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By

Stephen Lem

May 2013

EFFECTIVENESS OF COMPUTER BASED SAFETY TRAINING
VERSUS FACE-TO-FACE SAFETY TRAINING
IN VETERINARY CLINICS

A Thesis Presented to the
Faculty of the College of Education
University of Houston

In Partial Fulfillment
of the Requirements for the Degree

Master of Education

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Approved by Dissertation Committee:

Dr. F. Richard Olenchak, Chairperson

Dr. H. Jerome Freiberg, Committee Member

Dr. Sara G. McNeil, Committee Member

Dr. Robert H. McPherson, Dean
College of Education

May 2013

Acknowledgement

I wish to dedicate this thesis to my wife, Kristina, for her unwavering support.

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Abstract

This study found no significant difference between short term learning of safety topics in veterinary clinic regardless of whether face-to-face (FTF) instruction or computer based training (CBT) were used. The significant differences in the data were the time required and the satisfaction of the participants. The CBT was significantly faster but was not well liked by most participants. The FTF was preferred but required more time to complete. CBT appears desirable from a long term financial standpoint due to its ease of presentation and lower time consumption, however it takes longer to produce and is more difficult to change. FTF appeared preferable for employee satisfaction or if frequent changes to the training are required, however a qualified instructor is required and the training takes longer to complete which will raise training costs over time.

Keywords: Computer based safety training, CBT, safety training

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CHAPTER 1

INTRODUCTION

Safety training is required for all veterinary personnel, however, there has been little research done on how to provide the best training for the lowest cost. The literature review addressed the importance of effective safety training, the effectiveness of computer based training and best teaching practices. There are a limited number of studies that relate to safety training in veterinary facilities therefore more information is needed, or must be extrapolated from other safety and teaching sources, in order to draw conclusions.

This study found no significant difference between short term learning of safety topics in veterinary clinic regardless of whether face-to-face (FTF) instruction or computer based training (CBT) were used. The significant differences shown by the data were the time required and the satisfaction of the participants. The CBT was significantly faster but was not well liked by most participants. The FTF was preferred but required more time to complete. CBT appears desirable from a long term financial standpoint due to its ease of presentation and lower time consumption, however it takes longer to produce and is more difficult to change. FTF appeared preferable for employee satisfaction or if frequent changes to the training are required, however a qualified instructor is required and the training takes longer to complete which will raise training costs over time.

The results of this study seem to justify multimodal learning but raise additional questions about the affective parts of instruction and long term learning of safety topics that are beyond the scope of this study. Future research should address those topics.

Statement of the Problem

There is a lack of peer reviewed research that deals with safety in veterinary clinics. Even fewer studies have addressed the effect the mode of safety training has on learning. Computer based training (CBT) appears to be a desirable alternative to face-to-face (FTF) training since most veterinary clinics cannot afford the lost time and expense of frequent FTF training. This study adds to the existing body of knowledge.

Purpose of the Study

This study used a convenience sample of 52 participants, ages 18-64, who were employed at veterinary clinics located in Harris County, Texas. Participants met specific inclusion criteria. The instructional materials and tests were made by the principal investigator while the survey instrument was adapted from the Person Centered Learning Assessment (PCLA) (Freiberg, 2001). Participants completed two modules of instruction; one in a FTF format and the other a CBT format. All instruments were scored and the data was collected by the principal investigator.

Research Questions

Primary Research Question. Is computer based safety training equally effective as face-to-face safety training in veterinary clinics?

Secondary Research Questions. Is the effectiveness of safety training, as perceived by the students, affected by the instructor (face-to-face) or mode of instruction (computer based)? Does the amount of student participation, as perceived by the students, affect safety training effectiveness? Is safety training effectiveness, as perceived by the students, affected by the teaching materials used? Does the length of instruction affect learning outcomes for safety training?

Limitations

This was an exploratory study that used a convenience sample of 52 individuals in Harris County, Texas. The fixed work groups, geographical limitations and small sample size limit the generalizability of this study. These limitations should be corrected in future studies by using a larger sample size of truly randomly selected participants from a larger geographical area.

Significance of the Problem

The significance of this study is the impact it can have on directing future research. If the results of this study can be replicated on a large scale, it will indicate that the benefits and constraints of each training method will need to be weighed when deciding which training method will be used for safety instruction. Employee satisfaction is primarily a concern for the affective learning domain and may have an impact on long term retention of safety training; however the lower costs and flexibility of CBT presentations make them desirable from a financial standpoint. Future research on this topic should address the longer term impact the mode of instruction and the quality of the instructor have on long term memory of safety training.

Summary

The value of CBT versus FTF is ultimately expressed in cost versus effect. The prior research is limited regarding computer based safety training effectiveness even though CBT provides employers with a cost effective alternative to frequent FTF presentations. Since both methods produced virtually equal average test scores the least expensive option seems to be the most desirable. However, since FTF was preferred

versus CBT the affective domain must be considered when deciding which method to use for safety instruction.

Definition of Terms

Effective – adequate to accomplish a purpose; producing the intended or expected result (Dictionary.com, 2012)

Instructor or instruction method effectiveness – Instructor or instruction method effectiveness will be demonstrated by an average score of 6 or higher on the survey (Freiberg, 2001) instrument for questions 1-3.

Materials effectiveness – Materials effectiveness will be demonstrated by an average score of 6 or higher on the survey (Freiberg, 2001) instrument for question 5.

Participate – to take or have a part or share, as with others; partake; share. (Dictionary.com, 2012)

Participation – Participation will be demonstrated by answering 70% or more of the blanks on a Q&A form.

Student effectiveness – Student effectiveness will be demonstrated by an average score of 6 or higher on the survey (Freiberg, 2001) instrument for question 4.

Short term recall – Short term recall will be demonstrated by a correct score of 80% or higher on a test instrument.

Study effectiveness – Study effectiveness of the training for this study will be demonstrated by student short term recall of information on two post instruction test instruments.

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CHAPTER 2

REVIEW OF THE LITERATURE

Safety training is required for all veterinary personnel, however, there has been little research done on how to provide the best training for the lowest cost. This literature review addresses the importance of effective safety training, training costs, CBT effectiveness and best teaching practices. Each of these components is covered in more detail below.

Safety Requirements

Definitions. According to the United States Department of Labor Bureau of Labor Statistics, there were 3,063,400 recordable non-fatal accidents and 4,690 fatalities at companies operating in the US during 2010 (U.S. Department of Labor, Bureau of Labor Statistics, 2011). Recordable accidents are defined as work related, a new case and “if it results in any of the following: death, days away from work, restricted work or transfer to another job, medical treatment beyond first aid, or loss of consciousness” (U.S. Department of Labor, Occupational Safety and Health Administration, 2001). The strict inclusion criterion means that many injuries or illnesses were considered too minor to meet the threshold and were excluded, so the actual injury rate is probably much higher.

Legal and Statistical Importance. The Occupational Safety and Health Act of 1970 created the Occupational Safety and Health Administration (OSHA). OSHA establishes and enforces health and safety standards for all companies that operate in the United States. The relevant law for veterinary clinics is located under Chapter 29, Part

1910 of the Labor Code (U.S. Department of Labor, Occupational Safety and Health Administration, 1970). “Since the passage of the OSH Act, the rate of reported serious workplace injuries and illnesses has declined from 11 per 100 workers in 1972” (U.S. Department of Labor, Occupational Safety and Health Administration, 2010) to 3.5 per 100 workers in 2010. (U.S. Department of Labor, Bureau of Labor Statistics, 2011). Health care and social assistance workers experienced 5.2 recordable injuries per 100 employees during the same period (U.S. Department of Labor, Bureau of Labor Statistics, 2011). The combination of legal requirements, punitive measures and employee training has significantly improved worker health and safety (U.S. Department of Labor, Occupational Safety and Health Administration, 2010). Training appears to be an integral part of employee safety.

Training Resources

There are only two OSHA registered safety training centers in Texas, both near Dallas, which conduct OSHA sanctioned safety training for all industries (U.S. Department of Labor, Occupational Safety and Health Administration, 2012). OSHA does provide online training resources but these are site specific, grant funded training that do not necessarily meet OSHA training or record keeping requirements (U.S. Department of Labor, Occupational Safety and Health Administration, 2010). Another possible training resource for veterinarians is the American Veterinary Medical Association (AVMA). The AVMA promotes many peer reviewed articles on veterinary medicine but devotes few articles to safety training, and none of these are peer reviewed or produced to ensure veterinarians comply with OSHA regulations (American Veterinary Medical Association, 2009). The lack of outside resources justified creating

the training materials, performing a pilot test and conducting this study to add information to this field.

Training Costs

Training cost has historically been another concern for veterinary clinics since most are small businesses with low profit margins (Anonymous, 2002; Salas & Cannon-Bowers, 2001). According to the Bureau of Labor Statistics, veterinarians had a mean income of \$82,040 per year in 2010 (U.S. Department of Labor, Bureau of Labor Statistics, 2010). Professional trainers had a mean income of \$89,170 in 2010 (U.S. Department of Labor, Bureau of Labor Statistics, 2010). Finally there has typically been high turnover at veterinary clinics which requires frequent training of new employees (Anonymous, 2002). Since hiring an outside trainer is expensive, the challenge for veterinary clinics is to provide adequate safety training to meet OSHA requirements at a reasonable cost.

Training Effectiveness

Multimedia Learning. Existing literature on safety training effectiveness in veterinary clinics between computer based training (CBT) and face-to-face (FTF) training models is virtually non-existent; however, there are articles related to safety training in both computer based and face-to-face formats. It appears that the more involved students are during the educational process the better they seem to learn and retain information (Burke, Sarpy, Smith-Crowe, & Chan-Serafin, 2006). Likewise, the best method of education seems to result from the Generative Theory of Multimedia Learning which uses audio, visual and text in the same presentation (Holman, 2000; Mayer, 2004; Wallen

& Mulloy, 2005). Unfortunately there seem to be diminishing returns when too much information is presented (Mayer, Heiser & Lonn, 2001; Schols, 2009).

Employee Motivation. Effective employee training has historically been predicated on management and employee commitment, of which management commitment appears to have been the most important factor (Hofmann & Morgeson, 2004; Zacharatos, Barling & Iverson, 2005; Zohar, 2003). Commitment to safety can be demonstrated when “leaders monitor and reward safe performance” (Hofmann & Morgeson, 2004) which typically results in fewer injuries to employees. Several studies have shown a strong correlation between fewer work place injuries and high perceived commitment to safety by management (Neal & Griffin, 2004; Van Buren & Werner, 1996; Zacharatos, Barling & Iverson, 2005). Management commitment can be shown by engineering controls, safety procedures, enforcement of safety rules, provision of safety equipment and training (Colligan & Cohen, 2004). Employee motivation to learn and apply safety procedures can be negatively impacted by poor job security (Probst, 2004). Coincidentally factors that improve workplace safety also positively impact employee morale such as high performance workplaces and employee empowerment in decision making (Zacharatos, Barling, & Iverson, 2005). The team aspect in safety training and application is often over looked even though the two are inseparable (Salas & Cannon-Bowers, 2001; Turner & Parker, 2004). The team factor should make small group interactive FTF training more valuable to employees than CBT since it is a group activity, and many safety decisions are reached as a result of group dynamics.

Miscellaneous Issues. Other issues that affect employee understanding and application of safety training include the personal capacity to learn (Yilmaz-Soylu &

Akkoyunlu, 2009) and previous exposure to safety training and practice (Baldwin & Ford, 1988; Salas & Cannon-Bowers, 2001). The former seems to hold true regardless of the type of training being conducted (Mayer, 2004). Students with a high aptitude appear to have less difficulty transferring knowledge from one task to another task (Baldwin & Ford, 1988; Wallen & Mulloy, 2005). Students who have received previous safety training likewise tend to outperform those without prior training (Neal & Griffin, 2004). Perhaps the most important element in safety application, however, is practice. The skills we practice tend to be easier to recall and apply to real life situations. This is why simulators are widely used in aviation; practice makes perfect (Holman, 2000; Salas & Cannon-Bowers, 2001). Personal learning capacity and previous training are difficult to account for in a safety training program, so training should assume low aptitude and no prior safety training. This is particularly true for younger workers (Loughlin & Frone, 2004). Practice should be included for engineering controls, best practices and personal protective equipment (PPE), however, the use of simulators is neither cost effective nor practical for veterinary clinics.

Skills Transfer. The final note on safety training is that it must transfer the correct skills to the employees. Care must be used with training games to insure safety skills are learned rather than game playing skills (Robotham, 2001). CBT should be as fun if possible but the main goal has to be to insure learning of the safety topics that are presented (Robotham, 2001). Just as too much information can hinder learning (Mayer, Heiser & Lonn, 2001; Schols, 2009) games can be distracting to the learning process (Robotham, 2001). CBT must be sufficiently user friendly to insure that any poor scores are reflective of student safety knowledge and not due to poor computer skills. Tutorials

may be required for the use of the CBT to minimize the risks to this study due to poor computer skills.

Summary

Safety training is required for all veterinary personnel due to the high injury rates of medical personnel. Safety training should be accomplished using the best available methods and at the lowest cost. Multimedia learning approaches achieve the former while computer based models can achieve the latter, however, retention is affected by participation so any so safety training must be designed to insure maximum participation.

CHAPTER 3

METHODS

Research Questions

Primary Research Question. Is computer based safety training equally effective as face-to-face safety training in veterinary clinics?

Secondary Research Questions. Is the effectiveness of safety training, as perceived by the students, affected by the instructor (face-to-face) or mode of instruction (computer based)? Does the amount of student participation, as perceived by the students, affect safety training effectiveness? Is safety training effectiveness, as perceived by the students, affected by the teaching materials used? Does the length of instruction affect learning outcomes for safety training?

Research Design

Study Population. There were 52 participants, all of whom were 18 to 64 years of age, drawn from veterinary clinics in Harris County, Texas. Participants were employed, full or part time, as a veterinarian, manager or other staff members of a veterinary clinic in Harris County, Texas. Doctors had a doctoral degree in veterinary medicine (DVM) and a current veterinary license issued by the State of Texas. Managers were supervisory personnel including office managers or senior technicians who were not licensed doctors. Staff comprised all other employees who are neither doctors nor supervisors such as receptionists, veterinary technicians, kennel staff and groomers. Participants were required to be able to read and write in English. Participants had to be able to see and hear. If corrective lenses or hearing aids were required by the participant,

the participant had to wear those devices during the training. All persons who did not meet the inclusion criteria were excluded from this study.

The inclusion criteria were designed to protect at risk groups from undue stress or harm. At risk groups include adolescents, the elderly and those with mental or physical impairment. The training that is mandated by OSHA is only required for employees so non-employees were excluded. Finally this was a limited exploratory study and at risk groups could have severely skewed the results.

The principal investigator obtained Institutional Review Board (IRB) approval for the instruction and instruments used for this study in order to protect the human subjects involved. See Appendix C for all documents and links to the power points and movies used in this study. All data will be kept in accordance with University of Houston policies by Dr. F. Richard Olenchak at the University of Houston.

Veterinary personnel were include in the study using a convenience sample and were recruited by the principal investigator using a two-step process. First the principal investigator obtained a list of contact names and phone numbers from Dr. Dan Ahrens at Veterans Memorial Animal Hospital. The principal investigator then contacted these clinics using the IRB approved phone script and asked for the OSHA compliance officer. After reading the phone script, the clinic compliance officer was asked to participate. Those who agreed to participate were given the inclusion and exclusion criteria by the principal investigator. A copy of the IRB approved consent form was sent by email or fax to the compliance officer for dissemination to the clinic owner or personnel manager. Participants for this study were selected by the owner or personnel manager of each clinic

based on the inclusion and exclusion criteria contained in the consent form. See Appendix C for the consent form.

Training Development. The instruction and instruments used in this training were developed by the principal investigator or adapted from an outside source. The instruction, question and answer (Q&A) forms and tests used in this study were developed by the principal investigator using relevant Occupational Health and Safety Administration (OSHA) law found in the Code of Federal Regulations Title 29, Part 1910 (U.S. Department of Labor, Occupational Safety and Health Administration, 1970) and from the over 20 years of personal industrial experience with safety topics of the principal investigator. The training sessions were further refined using legal suggestions from the American Veterinary Medical Association (AVMA) (American Veterinary Medical Association, 2008; American Veterinary Medical Association, 2011). The legal suggestions were incorporated in the presentations to augment the existing OSHA requirements and allow for affirmative legal defenses of the employers. The surveys used were adapted from the Person Centered Learning Assessment (PCLA) developed by Dr. H. Jerome Freiberg and was used with permission (Freiberg, 2001). The survey questions were simplified from the original PCLA by removing the explanations. The surveys were used to gauge the basic effectiveness of the teacher, the students and the materials.

The primary researcher developed and pilot tested the two training modules from June to August of 2012 at Veterans Memorial Animal Hospital (VMAH) in Houston, TX. There were a total of 14 participants who took each module. A brief verbal survey of the participants discovered that only one employee had received any safety training in the

previous year. The lack of prior safety training limited the usefulness of a pretest so a pretest was not employed. Two training sessions were used: Health, Safety and Environment (HSE) and Emergency Response (ER). Both training sessions were given face-to-face as a power point presentation, narrated by the principal investigator, and questions were asked during the presentations. Participants were allowed to take notes and use their notes to complete the tests following instruction. At the end of each presentation, participants were asked if they had any additional questions. All questions were answered by the principal investigator, and then the participants were given a test and survey to complete for that module.

The first test consisted of ten matching and ten true/false questions. The second test consisted of five matching, five multiple choice and ten true/false questions. The first module covered health, safety and environment (HSE) with the subtopics of environmental hazards, safety practices and personal protective equipment. The second module covered emergency response (ER) with the subtopics of facility evacuation, fire suppression and proper hazardous materials handling procedures. Copies of the original tests and surveys are included in Appendix B. The positive results of the pilot study justified doing this study with a larger sample size.

The completed power point presentations were converted into a movie format by the principal investigator using Windows Movie Maker software. The slides used in the movies were copied directly from the power point presentations. Text was added to each slide that included one or more questions that asked the participant to pause the video, write answers to the question or questions then resume the video. These revised slides were converted into pictures so they could be loaded into Movie Maker. The movie was

made using the revised slides. The principle investigator made recordings which following the outlines for the power points and added the audio to the movies. See Appendix C for links to the movies.

This study used a convenience sample due to the fixed work groups at veterinary clinics. Participants were divided into three categories; Doctor, manager and staff. Doctors were required to have a Doctoral Degree in Veterinary Medicine (DVM) and be licensed by the State of Texas to practice veterinary medicine. Managers were other supervisory personnel such as office managers and senior technicians. Staff members were considered all other employees who were neither doctors nor managers such as technicians, kennel personnel and receptionists. Each participant self-identified the employment category they belonged to (doctor, manager or staff). Participants were divided evenly into two groups, group A and group B, based on job functions by the principle investigator. Participants in group A were paired with participants from group B who had the same job function. The principle investigator assigned a folder with an identification (ID) letter/number code and the employment category on a sheet that matched group A with group B.

Each folder contained three packets with a matching ID code on each page that corresponded with the ID code on the folder. The first packet was the informed consent while the other two packets were for the instruction. The principle investigator answered all questions before the participants signed the consent forms. All participants were required to read and sign the consent form before instruction began. Any participant who did not wish to sign the consent form was allowed to participate in the training but no data was collected from those individuals. Data was also excluded for individuals who

did not complete at least 80% of both tests. The other two packets used were for data collection, one for each training module.

Both training groups were given a five minute tutorial on how to fill out the instruments before instruction began. The CBT group received an additional two minute instruction on how to use the video. The primary researcher answered any questions the students had before instruction began.

The training sessions used multimodal instruction to insure the greatest amount of learning and retention (Atrey, Hossain, El Saddiki, & Kankanhalli, 2010; Mayer & Moreno, 1998; Mayer & Moreno, 2002). Each session required no more than one and a half hours to complete, for a maximum time of three hours for both sessions. All answers were hand written. All Q&A forms, tests, and surveys were scored by the primary researcher and recorded off site to insure the privacy of the participants. No answer or multiple answers for a question were scored as incorrect.

Intervention

The intervention consisted of two modules; HSE and ER. HSE covered the topics of health, safety and environment and include training on environmental hazards, safety practices and personal protective equipment (PPE). ER covered the topic of emergency response and included training on evacuation, fire suppression and hazardous materials (HAZMAT). Each participant was given both modules; one face-to-face (FTF) training module and one computer based training (CBT) module. Group A received the HSE training face-to-face while group B completed the ER training on computers. Once both groups had completed the first training session the groups switched places for the ER training. Group A received the ER training on computers while group B received the ER

training face-to-face. The participants were encouraged to take notes and answer questions on the Q&A form for each session and were allowed to use their notes while taking their tests as this has been shown to improve learning (Stefanou, Hoffman, & Vielee, 2008). Notes taken during instruction were not collected by the researcher. Start and stop times were recorded by the participants or by the principle investigator when each module was returned at the end of a training session. The participants recorded start and stop times for the CBT sessions while the principal investigator recorded times for the FTF sessions. The principal investigator verified the start and stop times were recorded on each instructional packet.

Each participant received an optional demographics form that was coded with the Group letter and participant number. The demographics form was returned to the researcher and kept in a locked file according to University of Houston policies. Demographics information was collected to assure the fidelity of the research and may be used in an ex-post facto analysis of the data. Only the primary researcher has access to the demographic information.

The principal investigator performed all of the FTF presentations during a contiguous ten day period at the clinics that agreed to participate between 11:00 am and 3:00 pm. The principal investigator wore the same blue two piece suit, a white dress shirt and a striped green and blue tie for all of the FTF presentations. The principal investigator loaded the movies onto computers at each clinic and tested the movies to insure proper functionality. Ear phones were provided and used by the CBT participants. A brief tutorial was done by the principal investigator to demonstrate how to use the

movies, including adjusting the volume, pausing the video and resuming the video. Any questions about the CBT were answered before instruction began.

Statistical Analysis

Data was collected using a question and answer (Q&A) form, a test and a survey for each module. The Q&A form was identical to the questions asked on the presentation slides and had one or more blank spaces for the participants to enter answers to the questions. The Q&A form was used to measure student involvement (Moreno & Mayer, 2000; Seel & Schenk, 2003). Each answer on the Q&A form was given a value of 1. Each blank was given a value of 0. The overall score for each participant was recorded. A score of 70% or better was considered acceptable participation.

The tests were used to measure the effectiveness of the instruction. A score equal to or greater than 80% was considered a passing grade. Each test consisted of 20 questions that were matching, multiple choice and/or true/false. Questions were derived using Bloom's Cognitive Domain levels of Knowledge, Comprehension and Application. Each question received a score of 1 for correct answers and a 0 for incorrect answers. The test questions were analyzed for difficulty and discrimination. Each student score was recorded by the primary researcher.

The survey was used to measure the effectiveness of the instructor or CBT, the students and the materials. It was based on the Person Centered Learning Assessment (PCLA) (Freiberg, 2001). There were five questions that used a seven point scale ranging from 1 to 7 with 1 being the lowest and 7 being the highest. Each value was recorded. All unanswered survey questions were excluded when calculating the results.

The independent variable (X) was the mode of instruction; Face-to-face (FTF) or computer based training (CBT). The dependent variables (Y) were the test, survey, Q&A instruments and the time required; HSE test (Y_1), HSE survey (Y_2), HSE Q&A form (Y_3), HSE time required (Y_4), ER test (Y_5), ER survey (Y_6), ER Q&A form (Y_7) and ER time required (Y_8). The scores from the FTF version of Y_1 were compared with the CBT version of Y_1 . The scores from the FTF version of Y_5 were compared with the CBT version of Y_5 . Other data (Y_2 , Y_3 , Y_4 , Y_6 , Y_7 & Y_8) were correlated with the test scores to improve the reliability and validity of this study.

The analysis was done using standard deviation, t-tests and correlations. The test scores for each module were distributed to find standard deviation scores. A t-test was run between Group A (GA) and Group B (GB) for both training modules; HSE and ER. Correlations were performed to reveal relationships between the participants, the mode of instruction, participation and time required. Correlations were done for each of the following data sets: GA to GB for HSE, GA to GB for ER, tests to surveys, tests to Q&A forms and tests to time required.

The effectiveness of each instrument was demonstrated by a percentage of responses filled in, correct or a specific score. Short term recall was demonstrated by a correct score of 80% or higher on a test instrument. Participation was demonstrated by answering 70% or more of the blanks on a Q&A form. Instructor or instruction method effectiveness was demonstrated by a score of 6 or higher on the PCLA survey instrument for questions 1-3. Student effectiveness was demonstrated by a score of 6 or higher on the PCLA survey instrument for question 4. Materials effectiveness was demonstrated by a score of 6 or higher on the PCLA survey instrument for question 5.

Limitations

This was a pseudo random, exploratory study, which had several limitations that could be corrected with a larger sample size using a purely random selection method. These issues included a relatively small sample size, the recruitment method, and no formal assessment of prior knowledge, varied facility layouts and variations in the FTF presentations.

The convenience sample was compensated for by having each group take opposite forms of instruction so a total of 102 data points were collected. Even so there is the possibility anytime a sample is taken that it is not representative and therefore not generalizable to the overall population. The veterinary clinics were also limited to Harris County, Texas so the study may not be applicable outside that part of the United States. A larger, more demographically diverse sample would correct this deficiency.

The challenge presented by the recruitment method was one of identity. Personal recruitment of participants would have been easier if the study had been conducted by a veterinary school or a veterinarian. Since this was not the case introductions were required from an established veterinarian; Dr. Dan Ahrens. Dr. Ahrens provided names and contact information for local veterinarians to the principle investigator. Dr. Ahrens also provided an introduction to the OSHA compliance officer so the principle investigator was not cold calling potential participants. The introductions greatly simplified access to participating clinics but reduced the randomness of the selection. This issue could be corrected in future studies by conducting the study from an established veterinary school.

The veterinarians who agreed to participate had fixed work groups so participant selection was not completely random. Employees who did not meet the selection criteria were excluded as were those who were not employees which may have had an impact on the study results. Again a larger, more diverse and randomly selected sample will improve the validity of any future study.

The instruction was given without the benefit of a pretest. A pretest was avoided since very few participants indicated they had safety training in the preceding 12 months and so that practice effects would not interfere with the study, however, that also means that participants with prior knowledge could have skewed the results. For this small study the risk was considered acceptable however a pretest should be incorporated into future studies and the results between the pre and post tests should be compared to verify the intervention had the desired effect.

The final major aspect of variability was the facility layout and changes in the FTF presentations which could have impacted learning. As a result an attempt was made to have all participants take the training sessions on the same day at the University of Houston however there was very little interest. The training sessions and lunch were offered free of charge but out of over 300 veterinarians contacted by email only eleven persons signed up and of those only two actually attended the training. Out of necessity further training sessions were offered at the clinics themselves. The instruction followed the same basic script however there may have been small differences in the FTF presentations due to questions asked by the participants.

The increased risk of variability from the presenter was considered acceptable since the greater numbers of data points were expected to reduce the impact of variability

between presentations. Furthermore it was anticipated that if the survey results were close for the first three survey questions the variability of the presenter was minimal. This was borne out by the survey results and participant comments. Any future attempt to collect data in a controlled setting will likely fail unless some financial inducement is included to offset the costs to the veterinarians.

The main limitations of this study were the small sample size and attitudes of the learners. The risks to the study were controlled by strict adherence to protocols outlined in the methods section. This was an exploratory study so a smaller sample size should have been acceptable but it must be remembered that it was only an exploratory study. Further research with a larger sample size will be needed to verify or refute the findings of this study.

Summary

The research questions were quantitatively measured using a test, Q&A form, PCLA survey. The instruction, test and Q&A form were developed by the primary researcher while the PCLA was developed by Dr. H. Jerome Freiberg and was used by the primary researcher with permission. Additional qualitative data was collected on the PCLA survey. The main limits of this study were the use of a small convenience sample size which limits the generalizability of the study.

CHAPTER 4

RESULTS

This study included 52 participants drawn from six different veterinary clinics in Harris County, TX. See Appendix A for the raw data. The null hypothesis was $H_0=0$ and the alternate hypothesis was $H_a \neq 0$. There was no significant difference between the scores on the tests regardless of the instruction method used.

Standard Data

The FTF scores were as follows. The completion of the Q&A forms had a mean of 79% with a standard deviation (SD) 19%, a median of 85% and a mode of 100%. The tests had a mean of 88.2 with a SD of 9.2, a median of 90 and a mode of 90. The FTF modules required 56.2 minutes to complete with a SD of 10.5 minutes, a median of 58.0 minutes and a mode of 59.0 minutes. The mean survey score was 31.7 with a SD of 3.7, a median of 33.0 and a mode of 35.0.

The CBT scores were as follows. The completion of the Q&A forms had a mean of 86% with a standard deviation (SD) 14%, a median of 91% and a mode of 100%. The tests had a mean of 86.1 with a SD of 9.5, a median of 90 and a mode of 90. The CBT modules required an average of 44.0 minutes to complete with a SD of 18.0 minutes, a median of 39.0 minutes and a mode of 30.0 minutes. The mean survey score was 25.3 with a SD of 8.5, a median of 28.0 and a mode of 35.0. See Table 4.1 below.

Table 4.1

<i>Standard Data</i>									
	FTF					CBT			
Measure	Q&A %	Test	Min.	Survey		Q&A %	Test	Min.	Survey
Mean	79%	88.2	56.2	31.7		86%	86.1	44.0	25.3
SD	19%	9.2	10.5	3.7		14%	9.5	18.0	8.5
Median	85%	90	58	33		91%	90	39	28
Mode	100%	90	59	35		100%	90	30	35

T-Tests

A two tail t-test, with $p=0.05$, was used to determine if there was a significant difference between the instruction methods. The critical value was just over 1.98 or -1.98. The t-value for the instruction methods was 1.06, well within the range to retain the null hypothesis. The t-test suggests there is insufficient difference between the test scores to reject the null therefore the null will be retained. See Table 4.2 below.

Table 4.2

<i>All FTF test scores versus all CBT test scores</i>		
t-Test: Two-Sample Assuming Equal Variances	FTF	CBT
Mean	88.2	86.1
Variance	84.3	89.5
Observations	52	52
Pooled Variance	86.9	
Hypothesized Mean Difference	0	
Df	102	
t Stat	1.16	Retain
t Critical two-tail	1.98	Null

A two tail t-test with $p=0.05$ was used to determine if there was a significant difference between the Q&A participation between FTF and CBT. The critical value was just over 1.98 or -1.98. The t-value for the Q&A participation was -2.10, so the null

hypothesis was rejected. The t-test suggests there is a sufficient difference between the Q&A participation scores to reject the null hypothesis. See table 4.3 below.

Table 4.3

<i>All FTF Q&A versus all CBT Q&A</i>		
t-Test: Two-Sample Assuming Equal Variances	<i>FTF</i>	<i>CBT</i>
Mean	0.79	0.86
Variance	0.04	0.02
Observations	51	51
Pooled Variance	0.03	
Hypothesized Mean Difference	0	
Df	100	
t Stat	-2.10	Reject
t Critical two-tail	1.98	Null

A two tail t-test with $p=0.05$ was used to determine if there was a significant difference between the time required between FTF and CBT. The critical value was just over 1.98 or -1.98. The t-value for the required was 4.25, so the null hypothesis was rejected. The t-test suggests there is sufficient difference between the time required between the FTF and CBT scores to reject the null hypothesis. See Table 4.4 below.

Table 4.4

<i>All FTF time versus all CBT time</i>		
t-Test: Two-Sample Assuming Equal Variances	<i>FTF</i>	<i>CBT</i>
Mean	56.1	43.7
Variance	112.7	324.7
Observations	51	51
Pooled Variance	218.7	
Hypothesized Mean Difference	0	
Df	100	
t Stat	4.25	Reject
t Critical two-tail	1.98	Null

A two tail t-test with $p=0.05$ was used to determine if there was a significant difference between the surveys between FTF and CBT. The critical value was just over 1.99 or -1.99. The t-value for the surveys was 4.61, so the null hypothesis was rejected. The t-test suggests there is a sufficient difference between the survey scores to reject the null hypothesis. See Table 4.5 below.

Table 4.5

<i>All FTF Survey to all CBT survey</i>		
t-Test: Two-Sample Assuming Equal Variances	FTF	CBT
Mean	31.7	25.4
Variance	13.9	72.9
Observations	47	49
Pooled Variance	44.0	
Hypothesized Mean Difference	0	
Df	94	
t Stat	4.61	Reject
t Critical two-tail	1.99	Null

Correlations

Correlations were done for all the FTF data versus the CBT data using the Q&A forms, time to complete and surveys versus the test scores. All correlations were rounded to two decimal places. Correlations were given the following levels of impact. A correlation at or below 0.3 was not considered significant. A correlation from 0.31 to 0.5 was considered mild. A correlation from 0.51 to 0.75 was considered moderate and a correlation of 0.76 and above was considered high. The only appreciable result was the minimal impact of 0.42 between the Q&A form and test for the CBT participants. None of the other correlations were at ± 0.3 or better. This result suggests that the Q&A form

was of minimal assistance to those who took the CBT. See Table 4.6 for the correlation values.

Table 4.6

<i>Correlations for all FTF and all CBT</i>			
FTF Correlations		CBT Correlations	
Q&A - Test	0.19	Q&A - Test	0.42
Time - Test	-0.02	Time - Test	-0.04
Survey-Test	0.15	Survey-Test	-0.28

Scores were also broken down by each group that was presented to arrive at the means and standard deviations of the presentation groups. The average FTF scores were 83% with a standard deviation (SD) 10% for the completion of the Q&A form, 89.5 with a SD of 3.4 for the tests, required 57.5 minutes with a SD of 11.7 minutes to complete and had an average survey score of 32.5 with a SD of 1.0. The average scores for the CBT were 87% with a SD of 5% for completion of the Q&A form, 86.5 with a SD of 3.1 for the tests, 50.3 minutes with a SD of 17.4 minutes to complete and a survey score of 25.7 with a SD of 4.0.

A two tail t-test with $p=0.05$ was used to determine if there was a significant difference between the two instruction methods based on the presentation group values. The critical value was 2.12 or -2.12. The t-value for the instruction methods was 1.95, still within the range to retain the null hypothesis. The t-test suggests there is insufficient difference between the test scores for the work groups to reject the null therefore the null will be retained.

Correlations were done for each presentation group based on which presentation they received. The correlations for the presentation groups were moderate for the Q&A

versus the test at 0.59 for the FTF and mild for the CBT at 0.38. The remaining scores ranged from -0.16 to 0.07 and were not considered significant. See Appendix A for the raw data.

Survey Data

The participants seemed to dislike the CBT HSE presentation with average instructor/computer scores of 5.63 by comparison with the average live instructor scores for the FTF HSE presentations of 6.73 on a 7 point scale. The data was even more skewed for the second presentation. The CBT ER was an average of 4.7 while the live instructor was rated at a 6.8 for the same presentation. The FTF presentations received almost equal scores at 6.7 and 6.8. See Figure 4.7 below.

Figure 4.7

Survey Data												
Module		HSE					ER					
Group	Mode	Instructor			Student	Material	Mode	Instructor			Student	Material
A	FTF	6.6	6.8	6.8	6.8	6.4	CBT	4.5	4.8	4.8	5.8	4.8
B	CBT	5.5	5.4	6	6.2	5.7	FTF	6.6	6.9	6.9	6.9	6.8

CHAPTER 5

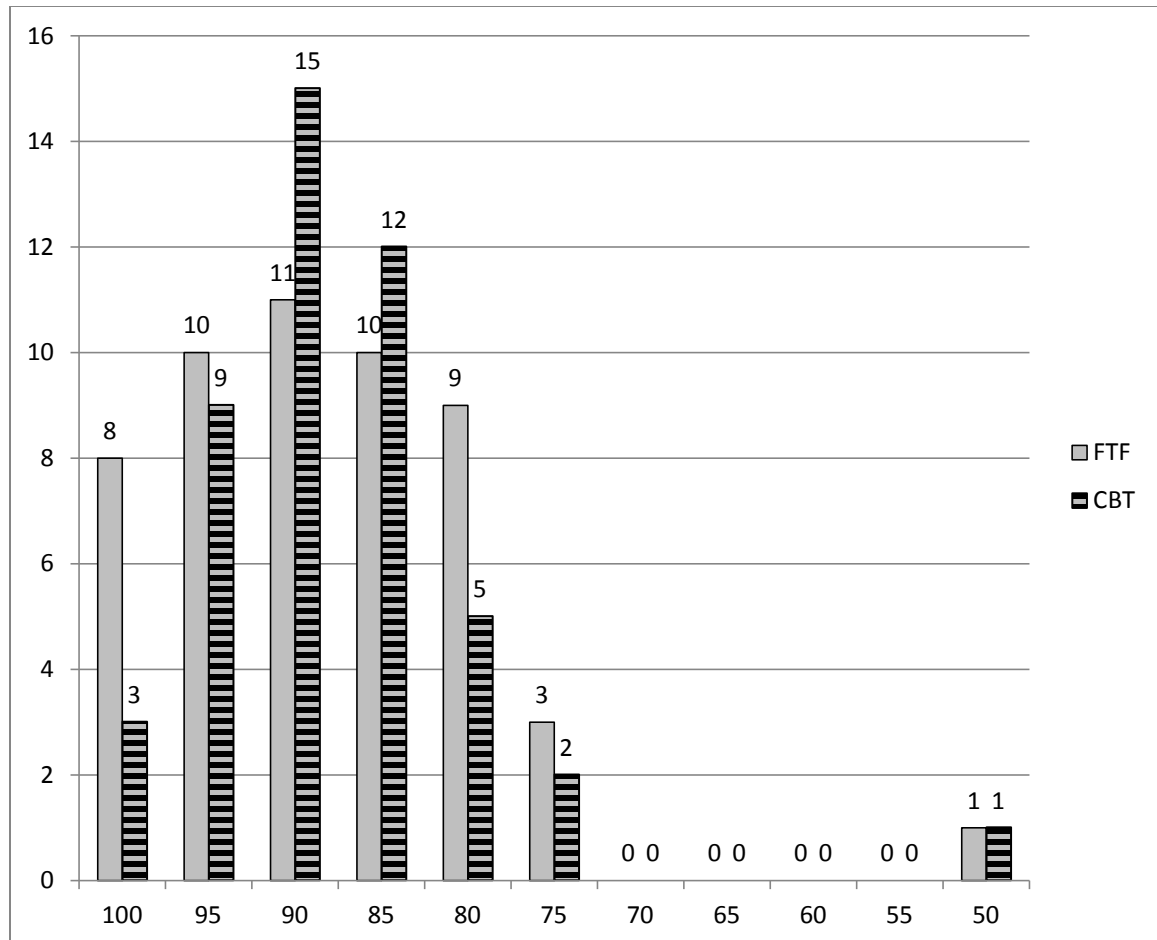
DISCUSSION AND CONCLUSION

This study found no significant difference between short term learning of safety topics in veterinary clinic regardless of whether face-to-face (FTF) instruction or computer based training (CBT) was used. The results from the t-tests revealed no significant difference between instruction methods on short term student recall. This could be anticipated from the narrow difference between the means. For all participants the test scores only varied an average of 1.9% and between participant groups it was only an average of 3%. For doctors the results were even lower at an average of 0.6%. There was a significant difference on t-tests run for the Q&A forms, time required and survey results between the FTF modules and the CBT modules. See Tables 4.3, 4.4 and 4.5 for those results.

Test Score Distribution

The test scores were negatively skewed for both modes of instruction. The test results for the FTF when placed in a histogram showed a flatter curve when compared to the CBT data. This resulted from a more even distribution of scores for the FTF than the CBT scores. The FTF scores were nearly evenly distributed from 80 to 100 whereas the CBT scores were predominately from 85 to 95. The medians and modes for both instruction methods were identical at 90. The distribution of FTF test scores was flatter, with more high scores while the distribution of CBT test scores had a sharper peak which is why the test score means were so close. See Figure 5.1 below.

Figure 5.1

CBT versus FTF Scores Histogram**Correlations**

The data was correlated using all of the Q&A forms, time required and surveys to the tests. When using all of the data the Q&A form for the CBT had a mild positive correlation with the test at 0.42. The other correlations ranged between -0.28 to 0.19 and did not meet the threshold for significance. Very little can be implied from the correlations except that it appears those participants who completed more of the CBT Q&A forms did slightly better on their tests than those who did not answer as many

questions on the Q&A forms. The Q&A forms were designed to mimic the participation that is normally experienced in FTF instruction during question and answer sessions. The participants in the FTF sessions were asked the questions verbally so the Q&A form might have been redundant for those sessions. Since there was no interaction with the instructor during the CBT sessions the Q&A form might have acted as interaction even though it was self-directed. Further study of this point is warranted.

The data was also correlated by presentation group and resulted in a moderate correlation between the Q&A forms and the tests. There was a moderate correlation for the FTF sessions at 0.59. There was a mild correlation for the CBT at 0.38 which was almost identical to that for all participants. The higher FTF Q&A to test correlation is based on the group means and may therefore be more accurate than the overall individual scores. The higher correlation may be a result of better note taking during the FTF sessions, coupled with the ability to ask questions and speak with fellow participants during the presentations.

The test scores by job function made the doctors group stand out above the manager and staff groups by almost 10 points. I attribute this difference to the higher level of education required to become a doctor. The manager and staff groups were virtually identical with a range of scores of 84.2 to 87.5 with a mean of 85.9 for the managers and a range of 84.7 to 86.7 with a mean of 85.7 for the staff. In post hoc discussions with veterinary staff members and owners I learned that many veterinary clinic managers were staff members who were promoted to management status based on seniority without additional education or training so in reality there is no significant difference between the manager and staff groups as evidenced by the similar test scores.

For future studies it may be necessary to divide staff using the same labels but with more stringent criteria for management personnel such as a Bachelor's degree in business administration (BSBA) or some other college degree.

Survey Results

The final data for review was the PCLA surveys. The participants seemed to dislike the CBT HSE presentation with average instructor/computer scores of 5.63 by comparison with the average live instructor scores for the FTF HSE presentations of 6.73 on a 7 point scale. The data was even more skewed for the second presentation. The CBT ER was an average of 4.7 while the live instructor was rated at a 6.8 for the same presentation. The FTF presentations received almost equal scores at 6.7 and 6.8. It is interesting that the participant's opinion of the CBT was a full point lower after they had the first training session face-to-face than the group who started with CBT. These results suggest that most participants preferred the face-to-face sessions however the results were more pronounced when participants could compare the two training methods. The survey results were borne out by the anecdotal evidence from the written comments on the survey forms. For example one participant wrote "Personal interaction was better than computer! Good job!" Another participant wrote "This was better than the computer." Several participants gave verbal feedback after both presentations which coincided with the written comments. The surveys suggest that even though test scores are not significantly affected, employee perceptions favor face-to-face interaction. See Table 4.7 above for comparative results.

Summary

This study indicated there was no significant difference between short term learning of safety topics, in veterinary clinics, regardless of whether FTF instruction or CBT were used. From a purely business standpoint, CBT appears preferable to FTF due to the lower time requirements and the flexibility it affords business owners. The main challenges to CBT are it is difficult to change, it has high initial production costs and, according to this study, results in lower employee satisfaction. Lower employee satisfaction may affect retention of the safety concepts learned, negating the advantages accrued from speed and flexibility. Any future study of this topic should include a longitudinal component to insure CBT actually offers the same level of retention as FTF instruction.

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APPENDIX A: RAW DATA

APPENDIX A: RAW DATA

<i>Group A Raw Data</i>										
	FTF					CBT				
Position	Q&A #	Q&A %	Test	Min.	Survey	Q&A #	Q&A %	Test	Min.	Survey
D	47	87%	100	62	34	42	98%	90	61	20
S	49	91%	95	62	35	34	79%	85	67	33
M	38	70%	90	61	30	40	93%	95	45	11
S	39	72%	90	74	30	35	81%	80	43	17
S	30	56%	80	51	33	36	84%	95	15	23
M	35	65%	90	52	33	34	79%	85	28	11
S	48	89%	80	51	33	43	100%	95	30	28
S	31	57%	90	53	35	39	91%	95	27	35
S	42	78%	100	59	30	39	91%	90	30	26
D	48	89%	95	64	29	43	100%	100	30	22
D	36	67%	80	69	35	39	91%	90	30	35
S	42	78%	75	56	32	23	53%	85	32	34
M	37	69%	80	63	35	24	56%	50	25	35
S	52	96%	85	54	35	43	100%	70	41	35
M	51	94%	85	59	35	43	100%	95	30	12
M	54	100%	85	61	32	43	100%	90	30	8
S	25	46%	75	64		29	67%	85	42	
S	29	54%	85	60	32	26	60%	70	28	32
D	50	93%	100	59	31	42	98%	100	30	9
S	52	96%	90	61	33	43	100%	85	40	13
D	13	24%	100	59	33	41	95%	90	38	31
M	39	72%	80	38	16	43	100%	85	58	23
S	36	67%	95	58	33	31	72%	95	20	20
S	22	41%	85	77	31	30	70%	90	37	28
S	36	67%	50	64	29	27	63%	70	38	30
S	41	76%	85	50	23	43	100%	85	58	30

APPENDIX A: RAW DATA

<i>Group B Raw Data</i>										
	FTF					CBT				
Position	Q&A #	Q&A %	Test	Min.	Survey	Q&A #	Q&A %	Test	Min.	Survey
D	23	53%	100	45		37	69%	95	45	22
S	43	100%	85	45	33	49	91%	80	28	28
M	9	21%	85	43		44	81%	80	45	10
S	40	93%	80	46		44	81%	85	60	20
S	31	72%	95	83	35	43	80%	90	87	
M	41	95%	80	85	32	52	96%	90	85	31
S	40	93%	95	58	35	54	100%	90	45	32
S	39	91%	95	59	35	53	98%	85	46	31
S	43	100%	95	59	30	54	100%	80	66	26
D	38	88%	95	58	35	51	94%	90	57	32
D	37	86%	90	46	24	48	89%	100	48	22
S	39	91%	85	45	34	54	100%	85	30	32
M	32	74%	90	45	33	37	69%	80	60	22
S	28	65%	80	52	32	43	80%	90	36	27
M	36	84%	90	45	30	52	96%	75	38	23
M	41	95%	100	47	30	51	94%	95	38	28
S	41	95%	80	46	28	43	80%	75	63	20
S	36	84%	85	50	33	38	70%	95	20	28
S	43	100%	100	60	35	54	100%	85	30	35
S	43	100%	90	61	35	48	89%	85	80	35
M	43	100%	95	50	30	54	100%	90	62	4
S	43	100%	90	70	26	45	83%	90	57	26
S	43	100%	95	30	29	53	98%	90	35	33
S	27	63%	75	48	35	24	44%	70	20	35
S	33	77%	100	56	34	46	85%	90	79	34
S	38	88%	90	50	32	48	89%	70	75	28

APPENDIX B: PILOT TEST DOCUMENTS

APPENDIX B: PILOT TEST DOCUMENTS

Original HSE Test

HSE Test Name _____ Date _____

Write the correct letter in the blanks provided.

- | | | |
|----------------------|-------|-----------------|
| 1. Housekeeping | _____ | E - Environment |
| 2. Gloves | _____ | P - Practices |
| 3. Lighting | _____ | PPE - PPE |
| 4. Communication | _____ | |
| 5. Safety glasses | _____ | |
| 6. Lifting | _____ | |
| 7. Wearing PPE | _____ | |
| 8. Masks | _____ | |
| 9. Evacuation routes | _____ | |
| 10. Sanitation | _____ | |

Circle the appropriate response

- | | |
|--|-------|
| 11. Oxygen cylinders must be chained to the wall or attached to a machine? | T / F |
| 12. Hearing damage begins at 100 decibels? | T / F |
| 13. Radiation exposure heals with time? | T / F |
| 14. PPE is designed to protect employees beyond other defenses? | T / F |
| 15. Shoe covers should only be worn for Parvo cases? | T / F |
| 16. Isoflurane is a highly toxic poison? | T / F |
| 17. Verbal communication of hazards is always sufficient? | T / F |
| 18. Employees do not need dosimeter badges when performing radiographs? | T / F |
| 19. Clients should muzzle their own animals when necessary? | T / F |
| 20. Surgical lasers can cause blindness and release pathogens? | T / F |

The test key is titled "HSE Test Key" and is located in Appendix C.

Original HSE Survey

HSE Survey

1. The Educator makes effective use of questioning techniques to check individual's progress and understanding of materials.
 - The educator asks questions in a variety of higher to lower level formats, which are related to the material covered during the presentation.

Not at all Applicable	Some			All the time			Not
1	2	3	4	5	6	7	NA

2. The Educator acts as a resource person, facilitator, guide and assistant in student learning.

- The educator is prepared for the class and demonstrates a strong knowledge of the material during instruction and when questions are asked by students.
- The educator usually answers students in a concise but complete manner.

Not at all Applicable	Some			All the time			Not
1	2	3	4	5	6	7	NA

3. The Educator demonstrates confidence in his ability to work with students.

- The educator appears calm and confident during the presentation and question sessions.
- The educator answers truthfully even when they do not know the answer.

Not at all Applicable	Some			All the time			Not
1	2	3	4	5	6	7	NA

4. The student is an active learner.

- The student actively listens and participates, by asking and answering questions, in class.
- The Student performs all hand-on tasks required in class.

Not at all Applicable	Some			All the time			Not
1	2	3	4	5	6	7	NA

5. The learner treats the teacher and other students with dignity and respect.

- The student actively listens to others, responds appropriately and does not interrupt the speaker.

Not at all Applicable	Some			All the time			Not
1	2	3	4	5	6	7	NA

6. The materials are directed toward various ways of learning, i.e. auditory, visual, tactile and kinesthetic.
 - Learning materials are presented in various mediums that span the four learning types.

Not at all Applicable		Some			All the time		Not
1	2	3	4	5	6	7	NA

Original Emergency Response Test

Emergency Response Test Name _____ Date _____

Match the question on the left to the letter code on the right.

- | | | |
|---------------------------------------|-------|------------------|
| 1. The primary person in charge (PIC) | _____ | D - Doctor |
| 2. The secondary PIC | _____ | M - Manager |
| 3. Checks bathrooms | _____ | R - Receptionist |
| 4. Buddies up with a Tech | _____ | T - Technician |
| 5. Buddies with Kennel person | _____ | |

Circle the best answer.

6. If a buddy is not available you should
 - a. Form a 3 person group
 - b. Leave the building
 - c. Perform evacuation tasks alone
7. If a fire is larger than 2 square feet the first thing you should do is
 - a. Leave the building
 - b. Try to put it out
 - c. Warn others
8. During an evacuation clients should be asked to
 - a. Assist in removing animals
 - b. Leave the building
 - c. Stay where they are
9. For an electrical fire you should use a fire extinguisher with a rating of
 - a. A
 - b. B
 - c. C
10. A hazardous material must be labeled, stored, used and _____ properly.
 - a. Applied

- b. Disposed of
- c. Packaged
- 11. An MSDS hazard rating of 4 is less hazardous than a rating of 3?
T / F
- 12. You should follow the cleaning practices of a senior tech over the MSDS?
T / F
- 13. The receptionists must check the exam rooms during an evacuation?
T / F
- 14. You should follow the first aid guidelines in the MSDS
T / F
- 15. Process containers only need the chemical name
T / F
- 16. Pills are safe to handle with your bare hands?
T / F
- 17. Hazardous materials may be in liquid, gas or solid forms
T / F
- 18. The EPA is primarily concerned with the health of employees
T / F
- 19. An ABC fire extinguisher should work on most small fires found in a vet clinic
T / F
- 20. You should follow EPA guidelines instead of the MSDS for first aid
T / F

The ER test key is titled “ER Test Key” and is located in Appendix C.

Original Emergency Response Survey

Emergency Response Survey

- 7. The Educator makes effective use of questioning techniques to check individual’s progress and understanding of materials.
 - The educator asks questions in a variety of higher to lower level formats, which are related to the material covered during the presentation.

Not at all Applicable	Some			All the time			Not
1	2	3	4	5	6	7	NA

- 8. The Educator acts as a resource person, facilitator, guide and assistant in student learning.

- The educator is prepared for the class and demonstrates a strong knowledge of the material during instruction and when questions are asked by students.
- The educator usually answers students in a concise but complete manner.

Not at all Applicable			Some			All the time		Not
1	2	3	4	5	6	7		NA

9. The Educator demonstrates confidence in his ability to work with students.
- The educator appears calm and confident during the presentation and question sessions.
 - The educator answers truthfully even when they do not know the answer.

Not at all Applicable			Some			All the time		Not
1	2	3	4	5	6	7		NA

10. The student is an active learner.
- The student actively listens and participates, by asking and answering questions, in class.
 - The Student performs all hand-on tasks required in class.

Not at all Applicable			Some			All the time		Not
1	2	3	4	5	6	7		NA

11. The learner treats the teacher and other students with dignity and respect.
- The student actively listens to others, responds appropriately and does not interrupt the speaker.

Not at all Applicable			Some			All the time		Not
1	2	3	4	5	6	7		NA

12. The materials are directed toward various ways of learning, i.e. auditory, visual, tactile and kinesthetic.
- Learning materials are presented in various mediums that span the four learning types.

Not at all Applicable			Some			All the time		Not
1	2	3	4	5	6	7		NA

APPENDIX C: EXPERIEMNTAL DOCUMENTS AND LINKS

APPENDIX C: EXPERIMENTAL DOCUMENTS AND LINKS**Phone Script**

When speaking to Receptionist:

“Hi, my name is Stephen Lem. I need to speak to (insert name of safety compliance officer) about safety training. Thank you.”

When speaking to safety compliance officer:

“Hi (insert name of safety compliance officer), my name is Stephen Lem. I am a graduate student at the University of Houston working toward a Master’s degree in education. Dr. Dan Ahrens at Veterans Memorial Animal Clinic suggested I contact you about participation in a study that compares the effectiveness of face-to-face safety training versus computer based safety training in veterinary clinics. I am collecting data for my Master’s thesis and would like to present two safety training sessions of approximately 3 hours duration in your clinic. The training is free of charge but will need to be conducted using certain criteria. Are you interested in participating?”

If the safety compliance officer answers “no” to the above question reply “Thank you for your time. If you change your mind please contact me at 281-300-4920 or slemme262@yahoo.com. Have great day.”

If the safety officer answers “yes” then give the safety compliance officer the inclusion and exclusion criteria.

“There is inclusion and exclusion criteria that must be met so please listen carefully. Inclusion criteria: Participants must be between the ages of 18 and 64. Participants must be employed, full or part time, as a veterinarian, manager or line

employee of a veterinary clinic in Harris County, Texas. Doctors will have a doctoral degree in veterinary medicine (DVM) and have a current veterinary license issued by the State of Texas. Managers will be supervisory personnel including office managers or senior technicians who are not licensed doctors. Line personnel will be all other employees who are neither doctors nor supervisors such as receptionists, veterinary technicians, kennel staff and groomers. Participants must be able to read and write in English. Participants must be able to see and hear. If corrective lenses or hearing aids are used by the participant these devices must be used during the training.”

“Exclusion criteria: Participants will be excluded from the study if they are 17 years of age or younger or 65 years of age or older. Non-employees, such as volunteers or persons working on an internship, will not be allowed to participate. Persons with a documented learning disability will be excluded. Learning disabilities include dyslexia and those who are legally deaf or blind with correction. It also includes those who are mentally impaired.”

Proceed with the following questions. For each “yes” answer ask the next question. If there is a “no” answer reply “Thank you for your time. Due to the strict inclusion criteria I will be unable to use your clinic in this study however if something changes and you are able to meet the inclusion criteria please contact me at 281-300-4920 or slemme262@yahoo.com and we will make appropriate arrangements to include your clinic. Have great day.”

“Please answer yes or no to the following questions:”

“Is your clinic located in Harris County, TX?”

“Are the participants between the ages of 18-64?”

“Are the participants employed full or part time?”

“Are the participants able to see and hear, with correction?”

“Can the participants read and write English?”

“Will your owner or personnel manager exclude participants from the study who do not meet the inclusion criteria or who meet the exclusion criteria?”

“Is your facility properly lit and climate controlled?”

“Is there a suitable place in your clinic to conduct a face-to-face training session with half of your employees at one time?”

“Are there sufficient computers with the addition of 2 laptops to conduct computer based training for half of your employees?”

Will we be able to conduct all of the training in a 3 hour window on a single day between 10:30am and 3:30pm?

If all questions are answered “yes” ask “Do you have any questions for me?”

Set up time and date. “Please contact me at 281-300-4920 or slemme262@yahoo.com if you have any additional questions. Thank you for participating.”

Consent Form

UNIVERSITY OF HOUSTON CONSENT TO PARTICIPATE IN RESEARCH

CONFIDENTIAL RESEARCH

PROJECT TITLE: Effectiveness of computer based safety training versus face-to-face safety training in veterinary clinics.

You are being invited to participate in a research project conducted by Stephen Lem a graduate student from the Curriculum and Instruction Department at the University of Houston. This project is required in partial fulfillment of the requirements for the Degree

of Master of Education, specifically the Master's thesis. This research is being conducted under the supervision of Dr. F. Richard Olenchak.

NON-PARTICIPATION STATEMENT

Your participation is voluntary and you may refuse to participate or withdraw at any time, without penalty or loss of benefits to which you are otherwise entitled. You may also refuse to answer any question.

PURPOSE OF THE STUDY

Despite the value of workplace safety there is a lack of peer reviewed research that deals with safety in veterinary clinics. Even fewer studies have addressed the effect the mode of safety training has on learning. Computer based training (CBT) appears to be a desirable alternative to face-to-face (FTF) training since most veterinary clinics cannot afford the lost time and expense of frequent FTF training. The participants should benefit though better legal compliance, lower training costs and less human suffering due to work place illness and injury. The study will require approximately three hours of training and documentation time per participant.

PROCEDURES

A total of 60 subjects will be asked to participate in this project.

Participants must be between the ages of 18 and 64. Participants must be employed, full or part time, as a veterinarian, manager or other staff member of a veterinary clinic in Harris County, Texas. Doctors will have a doctoral degree in veterinary medicine (DVM) and have a current veterinary license issued by the State of Texas. Managers will be supervisory personnel including office managers or senior technicians who are not licensed doctors. Line personnel will be all other employees who are neither doctors nor supervisors such as receptionists, veterinary technicians, kennel staff and groomers. Participants must be able to read and write in English. Participants must be able to see and hear. If corrective lenses or hearing aids are used by the participant these devices must be used during the training. All persons who do not meet the inclusion criteria will be excluded from this study.

The training sessions will be conducted at veterinary clinics in Harris County, Texas. Computer based training will be loaded and conducted on a laptop that will be provided or on a clinic computer at the preference of the clinic owner. The training areas will vary and depend on the layout of the specific building in which the training session occurs. All buildings will be temperature controlled and properly lit. Classroom layout will also vary depending on space available.

Each participant will receive a training acknowledgement form, a test, a survey and a question and answer (Q & A) form for both modules. Each document will be coded by

the researcher. Each participant will receive an optional demographics form that will be coded by the researcher.

There will be two training sessions of about 90 minutes per session with a total time commitment of three hours. One training session will be a face-to-face module consisting of a power point presentation and lecture. The other training session will be computer based in the form of a movie. During the presentations participants will be asked to write answers in the question and answer (Q&A) form for that module of instruction. The questions match those asked in the power point presentation and movie. Participants in the face-to-face sessions may be asked to share their written answers with the researcher and others in their group and to elaborate on the answers they give. Face-to-face participants may be asked to lift their chairs if the chair weighs less than 5 pounds. Participants with physical disabilities or previous back injuries that hinder their completion of physical task will be excused from the physical component. All participants will be asked to take a test and complete a short survey at the end of each module of instruction. Participants may take notes and use those notes during the test. Upon completion of the module each participant will fill out a training acknowledgment form that will be returned to the clinic owner or personnel manager.

CONFIDENTIALITY

Every effort will be made to maintain the confidentiality of your participation in this project. Each subject's name will be paired with a code number by the principal investigator. This code number will appear on all written materials. The list pairing the subject's name to the assigned code number will be kept separate from all research materials and will be available only to the principal investigator. Confidentiality will be maintained within legal limits. Any link between the data and the original documents will be kept in a locked file for three years and stored according to U of H policies. All written data will be destroyed after the retention period.

RISKS/DISCOMFORTS

Risks to the participants are considered minimal according to the criteria used by the Code of Federal Regulations. Minimal risk is defined in the Common Rule to be "that the probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests." (45 CFR 46.102(i))" The participants will be asked to perform mild physical and mental activities. The physical activities may include standing or lifting objects that weigh less than 5 pounds. Participants with physical disabilities that hinder their completion of physical tasks will be excused from the physical component. The participants will answer questions in writing on the Q&A form, survey and test. Participants will be asked questions during the FTF presentations identical to the questions asked on the Q&A form.

BENEFITS

This study will compare the effectiveness of face-to-face training versus computer based OSHA mandated training. There are no benefits to the participants.”

ALTERNATIVES

Participation in this project is voluntary and the only alternative to this project is non-participation.

PUBLICATION STATEMENT

The results of this study may be published in professional and/or scientific journals. It may also be used for educational purposes or for professional presentations. However, no individual subject will be identified.

SUBJECT RIGHTS

1. I understand that informed consent is required of all persons participating in this project.
2. All procedures have been explained to me and all my questions have been answered to _____ my _____ satisfaction.
3. Any risks and/or discomforts have been explained to me.
4. Any benefits have been explained to me.
5. I understand that, if I have any questions, I may contact Stephen Lem at 281-300-4920. I may also contact Dr. F. Richard Olenchak, faculty sponsor, at 713-743-4984.
6. I have been told that I may refuse to participate or to stop my participation in this project at any time before or during the project. I may also refuse to answer any question.
7. ANY QUESTIONS REGARDING MY RIGHTS AS A RESEARCH SUBJECT MAY BE ADDRESSED TO THE UNIVERSITY OF HOUSTON COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS (713-743-9204). ALL RESEARCH PROJECTS THAT ARE CARRIED OUT BY INVESTIGATORS AT THE UNIVERSITY OF HOUSTON ARE GOVERNED BY REQUIREMENTS OF THE UNIVERSITY AND THE FEDERAL GOVERNMENT.
8. All information that is obtained in connection with this project and that can be identified with me will remain confidential as far as possible within legal limits.

Information gained from this study that can be identified with me may be released to no one other than the principal investigator Dr. F. Richard Olenchak. The results may be published in scientific journals, professional publications, or educational presentations without identifying me by name.

I HAVE READ (OR HAVE HAD READ TO ME) THE CONTENTS OF THIS CONSENT FORM AND HAVE BEEN ENCOURAGED TO ASK QUESTIONS. I HAVE RECEIVED ANSWERS TO MY QUESTIONS. I GIVE MY CONSENT TO PARTICIPATE IN THIS STUDY. I HAVE RECEIVED (OR WILL RECEIVE) A COPY OF THIS FORM FOR MY RECORDS AND FUTURE REFERENCE.

Study Subject (print name): _____

Signature of Study Subject: _____

Date: _____

I HAVE READ THIS FORM TO THE SUBJECT AND/OR THE SUBJECT HAS READ THIS FORM. AN EXPLANATION OF THE RESEARCH WAS GIVEN AND QUESTIONS FROM THE SUBJECT WERE SOLICITED AND ANSWERED TO THE SUBJECT'S SATISFACTION. IN MY JUDGMENT, THE SUBJECT HAS DEMONSTRATED COMPREHENSION OF THE INFORMATION.

Principal Investigator (print name and title): _____

Signature of Principal Investigator: _____

Date: _____

HSE Test

HSE Test Code Number _____ Time Complete _____

Write the correct letter in the blanks provided.

- | | | |
|------------------|-------|-----------------|
| 1. Housekeeping | _____ | E - Environment |
| 2. Gloves | _____ | P - Practices |
| 3. Lighting | _____ | PPE - PPE |
| 4. Communication | _____ | |

5. Safety glasses _____
6. Lifting _____
7. Wearing PPE _____
8. Masks _____
9. Evacuation routes _____
10. Sanitation _____

Circle the appropriate response

11. Oxygen cylinders must be chained to the wall or attached to a machine? T / F
12. Hearing damage begins at 100 decibels? T / F
13. Radiation exposure heals with time? T / F
14. PPE is designed to protect employees beyond other defenses? T / F
15. Shoe covers should only be worn for Parvo cases? T / F
16. Isoflurane is a highly toxic poison? T / F
17. Verbal communication of hazards is always sufficient? T / F
18. Employees do not need dosimeter badges when performing radiographs? T / F
19. Clients should muzzle their own animals when necessary? T / F
20. Surgical lasers can cause blindness and release pathogens? T / F

HSE Test Key

HSE Test Key

Write the correct letter in the blanks provided.

- | | | |
|----------------------|-------|-----------------|
| 1. Housekeeping | __P__ | E - Environment |
| 2. Gloves | _PPE_ | P - Practices |
| 3. Lighting | __E__ | PPE - PPE |
| 4. Communication | __P__ | |
| 5. Safety glasses | _PPE_ | |
| 6. Lifting | __P__ | |
| 7. Wearing PPE | __P__ | |
| 8. Masks | _PPE_ | |
| 9. Evacuation routes | __E__ | |
| 10. Sanitation | __P__ | |

Circle the appropriate response

- | | |
|--|---|
| 11. Oxygen cylinders must be chained to the wall or attached to a machine? | <input type="checkbox"/> T / <input type="checkbox"/> F |
| 12. Hearing damage begins at 100 decibels? | <input type="checkbox"/> T / <input type="checkbox"/> F |
| 13. Radiation exposure heals with time? | <input type="checkbox"/> T / <input type="checkbox"/> F |
| 14. PPE is designed to protect employees beyond other measures? | <input type="checkbox"/> T / <input type="checkbox"/> F |
| 15. Shoe covers should only be worn for Parvo cases? | <input type="checkbox"/> T / <input type="checkbox"/> F |
| 16. Isoflurane is a highly toxic poison? | <input type="checkbox"/> T / <input type="checkbox"/> F |
| 17. Verbal communication of hazards is always sufficient? | <input type="checkbox"/> T / <input type="checkbox"/> F |
| 18. Employees do not need dosimeter badges when performing radiographs? | <input type="checkbox"/> T / <input type="checkbox"/> F |
| 19. Clients should muzzle their own animals when necessary? | <input type="checkbox"/> T / <input type="checkbox"/> F |
| 20. Surgical lasers can cause blindness and release pathogens? | <input type="checkbox"/> T / <input type="checkbox"/> F |

HSE Survey

HSE Survey

Code Number _____

Circle the appropriate response (1-7) and add any notes you feel would help clarify your answer.

1. The Educator/Movie makes effective use of questioning techniques to check individual's progress and understanding of materials.

Never				50%			Always
1	2	3	4	5	6	7	

Comments _____

2. The Educator/Movie acts as a resource person, facilitator, guide and assistant in student learning.

Never				50%			Always
1	2	3	4	5	6	7	

Comments _____

3. The Educator/Movie demonstrates confidence in his/its ability to work with students.

Never			50%		Always
-------	--	--	-----	--	--------

1 2 3 4 5 6 7

Comments_____

4. The Student is an active learner.

Never			50%			Always
1	2	3	4	5	6	7

Comments_____

5. The Materials are directed toward various styles of learning, i.e. auditory, visual, tactile and kinesthetic.

Never			50%			Always
1	2	3	4	5	6	7

Comments_____

HSE Q&A

HSE Q&A Code Number_____

Write down answers to the following questions: (Slide 4)

How does employee safety benefit the employee?

1.

2.

How does employee safety benefit the employer?

1.

2.

How does employee safety benefit society?

1.

2.

Write down any additional environmental hazards that exist at your clinic? (Slide 6)

1.

2.

3.

Write down other housekeeping issues you encounter in your clinic and what can be done to correct those issues? (Slide 12)

1.

2.

3.

Write down reasons employees should take periodic breaks? (Slide 16)

1.

2.

3.

Write down the answers to the following questions: (Slide 18)

Why should people under the age of 18 avoid radiation exposure?

1.

2.

Why should you keep clients out of radiation areas?

1.

2.

Write down other safety practices you feel should be included in this training? (Slide 22)

1.

2.

3.

Write down ways you could politely inform another employee that they needed to put on:

(Slide 24)

Safety glasses

- 1.
- 2.

Gloves

- 1.
- 2.

Write down appropriate responses to the above examples (Slide 24)

Safety glasses

- 1.
- 2.

Gloves

- 1.
- 2.

Write down examples of PPE you use at work? (Slide 27)

- 1.
- 2.
- 3.

Answer the following questions? (Slide 31)

Who must wear PPE? -

Are there any exceptions? -

What do these eyes have in common? (Slide 32)

- 1.
- 2.

Write down at least 3 things gloves protect you from? (Slide 39)

- 1.
- 2.
- 3.

Write answers to the following questions: (Slide 44)

What do closed toed shoes protect you from?

- 1.
- 2.

Why should shoe covers be removed immediately after leaving a Parvovirus contaminated room or isolation ward?

- 1.
- 2.

Write answers to the following questions: (Slide 56)

What are the effects of radiation poisoning?

- 1.
- 2.

What are the effects of radiation exposure?

- 1.
- 2.

Who may instruct you NOT to wear radiation protection? -

How long does the damage from radiation remain? -

Write answers to the following questions: (Slide 58)

Why do you need to wear your own dosimeter badge?

- 1.
- 2.

Why do radiation PPE need to be stored correctly?

- 1.
- 2.

ER Test

ER Test Code Number _____ Time Complete _____

Match the question on the left to the letter code on the right.

- | | |
|---|------------------|
| 1. The primary person in charge (PIC) _____ | D - Doctor |
| 2. The secondary PIC _____ | M - Manager |
| 3. Checks bathrooms _____ | R - Receptionist |
| 4. Buddies up with a Tech _____ | T - Technician |
| 5. Buddies with Kennel person _____ | |

Circle the best answer.

6. If a buddy is not available you should
 - d. Form a 3 person group
 - e. Leave the building
 - f. Perform evacuation tasks alone
7. If a fire is larger than 2 square feet the first thing you should do is
 - a. Leave the building
 - b. Try to put it out
 - c. Warn others
8. During an evacuation clients should be asked to
 - a. Assist in removing animals
 - b. Leave the building
 - c. Stay where they are
9. For an electrical fire you should use a fire extinguisher with a rating of _____.
 - a. A

- b. B
 - c. C
10. A hazardous material must be labeled, stored, used and _____ properly.
 - a. Applied
 - b. Disposed of
 - c. Packaged
 11. An MSDS hazard rating of 4 is less hazardous than a rating of 3.
T / F
 12. You should follow the cleaning practices of a senior tech over the MSDS.
T / F
 13. The receptionists must check the exam rooms during an evacuation.
T / F
 14. You should follow the first aid guidelines in the MSDS.
T / F
 15. Process containers only need the chemical name.
T / F
 16. Pills are safe to handle with your bare hands.
T / F
 17. Hazardous materials may be in liquid, gas or solid forms.
T / F
 18. The EPA is primarily concerned with the health of employees.
T / F
 19. An ABC fire extinguisher should work on most small fires found in a vet clinic.
T / F
 20. You should follow EPA guidelines instead of the MSDS for chemical spills.
T / F

ER Test Key

ER Test Key

Match the question on the left to the letter code on the right.

- | | | |
|---------------------------------------|---------|------------------|
| 1. The primary person in charge (PIC) | ___M___ | D - Doctor |
| 2. The secondary PIC | ___D___ | M - Manager |
| 3. Checks bathrooms | ___R___ | R - Receptionist |
| 4. Buddies up with a Tech | ___T___ | T - Technician |
| 5. Buddies with Kennel person | ___T___ | |

Circle the best answer.

6. If a buddy is not available you should
 - g. Form a 3 person group
 - h. Leave the building
 - i. Perform evacuation tasks alone
7. If a fire is larger than 2 square feet the first thing you should do is
 - a. Leave the building
 - b. Try to put it out
 - c. Warn others
8. During an evacuation clients should be asked to
 - a. Assist in removing animals
 - b. Leave the building
 - c. Stay where they are
9. For an electrical fire you should use a fire extinguisher with a rating of
 - a. A
 - b. B
 - c. C
10. A hazardous material must be labeled, stored, used and _____ properly.
 - a. Applied
 - b. Disposed of
 - c. Packaged
11. An MSDS hazard rating of 4 is less hazardous than a rating of 3.
T / F
12. You should follow the cleaning practices of a senior tech over the MSDS.
T / F
13. The receptionists must check the exam rooms during an evacuation.
T / F
14. You should follow the first aid guidelines in the MSDS.
T / F
15. Process containers only need the chemical name.
T / F
16. Pills are safe to handle with your bare hands.
T / F
17. Hazardous materials may be in liquid, gas or solid forms.
T / F
18. The EPA is primarily concerned with the health of employees.
T / F
19. An ABC fire extinguisher should work on most small fires found in a vet clinic.
T / F
20. You should follow EPA guidelines instead of the MSDS for first aid.
T / F

ER Survey

ER Survey

Code Number_____

Circle the appropriate response (1-7) and add any notes you feel would help clarify your answer.

1. The Educator/Movie makes effective use of questioning techniques to check individual's progress and understanding of materials.

Never				50%			Always
1	2	3	4	5	6	7	

Comments_____

2. The Educator/Movie acts as a resource person, facilitator, guide and assistant in student learning.

Never				50%			Always
1	2	3	4	5	6	7	

Comments_____

3. The Educator/Movie demonstrates confidence in his/its ability to work with students.

Never				50%			Always
1	2	3	4	5	6	7	

Comments_____

4. The Student is an active learner.

Never				50%			Always
1	2	3	4	5	6	7	

Comments_____

5. The Materials are directed toward various styles of learning, i.e. auditory, visual, tactile and kinesthetic.

Never			50%			Always
1	2	3	4	5	6	7

Comments _____

ER Q&A

ER Q&A Form Code Number _____

Write answers to the following questions: (Slide 6)

What is a PIC? -

Who will decide to evacuate if the manager is not present?

- 1.
- 2.

Write answers to the following questions: (Slide 8)

Why should staff members use the buddy system during an emergency?

- 1.
- 2.

Who will you pair up with?

- 1.
- 2.

Write answers to the following question (Slide 12)

Why might it be necessary to use the Alternate Assembly Area?

- 1.
- 2.

Write answers to the following questions: (Slide 14)

During a full evacuation why should everyone meet in front of the building?

- 1.
- 2.

Name some reasons it may not be possible to evacuate all the animals?

- 1.
- 2.

Write answers to the following questions: (Slide 18)

Why do the receptionists need to check the exam rooms?

- 1.
- 2.

Why should clients be directed out of the building for a partial evacuation?

- 1.
- 2.

Write answers to the following questions: (Slide 21)

When should you leave animals behind?

- 1.
- 2.

What is the minimum number of employees who will remove animals during an emergency? -

Why must you meet in the assembly area?

- 1.
- 2.

Write answers to the following questions: (Slide 24)

What else should you do before emergency services arrive?

- 1.
- 2.

Why do you need to stay until the emergency is over?

- 1.
- 2.

What should you do when the emergency is over?

- 1.
- 2.

Write answers to the following questions: (Slide 27)

Why should you only use a fully charged fire extinguisher?

- 1.
- 2.

What should you do if the fire does not go out?

- 1.
- 2.

Write answers to the following questions: (Slide 32)

Name hazardous materials you use in this clinic.

- 1.
- 2.
- 3.

Why do hazardous materials need to be properly labeled?

- 1.
- 2.
- 3.

What is the least dangerous rating on an MSDS label? -

Write answers to the following questions: (Slide 35)

Why should you avoid touching medication with your bare hands?

- 1.
- 2.

What happens when you mix an acid and a base?

- 1.
- 2.

Links to power points and movies**HSE Power Point**

http://viking.coe.uh.edu/~slem/Teaching%20Materials/HSE%20Training/HSE_Powerpoint.pptx

HSE Movie

<http://viking.coe.uh.edu/~slem/Teaching%20Materials/HSE%20Training/Veterinary%20HSE.wmv>

ER Power Point

http://viking.coe.uh.edu/~slem/Teaching%20Materials/Emergency%20Response/ER_Powerpoint.pptx

ER Movie

http://viking.coe.uh.edu/~slem/Teaching%20Materials/Emergency%20Response/ER_Movie.wmv