s training.
- As personnel change, you must submit a Modification Request Form – Exemption to add or remove personnel.

5. Research Personnel: Provide the name of the other individual(s) assisting with this study who (1) will be responsible for the design/conduct of the study, (2) have access to the human participants (i.e., will consent participants, conduct the study), or (3) have access to identifying AND confidential information. If the individual does not have a PSU Access User ID, please provide some other form of contact information. If additional space is needed, attach a separate sheet containing the same information.

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6. Participants: Estimated numbers of participants/samples/charts to be involved (Enter one number – not a range): 100

7. Participants: Will there be an equal representation of:

- Gender Identity
- Racial/ethnic groups
- Sexual Orientation

Public enrollment course, we do not control.

8. Participants: Age range – Choose all that apply:

- [ ] Less than 1 year
- [ ] 1 – 6 years
- [ ] 7 – 12 years
- [ ] 13 – 17 years
- [x] 18 – 25 years
- [ ] 26 – 40 years
- [x] 40 – 65 years
- [x] 65+ years
9. Recruitment: Describe from where and how the participants will be identified or recruited, who will make the initial contact with the participants, and how you plan to distribute or display any recruitment materials for this research (e.g., bulletin board, emails, newspaper advertisement).

Participants are drawn from attendees in a United States Power Squadron (USPS) Open-to-the-Public, open-enrollment, public-course in a public building with a meeting-room or class-room, scheduled between January 15th 2009 and May 17th 2009. Initial contact is during the normal activities of the course. Attendees are verbally addressed as a group by the Principal Investigator, who is introduced by the USPS instructor. A consent form is distributed. (Please see attachments) and the attendees as a group are invited to volunteer to join the study. Any who fill in and return the survey form and are over 18 years of age are permitted to join the study.

10. Recruitment: Indicate how participants will be recruited to participate in this study & attach copies of the materials.
Choose all that apply:
- Advertisement
- In-person Script (Verbal – script attached)
- Telephone Script
- Flyer
- Information Sheet
- Email
- Letter
- Other → Explain:

11. Consent: Describe the methods you plan to use in order to obtain informed permission to participate in this research. Attach a copy of the written description or script for oral presentation. If you cannot obtain informed permission for this study, explain why it cannot be obtained (e.g., the data are de-identified).

We will use an implied consent form handed out by the Principal Investigator during the verbal invitation to volunteer. (Please see attachments) The volunteers will review the consent form prior to writing their name and filling out a survey form which is returned to the investigator.

12. Compensation: If individuals will be offered compensation, indicate the type and amount of compensation that will be offered.

- Money → Amount:
- Gift Certificate → Amount:
- Extra/Class Credit → Amount:
- Drawing → Explain:
- Other → Explain:
- Compensation will NOT be offered → Skip to Question 14

13. Compensation: If extra/class credit is being offered, describe the alternative available for earning the extra/class credit. The alternative must be equal in time and effort to participating in the research.
Not applicable

14. Recordings: If recording will be done for this research, indicate the type of recording that will be made.

- Audio
- Video
- Photographs
- Recordings will NOT be made → Skip to #16

15. Recordings: Describe (a) where the recordings will be stored; (b) who will have access to the recordings; (c) how the recordings will be transcribed and coded, if applicable; (d) who will transcribe the recordings; (e) how and by what year will the recordings be destroyed. If you wish to retain the recordings indefinitely, provide a sound justification for doing so.

16. Abstract: The abstract below will assist the ORP in reviewing your research. The abstract must address the important elements of the exemption category you indicated your research meets in Question 4 above. The information in the abstract must include a specific description of the procedure(s) involving human participants to demonstrate the study meets all the requirements for the chosen category (ies). Depending on the category(ies) chosen in Question 4 above, the abstract should address the following:

Category 1: Specify whether 1.i. or 1.ii. applies and briefly explain.

Both 1.i and 1.ii apply as follows: This is research on the appropriate instructional strategies for Basic Boating Safety Education (i.e. 1.i)
This is research on the effectiveness of or the comparison among instructional techniques (i.e., 1.ii). The standard teaching technique in this course is a USPS PowerPoint Presentation which is delivered by a volunteer USPS instructor to seated attendees in a classroom in a two-hour session. This will be supplemented with the PALA designed to support training in the COLREGS. The researcher will contact the volunteer participants three times following this course for a ten-minute telephone interview to determine the effectiveness of this training technique. (Please see attachments)

Category 2: Assure condition 2.i. and/or 2.ii. applies and briefly explain. Attach copies of tests, surveys, interview questions, focus group topics or applicable instruments.

This Research involves the use of survey and interview procedures that are obtained and recorded in such a manner that human participants can NOT be identified directly or through identifiers linked to the participants, except by the interviewer who placed the telephone calls. After the data is collected, the linking personal information including name and telephone numbers are removed from the collected data and stored in a sealed envelope with the archived audio tapes. Any disclosure of the participants’ responses outside the research would NOT reasonably place the participants at risk of criminal or civil liability or be damaging to the participants’ financial standing, employability, or reputation. Course attendees are not pressured to join the study, and those who volunteer may choose to answer questions or not.

Use the following sections to complete your abstract:

a. Background/Rationale: Briefly provide the background information and rationale for performing the study and any potential benefits.

It is likely that the inclusion of adult playfulness can be directly related to success in a specific learning environment, and the availability of a successful activity of this nature would assist many learners in Basic Boating Safety Courses. However, it is possible that it will also affect the likelihood of participation and success in related learning activities at a later date. Evaluation of the efficaciousness and efficiency of a Playful Adult Learning Activity (PALA) is an important step in the application of such an idea.

b. Key Objectives: Summarize the study’s objectives, aims or goals.

The purpose of this research is to evaluate the efficaciousness and efficiency of a Playful Adult Learning Activity (PALA) compared to standard presentation techniques of standard material taught in a Public Boating Safety Course from the United States Power Squadrons.

c. Study Population, Samples and/or Charts: Describe the characteristics of the participant population, such as anticipated number to be involved, age range, gender, ethnic background and health status.

We expect 40-60 participants in 10 classes scheduled between 01/15/2009 and 04/15/2009 to participate in the study.

d. Major Eligibility Criteria: Identify the criteria for inclusion and exclusion.

Participants will be adult learners in a public boating education class or USPS Instructors. These are self-selected attendees, but based on past demographics, we expect a pretty wide age range (18-60) with slightly more males than females, from a predominantly middle-class background.

e. Research Procedures involving participants: Summarize the study’s procedures by providing a step-by-step process of what participants will be asked to do, emphasizing the procedures that may cause risk. Include enough details to demonstrate that the research meets the requirement(s) for the exemption category (ies) chosen in Question 4 above.

The Playful Adult Learning Activity (PALA) is an activity in a standard course. Some courses offer the PALA and others (control groups) do not. Comparison of the two groups will help establish the efficaciousness of the PALA. Participants will be given consent forms and asked to volunteer for the study during a standard boating safety course. The data collection is organized in four steps (Each about ten minutes) controlled by the Investigator as follows:
ENROLLMENT: during the Boating Safety Course.

BASELINE CONTACT: DC1 is administered shortly after the class

FOLLOW-UP CONTACT: May 2009 - DC2 is administered 30-90 days after the class

FINAL CONTACT: July-Aug 2009 - DC3 is administered 90-180 days after the class

f. Risks and Discomforts: If applicable, describe any reasonably foreseeable risks and discomforts – physical, psychological, social, legal or other.

Since the participants are involved only in three telephone interviews, any potential discomfort is greatly minimized. Any participant who is uncomfortable may opt-out of the situation by asking the interviewer to call back at another time or by dropping out of the study. The interviewer will ask if the timing is appropriate before conducting the telephone interview.

g. Confidentiality & Privacy: Explain how the confidentiality of the data and the privacy of the participants will be maintained.

Except for the need to contact the participants, nothing in the study requires personal data. Therefore, every participant will be assigned a Random Identifier (RID) which is recorded on every document. After the telephone calls are done, the contact data is removed from the document and stored in a sealed envelope. After that, all data is identified by the RID number, and the interviewer is unlikely to be able to connect any document or response with a specific individual.

h. Investigator Qualifications & Specific Role in the Research: Describe the role of each individual (including the advisor, if applicable) listed on this form. Clearly state (1) the procedures or techniques he/she will be performing and (2) his/her level of experience in performing the procedures/techniques.

The Principal Investigator, Jim Spaulding, will call and interview each participant on three occasions. He is an instructor in higher education, and the USPS Boating Safety Course. He is also an experienced telephone interviewer. Dr. Patricia Cranton is Adult Education Program Advisor for Mr. Spaulding and has no role in the activity, nor the study, and will not be in contact with the USPS Instructors, students, participants, nor any of their data. She is an accomplished student advisor who has directed many graduate students such as Mr. Spaulding.

i. References: If applicable, provide any relevant literature references/citations.

none

17. Assurances
I agree to report to the Office for Research Protections (ORP), in a timely manner, information regarding (a) any injury to a human participant, (b) any unanticipated problems involving risks to participants or others, or (c) any new information involving risks to participants. All individuals listed on this form have completed the training requirements. I have adequately explained in this form the role of each individual and their experience in performing that role.

I understand that any changes that occur after the initial exempt determination is made, must be submitted to and reviewed by the ORP before implementation, except where necessary to eliminate apparent immediate hazards to participants. In the latter instance, the ORP must be notified by the next workday.

I affirm that as the principal investigator on this study, I will adhere to the policies and procedures described in Penn State’s Federal wide Assurance with the Office for Human Research Protections as well as Federal regulations for the protection of human participants involved in research (45CFR46; 21CFR parts 50 & 56). Copies of these documents are available in the ORP upon request or on their website – http://www.research.psu.edu/orp/.

This form is available electronically at http://www.research.psu.edu/orp/areas/humans/samples/index.asp.
Signature of Principal Investigator, REQUIRED Date

I hereby confirm that I have read this application and my signature denotes the completeness and accuracy of the information provided.

Dr. Patricia Cranton
PRINT Name of Faculty Advisor, REQUIRED IF PI IS A STUDENT

SIGNATURE of Faculty Advisor, REQUIRED IF PI IS A STUDENT Date

I hereby confirm that I have read this application and my signature denotes departmental/unit approval of this project. To the best of my knowledge, the information in the attached application relating to members of my department is correct.

The investigator(s) who are members of my department are qualified to perform the roles proposed for them in this application. Any novice researchers from my department will be supervised by qualified investigators.

PRINT Name of PI’s Department/Unit Head, REQUIRED

SIGNATURE of PI’s Department/Unit Head, REQUIRED Date
Title of Project: Playful Adult Learning Activity Evaluation - IRB# _____

Principal Investigator: Jim Spaulding – (610) 269-6802 - jts11@psu.edu
406 Lloyd Ave. Downingtown, Pa. 19335

Advisor: Dr. Patricia Cranton – (717)-948-6405 pac23@psu.edu
Capital College School for Behavioral Sciences and Education
W331-B Olmsted Bldg. Middletown, PA 17057

Director Individual Study Dr. Patricia Cranton – (717)-948-6405 pac23@psu.edu

- **Purpose of the Study:** The purpose of this research is to evaluate the effectiveness of teaching techniques used in a Public Boating Safety Course.

- **Procedures to be followed:** You are asked to volunteer for three short telephone calls which will take about ten minutes each, including a quick survey, a short quiz and a brief interview concerning the material covered in this course and your boating activities.

- **Duration:** The study will last approximately six months, during which the investigator will talk with you on three occasions; once in the next few weeks, again in May 2009 and in July 2009. You will indicate when and how it is most convenient for the contact which will take about ten minutes.

- **Right to Ask Questions:** Please contact J. Spaulding at (610) 269-6802 with questions, complaints or concerns about this research study.

- **Voluntary Participation:** Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer.

- **Statement of Confidentiality:** Your participation is confidential. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared. The telephone calls may be recorded for analysis by James Spaulding alone and retained by him in a vault until 2012.

You must be 18 years of age or older to take part in this research study.

Completion and return of the attached Enrollment Form implies your consent to participate in this research.

Please keep this form for your records.
Dear USPS Instructor,

Please read this script while handing out an implied consent form and enrollment survey form: Please give them time to read and fill it out, and then collect the enrollment forms in class before going onto the next activity. The students should keep the Implied Consent Form with the investigator information:

```
“Hello, I am ... MY NAME..., 

We talk a lot about Rules of the Road, Nav-Aids and Lights in this class. I hope you enjoy it and learn a lot; we worked hard to bring it to you, and it is important for you to use on the water. 

Now I would like to ask you to volunteer for a research study to help us understand how our training helps boaters to become more knowledgeable. The study is being conducted by a USPS instructor for his Doctorate at Penn State University, and the results will go to the United States Power Squadrons and other organizations. 

I passed around a form explaining what you should know about the research study. Please read the first page and if you choose to participate, you may fill out most of the second page, which implies that you have read the form and want to participate. If you choose to volunteer, there will be three contacts in the next five months, which should take about ten minutes for a few survey questions, a short quiz and a few open questions. You can select when to do the telephone call with an investigator and he will even send an e-mail reminder to you in advance, if you wish. 

This activity is voluntary, and I am happy to answer any questions you may have. Please read the consent form before filling out the contact and survey data, then keep the consent form and return the enrollment form.

Thank you!”
```

Please complete the DCI - Implied Consent And Enrollment Form: USPS Instructor, attach the student enrollment forms and forward the package to:

Jim Spaulding,
406 Lloyd Ave., Downingtown Pa. 19335
(610-269-6802)
DC0 - IMPLIED CONSENT AND ENROLLMENT FORM: ADULT LEARNER RID # 29132

Dear Volunteer Adult Learner,

Please read the attached Implied Consent form and confirm your agreement before filling in this form.

Adult Learner ___________________________________________ Nickname ______________________

If you volunteer, an investigator will call you on the telephone three times to collect data. Each time will take about ten minutes for a short quiz, survey and interview; the first will be in a few weeks, then again in May / June, and then one last time in July / August.

You may note a vacation period NOT to call you: ________________________________________.

Please select the most convenient day and time to call you...

Please circle preferred day(s) to call: Sun Mon Tue Wed Thu Fri Sat

Please circle preferred time(s) to call: Morning Noon Afternoon Evening Night

Preferred phone #? (_____) _____ - _______________ Alternate #? (_____) _____ - _______________

May we send you an e-mail at ____________________________ a few days before calling, to confirm the contact? (please PRINT your e-mail address.)

After data is collected, above contact data is removed and the study uses only RID# and non-personal data.

DEMOGRAPHIC DATA: (Please check box.)

I am a male [ ] female [ ] adult learner. My age is: <18 [not eligible] 18-45 [ ] >45 [ ]

My boat preference is: Powerboat [ ] Sailboat [ ] Human Powered Boat [ ]

My boating interest is Fishing [ ] Cruising [ ] Racing [ ] Leisure [ ]

My boating experience is: < 1 year [ ] 1-15 years [ ] > 15 years [ ]

My education includes: Vocational [ ] Professional [ ] College [ ] Graduate [ ]

Please do not fill in this section - Investigator use only.

RID# (Random ID No.) _______ Quiz Group (circle) QG1 QG2 QG3 QG4 QG5

Class Type: ___________________________ Class Date ____________________

Tracking: (RID# and Quiz Group must appear on all Data Collection forms)

DC1 after course Interviewer ________________ Date _____ Time ____ Comment _________

DC2 May / June Interviewer ________________ Date _____ Time ____ Comment _________

DC3 July / August Interviewer ________________ Date _____ Time ____ Comment _________

DC4 July / August Interviewer ________________ Date _____ Time ____ Comment _________

__________________________________
VITA

James Thomas Spaulding

Prior to his doctoral studies, Jim acquired his higher education as an adult student, beginning with his Bachelor of Science in Mathematics with minors in Physics and Chemistry from Villanova University. While working for a fortune 500 company, he completed the course work for a Masters in System Engineering focusing on software and hardware integration from Widener University. Between and during such formal education, he studied computer science, computer systems design, systems engineering and business management in the corporate environment, and attended many courses and seminars. Later he returned for a Masters in Education from Immaculata University, leading to his Doctoral studies in Education.

Jim has worked full-time in parallel with his educational endeavors applying computer systems to human needs. His range of interests often led to the pursuit of computer applications for education, but he is also recognized as an educator of adults in computer applications and project management. Jim worked with a number of prominent companies and organizations, but has been an independent business man for the last two decades. He has an impressive list of clients and successful projects as well as extensive software copyrights and publications.

His flexible working environment permits him to work as a corporate instructor and as an adjunct instructor for Penn State University in Great Valley where he teaches computer science and project management courses. He has over five-thousand hours of face-to-face teaching in the adult classroom, as well as on-line teaching. He has taught for Project Management Institute, Immaculata University, Delaware County Community College, Montgomery County Community College and Cabrini University. Jim is also a certified instructor for the United States Power Squadron and Squadron Education Officer for the Main Line Power and sail Squadron. He has also taught for corporate clients such as: Microsoft Corporation, Wyeth Laboratories, Smith-Kline Beecham, and many others.

Since beginning the adult education doctoral program, Jim has published in Perspectives, the New York Journal of Adult Education. He has presented at every PSU Harrisburg program, and at the AAACE (2007) in Norfolk, Virginia and AAACE (2009) in Cleveland, Ohio.