2015

Anxiety and Focus in Work-Related Training

Steven Howard Harlan
Walden University

Walden University

COLLEGE OF EDUCATION

This is to certify that the doctoral study by

Steven Harlan

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Jennifer McLean, Committee Chairperson, Education Faculty
Dr. Thomas Hadley, Committee Member, Education Faculty
Dr. Mary Batiuk, University Reviewer, Education Faculty

Chief Academic Officer

Eric Riedel, Ph.D.

Walden University
2015

Abstract

Anxiety and Focus in Work-Related Training

by

Steven Harlan

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Walden University

October 2015

Abstract

Currently, nonemployee students who take General Electric's (GE's) pollution control classes do not demonstrate consistent knowledge gains following training. The purpose of this project was to investigate whether the independent variables of level of education and choice in attending the class made a significant difference in the means of the dependent variables of anxiety and ability to focus. The project was influenced by the theory of andragogy, which explores the motivations and principles specific to the teaching of adults. The research questions for this study probed relationships between level of formal education among participants and their choice in whether to attend or not and potential anxiety towards training and their ability to focus on training. Data were collected from 756 adults who took a voluntary self-designed survey while registering for this class. A quantitative approach that included *t* tests and ANOVA tests revealed significant differences when comparing the adult behaviors of anxiety and ability to focus with the variables of choice in attendance of training and level of completed formal education. The results were used to inform a train-the-trainer program with the goal of mitigating discrepancies in knowledge transfer. As the impacts of pollution are understood, it is critical that those who are responsible for controlling pollution have the best training. Organizations that issue professional certifications need to be assured that those completing continuing education units deserve the awarded credits. Thus, any improvement to the consistency of knowledge transferred for GE's pollution control classes will support social change by enhancing the ability of students of the class to protect the earth's communities and climate and fulfill education obligations.

Anxiety and Focus in Work-Related Training Experiences

by

Steven Harlan

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Walden University

October 2015

Table of Contents

List of Tables

List of Figures

Section 1: The Problem

Introduction

Industry and manufacturing are important parts of U.S. society and the economy. The manufacturing sector employs 11.5 million people in work as diverse as airplane fabrication to cement manufacturing (Moore, 2011). These industries are populated with different levels of job responsibilities, from the executives who manage the strategic operations to those who physically execute the associated tasks. For some who are in these jobs, it is the culmination of a desire to be a part of industry, but to others, the dirty and sometimes dangerous jobs are not what they had envisioned doing for a living.

In the industrial space, there are engineers who pursued professional degrees to gain that employment as well as mechanics with no college education. Some workers may have struggled to complete high school. Because not all of the employees have had similar experiences with past education, they might also have different views on the trainings required at their industrial workplace, which means some will struggle while others flourish (Burns, Schaefer, & Hayden, 2005).

With this array of jobs, it is not surprising to find diverse training needs throughout the industrial spectrum. Corporations may sell training opportunities that develop and enrich employees and also host education that fulfills the dictates of mandatory employee training, such as on safety. Although participants may attend out of compulsion or self-directed desire to obtain enrichment, all participants should gain the same knowledge from the same fixed curriculum, regardless of their reasons for attending.

However, the demographics of the learning attendees, and thus the diversity of the students in the training class, might create different results. For example, environmental protection measures require effort from individuals at all levels throughout an industrial location. Engineers must be knowledgeable about airflow and systems design, environmental officers must understand the current and pending laws, and maintenance mechanics must be able to efficiently change filters and troubleshoot issues. Trainings designed for those dealing with environmental protection must help to avoid or mitigate environmental tragedies such as the Gulf of Mexico oil spill, the response to the Fukushima nuclear power plant disaster, the Massey Energy coal mining disaster, and the poisoning of the Yangtze River by a poorly maintained cargo vessel. Again, some students of these classes might attend to gain knowledge and possible job opportunities while others attend under compulsion to fulfill a requirement.

A particular set of environmental protection trainings, which was the focus of this study, deals with topics regarding protection of the environment today and what can be done to protect it in the future. This training is delivered to nonGeneral Electric (GE) employees by 25 GE trainers and takes place approximately 100 times a year at a GE office, a third party facility, or the customer's facility. This two day training is also divided into 11 sections, and each is given 15–20 times a year, virtually. GE sells this training to its customers who may not otherwise have access to the expertise or resources to manage it on their own. As GE is recognized as a corporation that is at the forefront of environmental protection technology and products, tens of thousands of GE's customers attend annually. All customers must register online and are presented with details of the

event, demographic survey questions, and terms and conditions of registration. Industrial customers of GE who attend these specific trainings are dealing with minimizing environmental impact through the engineering, products, and processes that control pollution at sites such as coal burning power plants, smelting plants, and oil rigs.

GE environmental protection experts instruct on filtration, ventilation, and the physics of pollution to an array of industrial customers as diverse as the process of industrial environmental protection itself. The attendees of GE's trainings are not GE employees but rather GE's customers. There is evidence that not all students leave the classroom able to act upon the information in an equal way. In addition, the trainers give and receive disparate feedback that indicates there are varying levels of training abilities, stress, and methods for transferring knowledge.

Some customers attend GE's environmental protection trainings to gain insights into solutions that could be implemented today to meet the regulatory demands of the future. These customers are often looking to become more valuable to their employers through knowledge enrichment and attend purely by choice. Other students may be looking to gain certifications or memberships to professional organizations and are seeking development courses. Some, such as plant engineers and project managers, may attend to fulfill continuing education unit (CEU) requirements that allow for the continuation of professional development certifications.

Other customers attend GE training as a mandate from their company to improve their knowledge and skills regarding environmental protection. Additionally, government regulations require some employees from industrial settings to attend trainings, such as

GE's, to understand environmental protection standards. For example, management may attend from cement plants that are now required to reduce the release of poisonous mercury into the atmosphere, or from sewer treatment facilities that must return cleaner wastewater to the oceans and back into city systems. Another example of compulsory attendance results from tightening budgets and deteriorating economics that might mean some manufacturing leadership will mandate employees dealing with sourcing raw materials or maintaining equipment take courses to learn how to reduce the industrial plant's costs and improve efficiency. This set of students, who attend under a mandate, may have different reactions to the training, which could also be further affected by demographic factors.

The trainers who must execute the classroom elements of GE's environmental protection class are empowered to augment or change their delivery and delivery mechanisms but lack quantitative analysis that may guide them in determining the most effective ways to do so. The classroom participants register beforehand, giving ample amounts of information that was analyzed in this study for a better, more effective classroom experience. In particular, demographic variables were compared with students' levels of education and rationale for attending in the hopes that this analysis might provide insights into why the training does not have consistent success outcomes. If such analysis suggests that certain traits, specifically formal education levels and if they are voluntarily taking the class, will likely affect the students' anxiety and ability to focus on the class, then the course might be redesigned or the trainers might be given new tools to

mitigate negative issues and augment positive ones, enabling the execution of a more consistently impactful program.

After a GE environmental protection session in 2009, a student and a manager contacted me separately. The first student participated under compulsion and had come to the class anxious about formal learning, distracted, and unsure about engaging. However, the trainers were able to work with this student, who became impassioned by what he had learned and was able to apply the learning to leverage a slightly better work shift. To this student, the increased time he was able to be spend with family was a priceless return on the educational gift that the GE training was to him. In the same class had been a student with an apparently similar set of abilities as the previously mentioned student, but who had asked if he could attend, and thus, was not mandated to come. However, this student had returned to work unable to recall critical trainings and without the ability to actionably demonstrate to his manager what he had learned. The second student's manager contacted me, confused because the GE training has an excellent reputation but the results did not reflect it. This manager reported that his employee had felt so overwhelmed and anxious by the experience that he never felt like he could concentrate or fully participate in the activities, something that the trainers had not anticipated during the learning session. I have observed trainers struggle to teach highly-educated executives who fail to maintain focus on environmental protection issues so crucial that they themselves might have mandated the education. These executives, distracted by personal electronic devices and outside pressures, may leave the class without understanding what they need to know, even if they have a proven ability to succeed in classroom settings

and are attending under their own volition. In contrast, another student in the same class who lacks a high school diploma, is attending under a mandate, and is anxious might leave the class able to apply what is taught with expertise.

Situations like these contributed to my interest in identifying behaviors and attributes of adult learners that could explain the disparity in results of the training. This understanding could lead to mitigation solutions. Statistical analysis could identify effects of demographic factors and how to leverage relationships between variables such as level of education and anxiety to mitigate issues and augment strengths. To me, it was clear that further research was warranted to improve the consistency of the program results. Seemingly random results are not acceptable for any GE training, including the environmental protection training. Exploring the relationship between an adult's previous level of formal education completion and whether the student is attending by choice, and that adult's anxieties toward training and their ability to focus on the training can now inform a mitigation strategy that can improve training and, perhaps, other programs like it.

Undoubtedly, to some adult learners in industrial settings, the prospect of a company-mandated training on environmental protection hosted by industry experts at GE brings feelings of excitement, anticipation of growth, and hopes for increased security or financial opportunity. Other adults in an industrial scenario facing the same learning may have feelings of anxiety, expect failure, and feel a threat to their continued employment (DeFulio, Iati, Needham, & Silverman, 2009). It has been found that adult

learners' anxieties (Coryell & Clark, 2009) and inability to focus on training (Broady, Chan, & Caputi, 2010) are detrimental to effective transfer of knowledge.

A formalized project study had the greatest chance to yield the most valuable information regarding GE's environmental protection training, and thus, I initiated a project study utilizing a quantitative analysis. This study took place within the context of GE's environmental protection training, a learning situation that comingles students seeking self-enrichment with students who are required to attend by an external entity. This training includes safety trainings, pollution theory, learnings that meet government compliance and CEU requirements, as well as professional enrichment elements such as how to make a business case for an improvement idea. Data for the study derived from surveys taken by students registering for the class.

Observations

The driving force behind this project study was the observation that GE's customers did not graduate from the class with the same levels of working knowledge. The class itself is instructed by trainers who deliver the environmental protection curriculum. Through acquisitions, pay incentives, or pursuit of stable employment, subject matter experts (SMEs) have gravitated to GE's environmental protection divisions. GE (2012) markets the expertise of these trainers and attracts students in pursuit of this expertise. Some of these SMEs are converted to trainers, but no instructors have ever been educated on how to train before leading classes. This methodology has led to varying levels of training abilities.

GE's environmental protection trainers struggle when students are anxious and when they have fluctuating levels of focus. When students are anxious about the training, trainers often show frustration. For example, I have noted when auditing classes, trainers will mistake anxious behaviors, such as doodling or lack of eye contact, with the student not paying attention. However, at times, the students will prove they had been paying close but nervous attention the whole time.

In addition, GE trainers often openly discuss difficulties with students who are unable to focus (C. P. Fields, personal communication, May 3, 2012; A. M. Winston, personal communication, July 21, 2012; J. S. Plummer, personal communication, August 22, 2012). In particular, those students who check electronic communication devices or leave the room for assorted reasons cause the trainers to lose their own concentration (H. C. Litke, personal communication, June, 11, 2012), anger the trainer (G. A. Fleming, personal communication, February 11, 2012), or disrupt the flow of the class, as I have observed. Even if these students desired to participate, outside interruptions, personal or professional, distract them from focusing on the class. However, in the few instances that a trainer understands beforehand that they are going to face a classroom of people who cannot be counted on to focus, the trainer seems much less frustrated and all students learn more formally.

Trainers prepare for and build activities based upon audience numbers. However, when some of the audience does not participate, or does so intermittently, the activities do not function properly. For example, in the environmental protection training, there are numerous hands-on activities such as one that measures the ability of filters to capture

fine dust like smoke. The activity is set up at the beginning of class, and if the level of participation does not match the number of students, the feedback about the lesson varies more at the end of the two day seminar.

In addition, at the beginning of the courses, customers are asked to answer trivia questions, vote for favorite ideas, and give instant feedback. If the trainer is prepared for a small or fluctuating participation level, a version of the activity can be used that is slightly less effective but does not depend upon consistent, active participation. Likewise, if trainers expect a consistently high level of participation in sessions, they can augment this activity to make it less time consuming with more consistent results.

Adult Learner Differentiation

Individuals' experiences with formal education will be as different as the people themselves (Mun, 2010). Most often, a person's first experience with mandatory learning is during elementary school, progresses through high school, but then continues in life and the workplace in less obvious but equally critical ways (Lynch, 2009). The residual emotional scarring of negative primary education stays with a student into adulthood (Sparrow & Hurst, 2010). Those adult learners who flourish in compulsory trainings are more often those who succeeded in formal education as a young person (Kim, 2009).

Later in life, education becomes more of a choice, such as with pursuing higher degrees, but regardless of age or level of formal education completed, adults in industrial settings face mandatory learning situations, often through external mandates or requirements as well as enrichment training that can be done by choice. Indeed, this is the situation for the industrial customers in GE's environmental protection training. These

adult learners may or may not attend GE's training by choice, but regardless, it is still critical that they learn, retain, and are able to act upon their learning.

Some students have mostly positive experiences throughout their formal education while others may have experiences that are negative (Kruidenier, MacArthur, & Wrigley, 2010). In addition, emotional factors and viewpoints that the adult learner brings to the trainings, such as anxieties, can have a positive or detrimental effect on the students (Weinstein & Palmer, 1994b). Anxieties and concentration levels with compulsory training might differ with a person's previous level of education (Hawthorn, 2007), though no research indicates a link between these factors and whether or not the student attends under compulsion. Thus, there existed a need to explore and understand the linkages between certain adult learner attributes and adult learning behaviors.

Education theorists, such as those who support the theories of andragogy, differ greatly in how they explain adult approaches to learning versus youth approaches (Steier, 2010). Those theorists who focus on adult learners have found that anxieties and ability to focus on the training affect the readiness of an adult to learn; this has been well examined and documented (Backhaus & Liff, 2007; Gardner & Moran, 2006; Klassen, Krawchuk, Lynch, & Rajani, 2008). Researchers have found that adult learners' anxieties or lack thereof can be a boon or bane to the transfer of knowledge (Short & Harris, 2010). Students who cannot address their struggle to focus, whether it is from outside pressures or from a lack of interest, are less likely to retain and utilize the provided information (Parker & Patten, 2010). Actively participating adult learners retain and can utilize

training far better than those who are anxious or who have a negative attitude toward mandatory learning (Gilardi & Guglielmetti, 2011).

Student surveys from GE's environmental protection training courses support experts' findings such as these. One student from a GE class in November 2009 anonymously stated via survey feedback that, "There was so much information. It got me worked up…reminded me of school. Give us more breaks to check work email. It's hard to participate in activities after lunch." Another student in the same class stated, "I wish we could have had more hands-on material…We were interrupted by going on break too often."

Personal communications with students also show variations in satisfaction. Thompson, a newly graduated engineer at an industrial ceramics manufacturer, stated the training made her feel at ease to ask questions, which might reveal low anxiety. This student, who had to attend under a company mandate, hoped all of her coworkers would have the opportunity to attend GE's courses as the training was a great baseline for new employees. Additionally, another employee stated that he loved coming to the training every year because of the trainers and volunteered to attend the training at every opportunity (F. B. Bolander, personal communication, June 13, 2012).

Problem Statement

Currently, students who take GE's pollution control classes do not retain knowledge consistency. In this study I sought to understand the relationships between students' previous completion level of formal education and whether they are attending the class voluntarily, with student attributes with which the trainers had shown to

struggle: anxiety and ability to focus on learning. Examining these variables enabled me to uncover relationships that will hopefully lead to trainings with more predictable results. In addition, the understanding of the situation creates the foundation for more effective trainings that might be similar. To address this problem, I initiated a study to understand if there were relationships between specific learner attributes and behaviors relating to anxiety and focus that can be utilized by GE's environmental protection trainers to deliver a more effective learning experience.

Gathering and analyzing these data initiated positive social change by setting into motion the steps needed to create a more uniform and greater knowledge transfer, thus improving the lives of those adults who are involved with GE's education protection training. Students' lives would improve through the immediate benefit of making the training more enjoyable and engaging. In the long term, the skills learned and retained from a more effective training delivery could result in more lucrative jobs for these students. Trainers' lives will improve through the reduction of stress that unpredictable classroom situations create. I have observed frazzled GE trainers who will have their frustrations reduced with better understanding of their training situations and what they can do to adapt to them.

In addition, the health and safety of the communities that house these industries are at risk with environmental protection training that yields random results. Companies send students to GE's environmental protection training expecting effective, quality results. These companies include those that are most publically scrutinized for past environmental disasters, such as ExxonMobil, BP, Massey Energy Company, nuclear

power plants, and other manufacturers that can potentially pollute neighborhoods and communities. If the GE training produces inconsistent results, fewer companies will send their employees, and fewer adults will have the opportunity to learn about environmental protection, with the result of fewer opportunities for advancement and better lives.

More consistently effective trainings will improve the communities that depend on adults to understand environmental protection training to prevent workplace accidents, reduce environmental damage, and provide quality, stable employment. Higher quality training that elicits more predictable results will yield more return customers from satisfied students of GE. As companies see the predictable success that GE's environmental protection classes will bring, more adult learners will be sent, giving more adults the opportunity to learn.

Definition of the Problem

Although resources are being expended to create impactful environmental protection trainings at GE, students, their managers, and postclass surveys indicate that the results are inconsistent. Each class is comprised of different students and thus needs adaptation. However, no support exists to help the trainers adapt their methods to probable classroom situations. There is limited research that examines the relationship between adults engaged in mandatory learning situations versus those who attend by choice, let alone any that relate adults' previous level of education completion with anxieties or ability to focus on training. Even less research examining mandatory learning in industrial settings or environmental protection trainings exists. The registration process for the GE pollution control class collects survey data such as demographic data inclusive

of education level and if the class is taken for self-development or as part of a mandate. However, to date, there has been no systemic attempt to mine the data in a way that could improve the inconsistent outcomes of the training.

Compulsory adult learning is used to address an array of issues in industrial settings, as with the example of GE's environmental protection training. From food contamination prevention (Kassa, 2001) to disaster prevention (Walter, 2008), issues that arise at industrial locations are sometimes addressed by requiring employees to participate in mandatory adult learning. Some employees volunteer to attend these same trainings to gain insights into future regulations and technology solutions, to gain rewards by becoming more valuable to the corporation through expertise, to pause from potentially excruciatingly rigorous work, or to fulfill professional or trade association learning requirements such as obtaining CEUs.

In addition, some jobs at an industrial site require high levels of formalized education, such as industrial engineers, finance leaders, and plant managers. Other individuals at the same location might be subject to and have the same training available, such as GE's environmental protection training, but do not have jobs that require high levels of formalized education. It is possible that these latter individuals do not have the best or most exposure to learning, which could result in different classroom behaviors and differing results gained from the training.

Mandated trainings vary in quality, and improvements to programs are even more varied with diverse results. Kumar and Lightner (2007) found success in adult learning using interactive games, while Ashton (2010) found multiple failures for authentic adult

learning experiences in industrial settings. Further examples of the disparity in enrichment adult learning's impact were explained by Fryer (2011), who found no innovation in learning, and that "even when the language and vocabulary changes, there is a great deal of continuity with what went before, often with the self-declared 'new' policy constituting a development of a trend already started by predecessors" (p. 14). Contrary to this, Steier (2010) found vigor and creative efficiency throughout adult workplace learning that, in turn, could save his organization, Signature Healthcare, including its industrial component, $1.9 million through proper active participation and student understanding.

Wherever there is adult education, there are conflicting evaluations of its effectiveness, which is supported by what I hear from students and their managers at GE's environmental protection training and by what I see in their survey results. For example, adult literacy programs garner both support and derision. Some programs tout the ability to improve the chances of adult learners to pass the mandatory English language portion of the naturalization exam required to become a U.S. citizen (U.S. Citizenship and Immigration Services, 2012, para. 5), and research lauds literacy learning results (Fletcher, 2010; Hanna & Salzman, 2010; Mosley & Zoch, 2011). However, research questioning adult literacy programs also abounds (Gafoor, 2011; Hamilton & Pitt, 2011; Shi & Tsang, 2008). Researchers analyzing these adult literacy programs find both increased learning and individual satisfaction (Pinder, 2011) as well as a lack of evidence that the programs do any good at all (McVey, 2010). Clearly, more research and

understanding is needed to clarify the many notions about adult training and its effectiveness.

Limited study has been done on the effects of earlier formal education on later life learning. Though Wister, Malloy-Weir, Rootman, and Desjardins (2011) explored "whether past education, or more current learning practices and resources, are more important enablers" (p. 832), most research is outdated and does not include validated instruments to measure anxieties or ability to participate with compulsory or voluntary training (Cameron, 2000; Cooper, 1992; Jarrell, 1994; Preskill, 1989). A few researchers have focused on age group differentiation in adult learning, but much of it is focused on differences in online learning behavior, such as Hawthorn (2007), who tested interface usage of older online learners, and DiBiase and Kidwai (2010), who correlated online learning success with age and geography classes. Additionally, researchers have documented a connection between effective training and transferring actionable knowledge to students (Grenier, 2009; Kilgore, 2003).

Instructional designers who do not adequately understand their audiences could create adult learners who cannot effectively acquire new knowledge or skills. To be highly effective, trainings should be able to transfer as much knowledge to the learner as possible (Creswell, 2008). Corporations are fined when employees violate regulations they learn about in training (Occupational Safety and Health Administration [OSHA], 2010, para. 19); those who drink and drive in their personal lives could do so again while operating industrial equipment, risking more lives by repeating their offenses (Tongish, 2010); people are hurt or killed on the job for violating safety procedures (Environmental

Leader, 2011); and communities are contaminated or devastated by pollution (Fahrenthold, 2008).

Adults without the ability to succeed in company training programs or trainings required to gain CEUs are marginalized. These students lack the opportunities of their peers who flourish in mandated training (Hasch, 2011). Likewise, students who do not succeed in the voluntary training they chose to attend cannot gain the hoped for benefit.

Students in the GE course display various degrees of anxiety and focus on the course, while also making a variety of comments regarding being forced to attend due to government mandate, attending only to fulfill CEU requirements, or voicing fear of job impact if the training was not retained or useable. Those who volunteered to attend would sometimes sit anxiously beside those who are students by compulsion but appear completed relaxed. Similarly, those in the class who have advanced degrees, sitting next to those who did not graduate high school, might show various, though seemingly random, responses to GE's environmental protection training.

Rationale

This project study's statistical analysis provides a foundation from which improvements can be made to mitigate the inconsistency in results of the GE pollution control training. Unequal results of training affect companies through the loss of productivity, profitability, and community goodwill; the individual learner feels an even greater impact (Wlodkowski, 2008). Adult learners may find themselves in learning situations engaging with content that is not optimized for their experiences or needs (Gregg, 2007). Negative classroom experiences can foster more ill feelings in the adult

learner towards training, further reducing future training efficacies, as found in Field's (2011) study of longitudinal adult learning research. Furthermore, these negative experiences diminish the likelihood that an adult learner will volunteer for future training opportunities (Justice, 2001). Additionally, it is hoped that this study can be generalized for other required training programs and thus improve the lives of adult learners in other industrial situations.

From industrial workers who must participate in safety training for their own protection to power plant executives who attend a development course on more effective communications, education is a part of employment in industry. Some industrial, blue-collar trainings are geared toward saving lives and limiting injury on the job, while others focus on teaching workers to limit industry's impact on the environment. Although training may improve morale, reduce regulatory issues, develop future leaders, and increase profits, it cannot do any of these things if anxiety, lack of focus, and poor participation stand in the way of learning (Woolf & Quinn, 2009).

Evidence of the Problem at the Local Level

The problem I investigated in this study was the inconsistent transfer of knowledge among students in GE's pollution control classes. By better understanding the adult learners in GE's environmental protection trainings, populated by GE's industrial customers, a solution might be found to address the inconsistencies. Local evidence, gathered from postclass surveys, informal feedback from students and their managers, as well as trainers' evaluations, shows that not all attendees of these classes are able to understand, retain, and act upon the training equally.

Students who enroll in GE's pollution control classes are disparate adult learners, encompassing those with rudimentary skills, those dictated to fulfill a government requirement, those seeking enrichment, and those needing CEUs. As the education leader for one of GE's divisions, I oversee the development and execution of customer-facing education programs, such as the environmental protection ones which were the focus of this study. Throughout my experience with this training, I observed anecdotal evidence that suggests disparate results and wanted to explore the behaviors and attitudes of adult learners to lessen the disparity in results.

In one GE environmental protection class, I saw a logistics expert with numerous college degrees sitting beside his coworker, a young maintenance technician who did not complete high school, attending to learn how to maintain the new technology under his care. In this example, the maintenance technician had come into the seminar fearful of failure but left energized and able to use the new learnings, whereas his coworker had to be rebuked for refusing to join in hands-on activities to learn new skills, often too busy on his electronic communications devices to participate. In a different classroom, a mechanic with no formal education beyond high school was excited to use the class to learn new skills to try and leverage a more stable and safer job. The mechanic's boss, a well-educated plant manager, complained about being mandated to attend, ignored the class, and often multitasked, stepping outside to take phone calls. Clearly, a range of behaviors and attitudes exist in GE's environmental protection learning sessions that cause varying results. I wanted to explore if the observed behaviors have a relationship to

other factors such as formal level of education completion or if the student volunteered for the class.

Disparities among required adult learning initiatives in industrial settings impact adult learners who cannot maximize their learning. Furthermore, corporations that are supplying and funding these learning initiatives are not maximizing their investments nor achieving their desired results. Not only does this cause a loss of productivity for the corporation, it creates hazards in the work environment that include, but are not limited to, risking the health and safety of employees, regulatory fines, unfavorable media attention, and legal actions (Occupational Health and Safety, 2011, para. 4). Most alarming are reports of injuries that workers cause to themselves when violating a principle of safety that had been taught in a training class (Colling, 2010). These distressing reports of injuries are contradicted by research revealing the lowering of injury rate and the increase in a safety culture driven by training (Burke et al., 2011).

As is seen in GE's training, not all training is consistently effective (Walters, 2008). With this study, I sought to quantify and analyze the relationship between factors gathered during registration, level of completed education and voluntary or compulsory attendance, and the behaviors of anxiety levels, and ability to focus on training. By doing this, I could prepare a solution for a more predictably successful classroom experience.

Adult Learning Regarding Environmental Protection

Limiting industries' environmental impact on neighborhoods, local communities, and the globe is a major and growing concern for U.S. industrial companies, and it is one of the reasons for programs such as GE's. In 2008, 17.8% of training expenditures were

for industrial training (ASTD, 2010). Throughout corporations in 2009, including industrial settings, 7% of training was required training to meet a compliance or regulatory need (ASTD, 2010). However, in 2009, in the industrial sector only, there was nearly twice the amount of mandatory training, an average of 13% (ASTD, 2010).

Outsourcing options, such as those provided by GE and its competitors, now exist for industries who cannot meet the expanding needs for environmental protection training, and this matches the trend in the training industry. For example, the ASTD reported that, in 2009, "organizations increased their spending on outsourcing as they increased reliance on external providers. The consolidated average spent on external services was 26.9 percent of the total learning expenditure, up from 22.0 percent in 2008" (ASTD, 2010, p. 5).

Some companies such as GE have become third-party adjunct trainers for industries, offering required courses, often for a fee. The GE environmental protection training that this project studied can often be used to fulfill government training requirements for companies, as well as provide CEUs for employees' certifications. In addition, the training offers enrichment to the employees, including project management skills, negotiation competences, and insights into the leadership needs of the future.

Other companies have adopted similar outsourcing practices. For example, FedEx (2012) offers hazardous material handling training for its customers who ship hazardous materials, a government-required course. In addition, hundreds of government approved, privately-run traffic schools exist to help drivers fulfill mandatory learning requirements,

like those who drive industrial vehicles, such as forklifts, cargo trucks, and loading equipment (DMV.com, 2012).

Competitors of GE such as CamFil Farr, Menardi, and Midwesco sell environmental protection products to the same industrial companies as GE, and some offer environmental protection training on how to utilize the environmental protection solutions they provide (Industry Today, 2012; Menardi, 2012; Midwesco, 2012). These trainings often produce revenue in the form of paid tuition from a customer's company or from increased product sales that come through better customer relationships created through education. Beyond the immediate project study, the industrial customers who were the focus are a generalizable population worthy of studying for insights into their differing anxieties and abilities to focus in relation to their education level and choice of attendance.

Evidence of the Problem from the Professional Literature

The need for training is growing as corporations and the government use learning as a solution to various issues including profitability, compliance, and employee growth. Corporations such as the industrial companies that send employees to GE's environmental protection training are spending $125.88 billion annually on the training of employees (ASTD, 2010). Corporations are expected to and need to pick up more of the educational burden as U.S. government cutbacks shrink adult learning opportunities and access. For example, in 2009, the U.S. government eliminated all state grants for career and technical education (U.S. Department of Education, 2012, para. 12). As states struggle with the impact, some, like California, have had to make difficult decisions that

have negatively impacted adult learning efficacy. Two independent studies found that schools in California shifted, as one study says, "dollars from adult programs into their general funds and have invested more heavily in K–12 spending" (California Independent Voters Network, 2011, p. 5). Certainly California is not alone. Coast to coast, states are facing increased pressures on adult education budgets. For example, Pennsylvania faces a 20% reduction in federal grants for adult education programs (Esack, 2011).

According to the Congressional Budget Office (2012), the U.S. government spends $77.39 billion on education; the portion set aside for postsecondary education is "mostly for student financial aid" (para. 3). The 2008 recession in the U.S. has further strained resources, according to the National Center for Public Policy and Higher Education (2009), which have reached crisis levels in 2008 and 2009. The government appears to understand its limitations in adult education and must branch out to corporations to leverage their expertise in employment skills training, such as overtures made to companies like Motorola and Groupon (Runningen, 2011).

As U.S. industries struggle to become more efficient by cutting costs and increasing productivity, training is increasing in importance, as may be reflected in a substantial increase in attendance in GE's environmental protection courses. Innovative solutions to industrial training are being proposed, such as use of augmented reality (Zhong, 2002). Environmental protection training is growing in popularity as the most polluting of industries like coal-fueled power plants struggle to limit their impact on the environment to meet ever-tightening emission controls (GE, 2012). Thus, it is evident

that a demand exists for the most effective training in environmental protection possible, and to do so, it is necessary to prepare the training staff as best possible.

Definitions

American Society for Training and Development (ASTD): A professional development organization which began in 1943 and has now expanded to include 130 chapters comprised of those involved with learning (ASTD, 2010).

Anxiety: Anxiety is an emotion characterized by feelings of tension, worried thoughts, and physical changes (American Psychological Association, 2015).

Autogenic learning: A relaxation technique to reduce anxiety that has proven helpful in the reduction of classroom stress (Kanji, White, & Ernst, 2006).

Blue collar jobs: Employment opportunities that are often manual labor, mostly hourly-wage earning, and can be either skilled or unskilled (Foster, 2003).

Continuing education units (CEUs): A generic term and unit for continuing education needed for licensed professionals to retain a license. Generally a CEU equals about 10 hours of qualified instruction (Ebell, Cervero, & Joaquin, 2011).

Environmental Protection Agency (EPA): A government organization created to "protect human health and the environment" (EPA, 2012b, para.1).

Human resources (HR): A department that exists at many organizations that focuses on the activities of employees including recruitment and hiring, orientation and training of current employees, and management of employee benefits (United States Department of Labor, 2012).

Mandatory learning: Any education that an adult must undergo at an external behest, and over which the adult learner has no choice in participation (Pontefract, 2012).

National Emission Standards for Hazardous Air Pollutants (NESHAP): Continuously revised air emissions standards set by and enforced by the EPA (U.S. Department of Energy, 2011, para. 4).

Occupational Safety and Health Administration (OSHA): A government bureau, that works "to assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance" (OSHA, 2012a, para. 2).

Significance

By exploring the relationships between level of completed formal education, compulsory participation, anxiety, and ability to focus, this project creates a solution to support a more reliable outcome for GE's pollution control classes. Any improvement made by the training will be significant in that it will enable more students to receive education at no personal expense by attracting more customers as managers see an improvement in training efficiency, a key component of adult learning (Woolf & Quinn, 2009). From vocational, industrial adult learning to the training offered by GE, institutions that provide adult learning must strive for quality and effectiveness (Kelting-Gibson, 2005); this effectiveness could also result in greater profits for GE. Any improvements to the required trainings of an industrial adult worker would be significant to groups such as the government, employers, and the adult learners being trained.

Government

The U.S. government's role in education is changing, especially in the wake of the 2008 recession. Even as the government cuts funding to adult training programs, federal and state governments are increasing the need for industrial training programs through the introduction of new regulations, as seen in the nearly 40,000 new pieces of legislation that were signed into law in 2011 (National Conference of State Legislatures, 2012. para. 5). Tighter regulations on environmental pollutions through new laws such as NESHAP dictate stricter industrial compliance, which requires the improvement of the skills of the employees working in industries that are typically polluters, like cement plants, steel mills, and power plants. On NESHAP regulations alone, the U.S. Department of Energy (2012. para. 5) offers dozens of trainings or referrals to training on everything from handling asbestos to limitations on industrial paint shops pollutants.

Compulsory industrial adult education mandated by the government legal system usually intends to reform behavior. For small offenses such as traffic violations that could impact an industrial worker's ability to drive equipment on the job, defensive driving schools exist to create a more adept driver (McDaniel, 2012). Industrial workers who abuse alcohol and illegal substances on the job pose increased safety threats. Failure to be able to reform this behavior could lead to more serious situations such as incarcerations or injuries that would cause detriment to families, communities, and employers, as well as the government. As seen in a Pew Charitable Trust (2013) analysis, the U.S. will spend $29 billion more on the prison system than it had in the previous 5 years.

The government also suffers from citizens being hurt on the job. Assistant Secretary of Labor for OSHA, Michaels (2012) said that "every workplace injury or illness places a heavy burden on our nation" (para.1). The issue is so serious that U.S. President Barrack Obama set aside April 28 as Worker's Memorial Day, a day of remembrance for employees killed on the job, saying that "we honor all the men and women who have died on the job. In their memory, we rededicate ourselves to preventing such tragedies, and to securing a safer workplace for every American" (The White House, 2012, para. 5).

Employers

As those who send employees to GE's training can attest, the cost of training employees is rising, and, especially in challenging economic times, it is critical that employers see a return on their investment. Corporations are spending over a billion dollars annually on adult training (ASTD, 2010), while also investing the time and human resources of those involved with training and the employees who take the training.

In 2009, companies spent $1,081 per employee, up 1.2% from 2008, to train their employees (ASTD, 2010). As a percentage of revenue, companies raised their investment from 0.59% to 0.71%, or seen as a percentage of profit, from 8.75% to 10.88% in 2009 (ASTD, 2010). Even with this elevated investment, companies pay huge fines for the mistakes of their employees. Whether they be regulatory fines from issues that GE's training seeks to correct, such as an air environmental protection violation that resulted in a $950,000 fine levied against Pfizer, or other issues such as workplace safety issues that resulted in a $280,000 fine against the Hershey Company, or lawsuits that affect

institutions who poorly trained their employees on harassment, such as the $1 million award to employees harassed at the University of Arizona, poor training not only fails to make a return on the training investment, it also puts employers and employees at further risk (Johnson, 2012; OSHA Regional News Release, 2012; Walter, 2008).

Adult Learners

One of the most significant impacts of poorly planned and executed adult learnings is for the learners themselves. The ultimate failure of adult learning results in the loss of life; 4,547 workers died on the job in 2010 (OSHA, 2012d). In 2012, each day, on average, 14 people died on the job. The U.S. Secretary of Labor, Hilda Solis, issued the following statement, "With every one of these fatalities, the lives of a worker's family members were shattered and forever changed. We can't forget that fact" (U.S. Department of Labor, 2009, para. 2).

The inequitable access to opportunity that exists if adults do not have the same abilities to participate in voluntary, enrichment training is also significant. Adult learners who do poorly with these trainings may have less access to raises or higher paying jobs, such as is seen throughout many state job reports, like New Hampshire's (Callahan, 2011). In contrast, those students in employers' classrooms who excel might achieve large rewards, such as those who can pass elevator maintenance training and exams required of those who operate the industrial elevators of a plant, a job that can earn over $60,000 a year (Kirday, 2012).

Contribution to Scholarship

Although the primary purpose for this study was to gain consistent results of a specific pollution control course by investigating possible relationships between adult learners' anxieties and ability to focus with the learning, with their previous levels of completed education and choice in attendance, the study also resulted in the deeper understanding of adult learners. Those who participate in GE's training will benefit from improvements to the course, and, with the findings of this project, there is now more scholarship in the area of mandatory learning, the effects of levels of education, anxiety, and ability to focus on training. Potentially, future scholars can build off this research in studies that involve adult learners in similar learning situations.

Guiding/Research Questions

Guiding questions of the study were:

1. For adult learners in GE's environmental protection course, is there a relationship between their level of formal education and their anxiety towards training?
2. For adult learners in GE's environmental protection course, is there a relationship between their level of formal education and their ability to focus on the training?
3. For adult learners in GE's environmental protection course, is there a relationship between their choice in attendance and their anxiety towards training?

4. For adult learners in GE's environmental protection course, is there a relationship between their choice in attendance and their ability to focus on the training?

Review of the Literature

With a focus on creating consistent results for a GE's pollution control course, I conducted the literature review organically, wherein the discovery of new data and viewpoints grew from previous searches. This minimized bias towards any particular research direction or preconceived notions that my closeness to GE and the needs of its trainers may cause. In addition, this allowed me to find gaps in the research through an extensive review instead of attempting to imagine gaps and then find if others had researched them. Utilizing research databases and search engines, including Education Resources Information Center (ERIC), SAGE Publications, and Google Scholar, I found peer-reviewed articles. Search phrases were *adult learning or education or training and anxiety*, *adult learning or education or training and focus*, *adult learning or education or training and mandatory*, *adult learning or education or training and choice*, *adult learning or education or training and graduation*, and *adult learning or training and education and level*, using Boolean operators.

The first step in the literature review was to uncover if there truly was a problem regarding discrepancies in the efficacy of adult students in industrial learning situations that, if corrected, might lead to more consistent results. This investigation led to a review of the impacts of the discrepancy in knowledge transfer among adult participants in

mandatory learning situations. This included a review of the effects of mandatory education and the areas in which it is used.

Scholarship does exist regarding adult learning and anxiety, and ability to focus. A smaller amount of scholarship exists that explores mandatory learning. However, research that links the relationships between these variables does not exist. In particular, research related to collecting and correlating these variables and the impact on the effectiveness of knowledge transfer in adult learners in mandatory learning situations was lacking. Research on mandated industrial education information was particularly absent. At this point, I felt I had found enough gaps in the research to undertake a research project to investigate relationships in industrial adult learners' anxieties and ability to focus on training with the students' previous levels of formal education completion and choice in attendance.

Theoretical Framework

The theorists that built the principles of andragogy influenced this study. Throughout the project, as well as the literature review, I paid particular attention to those studies that aligned to the theories of andragogy, the theoretical foundation of this project. The model of andragogy, made famous by Malcolm Knowles, contains six assumptions about adult learners that oppose six assumptions about young learners. In 1973, Knowles, already a respected mind in the world of education, revolutionized adult learning by publishing ideas about the andragological model. These theories sought to mold adult education separately from the practices and principles used to educate young people. Knowles identified at first four, and then six, "assumptions that are different from

those of the pedagogical model" (Knowles, 1998, p. 64). The six areas of differentiation focus on the need to know, the learner's self-concept, the role of experience, readiness to learn, the orientation to learning, and motivation.

Pedagogy, defined as the "art and science of teaching children" has shaped almost all educational systems (Knowles, 1998, p. 61). For centuries, this model of education was the only basis for instructing students, even adults. When, after World War I, higher educational programs began targeting adults, the instructional basis continued to be based in a pedagogical model. Seeking a fresh concept, Knowles imported the fledgling European idea of andragogy. Dastoor (1993) explained, "andragogy, or adult-learning theory, presents a learning model that centers on learners rather than instruction, making them active participants in the process" (p. 20). Knowles attempted to promote andragogy from a theory to an applicable teaching methodology.

Historical View of Issue

From patron systems in ancient Greece to the apprentice structure that replaced it, training has evolved in delivery method, specific subject matter, and frequency (Tuttle, 1999). In more modern times, training has evolved away from an apprentice structure wherein people interested in careers studied directly under a master. Apprentice programs are disappearing rapidly, being replaced by self-paced initiatives (Smith, 2011). Within the past few years, more and more of this training is delivered online, rising to 36.5% in 2009 (ASTD, 2010).

Following powerfully destructive events such as nuclear power plant disasters, coal mine collapses, and industrial accidents, there is a surge of training on what was

learned from the disaster (Online OSHA Safety Training, 2012, para. 12). An increase in litigation, or threats thereof, has caused a desire for more compulsory training from industries. Impacts to public health create an outcry for corrective action through training, such as with health outbreaks from food handling illnesses like trichinosis (Gajadhar et al., 2008) or norovirus (Kassa, 2001). Companies themselves can lessen their exposure to legal issues and protect their brand by showing dedication to public concerns through training their employees to mitigate those concerns, such as with GE's environmental protection training (Haugen, 2006b).

Types of Mandatory Training

I had estimated half of the attendees of GE's environmental protection trainings attend as a mandate from an external source, which could impact certain behaviors, and I confirmed this with this project study. A review of the literature indicated that mandatory learning is pervasive throughout industry. From mandatory driver's training, to company required sexual harassment training, it was assumed that at least half of the participants in the study would have found themselves in an educational scenario that was not of their choosing. Clearly, many industrial workers who attend GE's training are not immune to the lifelong requirement of learning. Those mandated to attend GE's environmental protection training are most often directed to attend from one or more of the following: the government, issuers of CEUs, and employers.

Government. Some of GE's environmental protection students are attending to fulfill a government mandated requirement. The U.S. government mandates education to adult workers through numerous avenues, such as OSHA and the court system. OSHA

requires evidence that employers have trained employees on hundreds of topics for industries as varied as construction, aviation, and manufacturing (OSHA, 2012b, para. 17). An example of this diversity is that workers in maritime manufacturing are required to take courses such as *Portable Air Receivers* and *Other Unfired Pressure Vessels*, while those in construction take an array of courses on dangerous chemicals such as vinyl chloride and arsenic (OSHA, 2012c, para. 21).

OSHA is just one of many government agencies that mandate training. Another area of governmental involvement in mandatory adult learning regards minimizing the impact that industries and their employees have on the climate. The Environmental Protection Agency (2012a, para. 2) requires industries to train employees on dozens of courses. Those who will encounter minors through their profession, such as those who service and maintain schools' heating and cooling equipment, are required to take training to understand how to identify and report child abuse (U.S. Department of Health and Human Services, 2012, para. 3).

The list and amount of government-mandated training is growing. For instance, the America COMPETES Act of 2007 mandated new training programs such as the Responsible Conduct of Research for federal research grant recipients (U.S. Department of Health and Human Services, 2012, para.1). Advancements in technology and science have also increased the need for training. For example, the introduction of alternative fuels such as ethanol and biodiesel into the airline industry has caused the government to mandate that those working in airline manufacturing are trained on dealing with biofuels in disasters. The Federal Aviation Administration (FAA, 2012) noted, "with the increased

production and use of ethanol as a renewable fuel, emergency responders need to understand the chemical characteristics of this flammable liquid and how best to fight any possible fire that results from a hazmat transportation accident or incident" (para. 4). The use of those same biofuels is creating a demand for new education around environmental protection in industries, such as power plants, that previously used coal but have switched to different but lesser pollutants like biofuel (Elnashaie, Fateen, El-Ahwany, & Moustafa, 2008).

The government also requires mandatory courses for its own employees, with the U.S. Department of State (2012, para. 3) mandating dozens of courses to government employees, such as how to safely travel abroad while on government business. The government goes as far as to have a department to manage its internal employee training. This department, the U.S. Office of Personnel Management (2012, para. 1), reported that it is fully dedicated to all of the details necessary to create a highly trained workforce.

Apart from the federal government, state and local governments impose mandatory education on manufacturing. For example, the state of Virginia requires training for more than 30 industrial occupations (Virginia Department of Professional and Occupational Regulation, 2012, para. 4). Some training mandates differ from state to state. For instance, those workers who might use explosives on the job, such as many of the GE environmental protection students who deal with cleaning boilers in utility plants in states like Massachusetts, Minnesota and Maryland, require elaborate safety courses; similar workers in other states such as Alaska, Vermont, Washington, Pennsylvania, and South Dakota have fewer mandates.

Those who break the law in an industrial setting could face mandatory reform education imposed by the legal system and required for continued employment. The most prevalent forms of court-ordered education encountered in the literature review was for those industrial workers who drive on the job, such as cargo haulers, forklift drivers, and hazardous material movers, who had a traffic violation (Meuser, Carr, Irmiter, Schwartzberg, & Ulfarsson, 2010). In some cases, driver's education can lessen the legal impacts of traffic violations and allow for the continued ability to operate a vehicle as part of an industrial job, as is the case in Florida (Florida Highways Safety and Motor Vehicles, 2012, para. 1).

Personal issues might compel some of the millions of industrial workers to face training requirements outside of their industrial workspace, such as with substance abuse issues. Thirty-seven states mandate alcohol education programs for those convicted of drinking while performing certain industrial jobs (National Substance Abuse Index, 2012, para. 7). Serious drug offenders might be legally pressured to attend additional substance abuse education (National Institute on Drug Abuse, 2012, para 1).

Parenting issues may also create compulsory learning situations for those attending GE's trainings, as well as impact their ability to focus on the course. The court system assigns mandatory adult education to parents who are going through a divorce or separation. For example, Kitsap County in Washington State requires that divorcing parents with children who are minors attend mandatory parenting classes (Kitsap County Clerk's Office, 2012, para. 10). Neglect and abuse in parenting can have court-mandated education required before a parent can regain custody of a child. Certain behavioral

corrections may have overlapping mandates. For example, counties in Kentucky mandate that parents who are guilty of neglect or abuse and have lost custody of their children due to substance abuse must complete a number of trainings in order to regain custody of their children (LKLP, 2012, para. 18). Mandatory training may be assigned to parents whose children have run afoul of the law. For instance, parents who have children who are convicted of gang activity are forced into education in some jurisdictions, such as in California, where judges send parents of convicted gang members to compulsory parenting classes (Watkins, 2010). These outside mandatory trainings impact the behaviors of the GE environmental protection students, regardless of demographics such as level of formal education completed, which was revealed through this study, and will be passed on to the trainers who interface with the students, through a train-the-trainer course.

Fulfilling CEUs. As was discussed, the breadth and diversity of trainings mandated derives from the government, corporations, and trade or professional groups. These organizations may require CEUs for industrial positions. Some adults in industrial settings attend learning, such as GE's, as a requirement to or desire to fulfill professional certifications or license requirements for groups such as trade associations. The list of professional certifications is extensive and diverse. Different organizations might require different CEUs and recertification levels that can further complicate understanding. Those who attend GE's training for CEUs are often seeking engineering, environmental protection, or industry specific certifications. These CEUs extend throughout industry and the various roles that support industry. For example, attorneys servicing the industrial

sector in 39 of 50 states must take continuing education to retain their right to practice (American Bar Association, 2012, para. 3). Acquiring an industrial commercial real estate license differs from state to state, with some states outsourcing their training and testing (Real Estate Express, 2012, para. 4). Educators themselves, including those in the internal training departments within industry, have continuing education requirements to hold licenses to instruct or administer education that vary in each state (University of Kentucky, 2012, para. 12).

Many manufacturing sites have onsite healthcare professionals as part of union negotiations or government requirements. Those in the medical profession, such as nurses, must undergo extensive certification and recertification. The American Nurses Credentialing Center (2012, para. 1) offers mandatory courses for the certification of 41 types of nursing specialties. Physicians have extensive CEU requirements for continued membership in the American Medical Association (2012), the organization that offers the courses "to help physicians maintain, develop, and increase the knowledge, skills and professional performance and relationships they use to provide services for patients" (para. 12).

Project management, in which some GE students maintain a certification, seems to have an entire business built around certification and recertification of project managers. Those involved with environmental protections who are project managers include maintenance planners, stockroom supervisors, and supply chain logisticians. Competing professional organizations certify and recertify project managers to various degrees. The leading project management organization, the Project Management Institute

(PMI, 2012), stated that having their "credentials certify your knowledge and experience in project management so you can be more confident at work and more competitive in the job market" (para. 3). As is the case with many professional certifications, such as nurses, project managers must continually renew their certifications, creating a lifelong relationship between these industrial workers and mandatory training.

Continuing education can comingle with government requirements. This can be the case for some blue-collar industrial work. For example, journeymen electricians have national criteria to meet, as well as widely varying state regulations that range from Colorado's complicated law to Illinois that has no additional training mandates (National Electric Installation Standards, 2012, para. 8).

Employer-mandated training. As is seen with GE's environmental protection training, employers create much of the learning mandates adults face. For example, GE's environmental protection training courses advertise an appreciation for the seriousness of environmental compliance and seek to instill this model in the student (GE, 2012, para. 2). Companies understand that failure to adhere to the EPA standards within the U.S. will result in fines, lost work time, and negative publicity (Fahrenthold, 2008). As some of GE's students are the frontline defense against noncompliance for their organizations, and other students are those who manage this first set of students, these customers must be armed with the knowledge and skills to comply with regulations. They must also have the awareness regarding the severity of noncompliance and the foresight to understand future demands.

On average, companies allocate four working days of the year, per employee, to formal learning activities (ASTD, 2010). Some of this training comes as a condition of obtaining employment, as it does for those who want to work in food manufacturing plants as food safety inspectors (Food Safety and Inspection Service, 2012, para. 1). Other training is a prerequisite before advancement, such as being promoted through a career in the many elements of environmental protection, or condition for continuing in a current job role, such as when a new skillset or protocol is required (Larson, 2011).

Up to 30% of the training that an employer mandates for industrial employees directly relates to the industrial job itself, such as training on product knowledge, industry specifics, and skill improvements (ASTD, 2010). Other required learning in industrial settings involves the protection of the employee as well as the company. HR issues such as sexual harassment training, diversity sensitivity, and violence in the workplace drive some employer-related training mandates. As previously discussed, government mandated trainings from its agencies, such as OSHA, drive some of the compulsory adult learning (Shipton, 2011).

However, companies, particularly industrial companies, sometimes invest even more than baseline requirements into training to keep their employees and brand safe. OSHA has a special program, the Voluntary Protection Program (VPP), to recognize companies that go beyond baseline federal workplace safety requirements. OSHA (2012b, para. 1) rewards VPP recipients with decreased frequency of audits and less stringent inspections. Even in difficult economic times, companies are investing more in training their employees. Experts see that "organizations' financial commitment to

learning and development held steady even while their revenue and profit decreased because of the recession" (ASTD, 2010, p. 5).

Voluntary Employee Training

Not all learning encountered by GE's environmental protection training students is mandatory. There are numerous reasons a student might volunteer for a class, but there are four reasons that GE's market research efforts have found are the most common ones that cause customers to volunteer to attend this specific training. My anecdotal observations of the training support that these are the four major reasons for voluntary attendance: subject matter expertise, training for enrichment, seeking insight into the future, and as a respite from work. Certainly students can also volunteer for a combination of these reasons.

Subject matter expertise. Some students of GE's environmental protection courses volunteer to attend hoping to gain practical knowledge, such as skill building on how to use specific products, how to save money by increasing efficiency and output, or to understand how advanced technology could maximize their revenue, all without impacting the environment. These students often are attracted by GE's reputation and the strength of the trainers. The 25 trainers who instruct the environmental protection programs have a combined 501 years of relevant experience, as of August 26, 2015. GE's trainers who teach the courses that were the focus of this study are often featured, including a large photo of the person, in GE's magazine advertisements (Clifford, 2010), which top-tier advertising agencies designed and executed. GE's brand reputation in

environmental protection also attracts students who volunteer to attend GE's environmental protection training seeking subject matter expertise.

Furthermore, customers may be attracted to volunteer for the training because the program and the trainers are respected by industries, the government, and trade associations. For example, when environmental disasters strike, such as Hurricane Katrina, GE is asked for expertise and creativity in helping (Bufford, 2008). Additionally, students may be attracted to GE's overall reputation. For example, President Obama has selected GE's CEO, J. Immelt to be the head of his Job's Council, partly because of GE's creation of jobs in the environmental protection sector (Goldman & Layne, 2011).

The GE environmental protection training meets different student needs by separating learners into tracks by topics, by varying the environmental protection training offered, and by leveraging information from the overall registration survey (separate from the 22 questions utilized in this project study's survey). Students with a variety of job roles understand that, if they attend, they will be able to expand the knowledge important to them and their employers. Again, GE's marketing of this event helps customers who are considering voluntary enrollment to understand the potential benefits of attending (GE, 2012).

The complex and sometimes dangerous or painful tasks that comprise the jobs of the customer students who attend GE's environmental protection trainings must be performed with high quality execution each and every time. Students may be looking for the amelioration of the most difficult elements of these jobs and volunteer to attend this course. For example, maintenance technicians responsible for air environmental

protection must be able to perform the manual changing of filters, including sizing, material selection, and positioning. Considering that coal-burning power plants might have over 50,000, six-story tall filters that need to be maintained, inspected and periodically changed, and that each failed filter could result in environmentally damaging emissions and lost productivity, consistent quality execution is paramount. Furthermore, students in this group freely express their desire to minimize time spent in conditions that are, at times, excruciatingly hot, dusty, or performed at extreme heights.

Engineers come from a contrasting profession but might also volunteer for GE's environmental protection courses to make their work lives easier. They design the equipment and facilities that the maintenance technicians utilize. These engineers must understand the implications of their decisions and how to prevent issues and maximize advantages such as technology. Those who provide the engineers the material options for designs and the products that the maintenance technicians install must be chosen by sourcing agents making the best decisions with the information at their disposal. These sourcing agents may attend to get tips and tricks from experts on how to make profitable decisions. Those who provide their own company training on environmental protection must be knowledgeable and confident of the material, and a few students in GE's environmental protection classes attend to absorb the information and teach it to coworkers. Regardless of the expertise pursued, students are given a money-back guarantee if they or their companies are dissatisfied for any reason, which has never occurred.

Training for enrichment. Some attendees of GE's environmental protection courses are seeking the personal and professional development that comes from the learning experience. It is not uncommon for adults who seek development to do so by volunteering for training (Macdonald & Kozak 2010). Within the GE environmental protection training, GE advertises the personal and professional development students receive from the training (GE, 2012, para. 4). These learning elements include making a business case for ideas, general problem solving techniques, and best practices for approaching troubleshooting guides (GE, 2012, para. 7).

Some students who attend the GE environmental protection seminars hope to gain the skills necessary to design, choose, diagnose, troubleshoot, and maintain environmental protection options that will give them career advancement opportunities. Within the environmental protection space, GE has several decades of experience in environmental protection elements that meet these needs. With both an advertising and classroom focus on enrichment, it is not unusual that a number of customers who volunteer for the training do so for the development element.

Seeking insight into the future. After completing the GE seminar, student customers will, hopefully, be able to perform job tasks that will enable them to stay compliant with present environmental regulations, as well as understand future governmental changes. I have observed a small but not insignificant portion of professionals who are seeking insights into how the future will affect their current and future work. For example, cement plant managers are facing new pollutant emission regulations that are causing some to shut down production, as it is not cost effective to

make the upgrades. These managers are attending GE's environmental pollution control classes to find solutions to this issue, while plant and environmental engineers at similar manufacturing sites want to learn how to prepare now for the same regulations that probably will apply to them in the future.

To comply fully with environmental regulations, some students need not only the transfer of environmental protection knowledge but also the expertise to make wise decisions regarding environmental protection elements today. For example, engineers need to understand if the installation of more expensive filters today will save money tomorrow or if money could be spent in other areas to meet compliance requirements of the future. GE markets that students might gain insights into tomorrow's demands by understanding how elements such as tightening government regulations and technical advancements influence the future, as well as potential solutions (GE, 2012, para 4). This subset of students is, at least partially, volunteering for insights into the future that could benefit their companies and themselves through possible job advancement, though it is also possible that their companies have mandated attendance to gain these insights.

Rest from work. Not all students who volunteer to attend GE's environmental protection training have obtaining the classroom information as their top priority. Postseminar surveys sometimes praise the seminar and use terms suggesting a vacation, office escape, or respite. Many who are not brave enough to submit these thoughts in writing confide in me that they volunteer for the training only for the fact that it gets them out of work. Those who attend sessions also submit surveys in which they admit that

escaping the drudgery, hardship, or tedium of work, even for a few hours a week, is ample reason to volunteer for company-paid training.

Thus, it appears that a small portion of the attendees are attracted by the fact that GE's environmental protection training is better than their work alternative. With the often difficult array of sometimes dirty, dangerous, monotonous, or tedious jobs that some of GE's students endure, it is not surprising that some might be attracted to a few hours away, or, perhaps even better, a company-paid trip with high-end dining options and events. These marketed activities include private area dining at Kansas City Royals games, trips to popular and rare retail options, and photo events at NASCAR tracks.

Disparity of Training Efficaciousness

The literature review revealed differences among the effectiveness of adult training programs in industrial settings such as variations in their quality and value. From industrial sales training (Hechtel, 2010) to federal environmental training (West, 2005), the signs of disparity in the quality and effectiveness of adult training stretch across industry sectors, social strati, and subject areas. Disparity is seen not only in struggling operations but in the most successful ones too. As I previously noted, there is a disparity in GE's environmental protection training results that support these observations.

Implications

GE's environmental protection classes result in varying degrees of knowledge transfer to students. For decades, research has explored the knowledge losses due to a failure to transfer learning to adults (Preskill, 1989), from Knowles's early work with andragogy to studies regarding transfer of knowledge (Bates, 1997) and recent research

of adult learners online (Hawthorn, 2007). Some are quantifying the financial impact of inefficacious training to industries (McAdoo & Manwaring, 2009), safety failings in industry (Rasikchandra, 2009), or environmental destruction (Haugen, 2006a). Researchers working on improving adult training have developed validated instruments to determine an adult's readiness to receive training (Weinstein & Palmer, 1994a).

Even with the development of validated tools and research, GE's environmental protection trainers are not as fully prepared for their classes as possible and thus cannot maximize delivery effectiveness. Although the trainers are given demographic data from the registration process, they must individually determine the best delivery for each class. This project study has led me to understand how to apply the relationships of students' demographics to their anxieties and ability to focus on training, which will lead to actions that support more predictable class outcome.

Summary

How people interact with the education that makes growth possible is as diverse as the people themselves. To fulfill the need for higher quality adult learning, and to make a positive social change for adult learners, corporations, and the communities that house them both, a study to investigate the possible existence of a relationship between adult learners' attributes and behaviors was beneficial. Specifically, this project study sought to understand the variation in results within GE's environmental services classes.

With billions of corporate dollars at stake, an enriched understanding of adult learners can help instructional designers improve GE's pollution control offerings as they improve the return on customers' training investment. The next section will explore the

methodology I used to gather the necessary quantitative data to investigate the guiding research questions. With this data, I analyzed the situation and proposed a support mechanism to address the problem of inconsistent knowledge transfer with GE's course.

Section 2: Methodology

Research Design and Approach

In this section, I will explain why I chose a quantitative methodology to address hypotheses regarding the unequal knowledge transfer resulting from GE's pollution control training. In addition, I will present the hypotheses themselves, along with the guiding questions that led to the chosen design. I created a survey instrument based upon scholarly research, and I will discuss the concepts the survey measured, how scores were calculated, the process for assessing reliability and validity, as well as a description of the data collection process itself. I will also discuss the population of the project study as well as information regarding the sampling size, methods, eligibility, protection of, and characteristics of the sample. Lastly, assumptions, limitations, and the scope of the project will be discussed.

Statement of Hypotheses Related to the Guiding Questions

The guiding questions of the study were:

1. For adult learners in GE's environmental protection course, is there a relationship between their level of formal education and their anxiety toward the training?
2. For adult learners in GE's environmental protection course, is there a relationship between their level of formal education and their ability to focus on training?

3. For adult learners in GE's environmental protection course, is there a relationship between their choice in attendance and their anxiety toward the training?
4. For adult learners in GE's environmental protection course, is there a relationship between their choice in attendance and their ability to focus on the training?

From the guiding research questions, four hypotheses were developed and tested:

$H_1$1: Adult learners in GE's environmental protection course with differing levels of completed formal education will have differing anxiety levels towards training.

$H_1$2: Adult learners in GE's environmental protection courses with differing levels of completed formal education will have differing abilities to focus on the class.

$H_1$3: Adult learners in GE's environmental protection course who attend under compulsion will have differing levels of anxiety towards the learning.

$H_1$4: Adult learners in GE's environmental protection course who voluntarily attend the learning will have differing levels of ability to focus on the class.

The null hypotheses for this project were:

$H_0$1. Adult learners in GE's environmental protection course with differing levels of completed formal education will have no differing anxiety levels towards training.

$H_0$2. Adult learners in GE's environmental protection courses with differing levels of completed formal education will have no differing abilities to focus on the class.

$H_0$3. Adult learners in GE's environmental protection course who attend under compulsion will not have differing levels of anxiety towards the learning.

$H_0$4. Adult learners in GE's environmental protection course who voluntarily attend the learning with not have differing levels of ability to focus on the class.

Methodology

To address the issue of inconsistent results within GE's pollution control training, I sought to compare specific adult behaviors and attributes. The guiding questions and hypotheses informed the methodology for this project study. I examined the relationships between variables that my review of the literature suggested leads adult learners to success or failure in training courses. In addition, I sought a study that could be generalized and thus used for other similar situations. This suggested a quantitative rather than qualitative methodology (Merriam, 2008). With these parameters in mind, a comparative design, meets the needs of the study, as recommended by experts, (Cohen, Manion, & Morrison, 2007; Lodico, Spaulding, & Voegtle, 2006).

Independent and Dependent Variables

Independent Variables

The survey included two short demographic questions, which were the independent variables for the study. The data from these questions were utilized to

comprise the independent variables of formal level of completed education and whether the student was attending under compulsion.

The first independent variable was coded as ordinal through the question on the created survey instrument:

1. What is the highest level of education you have completed?

    1. Less than high school
    2. High school/GED
    3. Some college no degree
    4. 2-year college degree (associates)
    5. 4-year college degrees (BS, BA, etc.)
    6. Master's Degree
    7. Doctorate Degree

The second independent variable asked:

2. Are you attending this training session by choice?

This variable is categorical. The two answers are *yes* and *no*, coded 1 for no, and 2 for yes, reflecting the negative to positive. Per best practice, the independent variables of this study, level of formal education completed, and choice in attendance were given numerical values; these values were only for statistical analysis, not as an evaluation or ranking (Green & Salkind, 2010).

Dependent Variables

Anxiety. My review of the literature highlighted the importance that anxiety has on the success or struggles of adult students. Through the literature review, I found many

resources dedicated to determining that anxiety has an effect on the ability to transfer knowledge. Some elements of previous research could be utilized while forming the research questions related to anxiety for this project. In addition, I found some areas of research that were lacking and needed more study.

For example, a large amount of scholarship relates to anxiety in adult students for whom English is a second language (Foroutan & Noordin, 2012; Mitchell, Myles, & Marsden, 2013; Nassaji, 2013). For example, Mitchell et al. found that "anxiety is a commonly reported experience for" adult learners who are in classes led in a language which is not their first language (p. 24). However, as GE's pollution control classes are only instructed in English, I could only from these researchers' findings about generalized anxiety, not their findings on instructing in English as a second language environment.

However, research did could be used to elucidate a study, because it was found that anxiety impacts an adult learner. For example, research exists on the negative effect that anxiety has on adult learners. Some researchers found "parallels between older individuals' anxiety over real or imagined intellectual failures" (Hayslep & Cooper, 2012). This research shows that anxiety, imagined or real, has an impact on successful learning. Bigdeli (2010) said that "among emotions, anxiety affects individuals in a…negative (inhibitory)" (p. 675). Furthermore, Rothenberg and Harrington's (1994) research on anxiety stated that "psychology has long acknowledged the debilitating effects of anxiety on learning and achievement" (p. 3).

Missing from the research were any direct comparisons between the behavior or anxiety, and the impact this has on an adult learner's level of education or choice in attendance. Thus, anxiety is a critical variable on which to focus this project study as a potential variable that might relate to adult learning behaviors and impact the variance in knowledge gained. From the literature review, I understood that anxiety was a dependent variable that needed to be investigated to see if relationships existed when compared to adult students' attributes. Research questions, hypotheses, and survey questions were based upon findings from this literature review.

Ability to focus. The literature review also made me aware of the importance of the ability to focus for adult learners. Classroom management is the subject of many research projects. Amongst these projects, I noticed that many were geared towards the negative impact that poor attention in the classroom creates. Many researchers from the past five years have built their scholarship on the foundational work of Hale and Lewis (1979). For example, Brand (2010), produced research to connect focus, attention, and achievement. She connects focus to concentration when "the learner's attention is focused on the required learning material, and the learner maintains this focus of attention, over a period of time, this prolonged or sustained attention is concentration" (p. 2). Bunce, Flens, and Neiles (2010), also based their research on the seminal work of Hale and Lewis and tracked how long students can pay attention in class before there is a loss of knowledge transfer by using system of electronic responders, or clickers. They found a varying degree of ability to focus for a varying length of time, and a decrease in

ability to retain knowledge as focus was lost. However, they did not attempt to identify demographic groups which might struggle more with focus.

Additional work that uncovers the negative impact of poor attention was done by Pallarito (2015), who reported on the importance of focus and identified two distractors, "external stimuli like noise or internal stimuli like daydreaming" (p. 1). Psychology researchers, such as those at the University of Massachusetts, have found that "If your attention is being broken constantly, you actually have to mentally reconstruct what you've been thinking…You've lost precious seconds and you may have also lost fundamental insights" (Van Dusen, 2015). Focus, or the ability to pay attention in class, was becoming an important theme for the successful transfer of knowledge.

Another example of research that has had a good amount of research work dealt with all ages of learners that suffer from the learning disability of Attention Deficit / Hyperactivity Disorder (ADHD). As it applies most to my population, I focused the literature review on (ADHD). While it may not be known which students within GE's pollution control classes must deal with this learning disability, I gleaned from the literature review that research has been done.

A few of the research projects that most helped me determine that the struggle to focus, sometimes because of (ADHD), were those done by Biederman, Mick, Fried, Aleardi, Potter, and Herzig (20005), who found a strong statistical correlation in their quantitative study and concluded that their "findings show that individuals with a diagnosis of ADHD are at a high risk of being unsuccessful" in gaining knowledge in workplace trainings (p. 1622). In addition, Rutledge, van den Bos, McClure, and

Schweitzer (2012) reported that any training that involves adult students with ADHD, which GE's pollution control classes might, must include a concerted effort to meet the needs of these individuals through techniques that I will discuss in the project formation portion of this study.

A common theme in ADHD research in adults in the classroom was the need to support cognitive therapy. An additional benefit of the research in cognitive therapy is that it often also deals with the same anxiety behaviors with which my previous literature review brought to the forefront regarding anxiety. Cognitive therapy, can be described by the work of Bherer, Kirk. Erickson, and Teresa Liu-Ambrose (2013) that delves into "distortions of facts and negative automatic thoughts" that are associated with a lack of focus because of ADHD (p. 98). This distortion of facts prevents logical processing of that which is the focus of learning. It is clear that focus must factor into research and hypotheses, though, as a researcher, I must, at this point, only include these as variables and identify what is relevant based upon the project.

Some research centered on the helpfulness and hindrance of increased technology in the classroom. For example, the research of Duncan and Barcyzk (2013) found using Facebook in class to build a community is effective but the use of Facebook for gaming or chatting with friends outside of class hinders knowledge transfer. Junco, Heiberger, and Loken (2011) came to a similar conclusion regarding Twitter use in the classroom. The introduction of more electronic devices into the classroom creates potential new distractions that challenge a student's ability to focus (Baker, Lusk, & Neuhauser, 2012). Digital age technology, such as social media, online gaming, and other potential

distractions were found to negatively outweigh the potential benefits, in a study done by Greenhow, Robelia, and Huges (2009).

Similar to anxiety, I had to identify the research that would not apply to my study's population of adult learners in GE's pollution control classes, to ensure I was selecting variables that would add value to the addressing this project's issue of disparate knowledge transfer. Some studies involved only the end user, or how a student can better prepare for paying attention in class. For example, an online forum, Study Guide and Strategies (2015), dedicates an entire guide entitled "Paying Attention in the Classroom". While this reinforces the need to study the impact that attentiveness has on adult learners, I knew I wanted to discover more information that could support the instructional design element, over which I have more control as compared to the nonemployee students that attend GE's pollution control classes. While I found excellent research projects to help students, the scholarship that I found most valuable included techniques that could be done by the instructors to help adult students maintain focus. I have minimal amount of control over the nonemployee students who come to GE to learn and do not receive a grade for the class, but I do have a wide span of control over what and how the instructors teach.

After the literature review, I understood that my research questions, hypotheses, and survey must include an investigation of possible consequences on learning effectiveness that focus, or a lack of focus, might have on training effectiveness. This may be a root cause of why some students return to their employers able to act upon the

training they received from GE, and others self-report, or have their managers who are also not employees of GE, report that there was a lack of knowledge transfer.

Table 1 shows the independent variable of anxiety's research questions, applicable hypotheses, and null hypotheses. These formed the foundation of the survey questions that I posited to those customers registering for GE's pollution control classes. Table 2 displays, in a similar fashion, the dependent variables. Table 2 explores similar hypotheses, null hypotheses, and foundations for survey questions.

Table 1

Independent Variables and Research Questions with Survey Questions

Independent Variable	Applicable Research Questions	Applicable Hypotheses	Null Hypotheses	Survey Questions
Formal Education Level	1. For adult learners in GE's environmental protection course, is there a relationship between their level of formal education and their anxiety towards training?	1. Adult learners in GE's environmental protection course with differing levels of completed formal education will have differing anxiety levels towards training.	1. For adult learners in GE's environmental protection course, there is no relationship between students' formal level of education completed and their anxiety toward learning.	What is the highest level of education you have completed?
	2. For adult learners in GE's environmental protection course, is there a relationship between their level of formal education and their ability to focus on the training?	2. Adult learners in GE's environmental protection courses with differing levels of completed formal education will have differing abilities to focus on the class.	2. For adult learners in GE's environmental protection course, there is no relationship between students' formal level of education completed and their ability to focus on the learning.	What is the highest level of education you have completed?
Mandatory Attendance	3. For adult learners in GE's environmental protection course, is there a relationship between their choice in attendance and their anxiety towards training?	3. Adult learners in GE's environmental protection course who attend under compulsion will have differing levels of anxiety towards the learning.	3. For adult learners in GE's environmental protection course, there is no relationship between the students' choices in attending the training and their anxiety toward the learning.	Are you attending this training session by choice?
	4. For adult learners in GE's environmental protection course, is there a relationship between their choice in attendance and their ability to focus on the training?	4. Adult learners in GE's environmental protection course who voluntarily attend the learning will have differing levels of ability to focus on the class.	4. For adult learners in GE's environmental protection course, there is no relationship between the students' choices in attending the training, and their ability to focus on the learning.	Are you attending this training session by choice?

Table 2

Dependent Variables and Research Questions with Survey Questions

Dependent Variable	Applicable Research Questions	Applicable Hypotheses	Null Hypotheses	Survey Questions
Anxiety	1. For adult learners in GE's environmental protection course, is there a relationship between their level of formal education and their anxiety towards training?	1. Adult learners in GE's environmental protection course with differing levels of completed formal education will have differing anxiety levels towards training.	1. For adult learners in GE's environmental protection course, there is no relationship between students' formal level of education completed and their anxiety toward learning.	I avoid attending training because I didn't do well in school. When I am in training, I feel anxious. I have negative memories of school. My previous classroom experiences make me feel less self-assured during training. I avoid telling my peers what my level of education is.
	3. For adult learners in GE's environmental protection course, is there a relationship between their choice in attendance and their anxiety towards training?	3. Adult learners in GE's environmental protection course who attend under compulsion will have differing levels of anxiety towards the learning.	3. For adult learners in GE's environmental protection course, there is no relationship between the students' choices in attending the training and their anxiety toward the learning.	I get nervous when the trainer asks me questions in a training class. My anxiety about training affects my sleep the night before the class. I am concerned with making mistakes in front of my coworkers. I am worried that taking training will negatively impact my home life. I volunteer to participate in classroom or online training activities, even if there is risk of failure.

(table continues on next page)

Dependent Variable	Applicable Research Questions	Applicable Hypotheses	Null Hypotheses	Survey Questions
Ability to Focus	2. For adult learners in GE's environmental protection course, is there a relationship between their level of formal education and their ability to focus on the training?	2. Adult learners in GE's environmental protection courses with differing levels of completed formal education will have differing abilities to focus on the class.	2. For adult learners in GE's environmental protection course, there is no relationship between students' formal level of education completed and their ability to focus on the learning.	My workload impacts my ability to focus on training. My job requires me to be on-call, available to be contacted even in trainings. Family or relationship issues often arise that affect my ability to focus on training. When in training, I am worried I am missing out on family time. Financial worries distract me from focusing on training.
	4. For adult learners in GE's environmental protection course, is there a relationship between their choice in attendance and their ability to focus on the training?	4. Adult learners in GE's environmental protection course who voluntarily attend the learning will have differing levels of ability to focus on the class.	4. For adult learners in GE's environmental protection course, there is no relationship between the students' choices in attending the training, and their ability to focus on the learning.	New material comes slowly to me. I often check the time during training to see how much is left. I am often unable to arrive on time for training. I use technology to keep connected to my outside life when I'm in training. I think taking training at work will not improve my life.

Instrumentation and Materials

To investigate the problem of inconsistent results from GE's pollution control classes, I sought to learn what relationships exist between levels of education and choice in training with anxiety and the ability to focus. To collect the quantitative data necessary, I used a relational survey I created for this project study based upon previous research. While building the instrument, I paid careful attention to best practices and multiple research viewpoints on the subject. For example, I incorporated ideas from research experts, to ensure a mix of behavioral, personal, and attitudinal questions (Creswell, 2008; Lin-shuang and Zi-jiang's, 2007; Rose, Jeris, and Smith, 2005; Weinstein and Palmer, 1994a).

Survey Instrument

Survey designs are used when seeking generalizability and I sought to make general understandings about a broader population's behaviors from a smaller sample of that population (Lodico et al., 2010). The survey design is preferred by some researchers as it has the advantage of economy and rapid data processing (Creswell, 2009). As suggested by Backhaus and Liff (2007), a survey is useful to gather data from a population of adult learners who have taken part in workplace training. The survey was single stage, in that direct contact with the target population was immediately available (Creswell, 2009).

The sample consisted of industrial workers, who were employees of companies other than GE, and were registering for GE's classes. These external customers were electronically presented with a pop-up survey. The customers could easily exit the

window to decline participation, or they could agree to the survey terms and conditions, and record answers simply by electronically selecting the most appropriate answer.

The survey contained 22 questions, 10 each for the two variables of (a) anxiety toward training, and (b) ability to focus on training, and two categorical, demographic questions to determine data for the variables of (a) education level, and (b) choice of attendance – a copy of the survey is presented in Appendix B. For each survey statement pertaining to the dependent variables, participants selected a numerical value for what degree the assertion was reflective of them, "*not at all typical of me"* valued at 1, "*somewhat typical of me*," valued at 2, "*typical of me*," valued at 3, "*mostly typical of me*," valued at 4, and "*very typical of me*," valued at 5. Those registrants that filled out the survey and had responses to anxiety related questions that had a mean closer to 5, "*very typical of me,"* indicated self-reported higher levels of anxiety towards the training. Likewise, those who had a mean closer to 5, "*very typical of me"* regarding ability to focus were self-identifying a tendency to have a harder time focusing on the training than those respondents whose answers to the same questions trended towards 1, "*not at all typical of me."*

I chose this scale based upon its use in previous studies that I used as a benchmark (Prins, 2009; Somerville & Lloyd, 2006). I wanted to use a scale labelling that closely matched the studies that most influenced me, such as Weinstein and Palmer (1994b). A Likert scale was a good match as it provided a range of answers that have a theoretical equidistance between each response. In addition, Likert scales allow for flexibility based upon need according to researchers who have focused on adult learners

in workplace trainings (Croadsmun & Ostrom, 2011; Norman, 2010). Finally, this coding forced among the sample population to choose a position, accepted as a best practice by statisticians such as Creswell (2008).

The 10 questions on the survey that related to anxiety were influenced by several researchers, including Hawkins, Reddy, and Bunker (2007); Rose, Jeris, and Smith (2005), and Winter (2009), who all successfully analyzed physical, emotional, psychological, and behavioral sets to measure classroom anxiety. Hawkins, Reddy, and Bunker (2007) found, "one in six adults met criteria…for anxiety" and that anxiety has increased in the workplace "as illustrated by increases in stress-related compensation claims and days lost because of stress-related conditions" (p. 107).

The following questions were created to measure anxiety for this research based on Hawkins et al. (2007):

3. I avoid attending training because I didn't do well in school.
4. When I am in training, I feel anxious.
5. I have negative memories of school.

Giancola et al. (2009) utilized a survey instrument that incorporated an array of previous survey work on anxiety. This work includes the Anxiety Appraisal scale (Skinner & Brewer, 2002), Work–Family–School Conflict scale (Hammer, Grigsby, & Woods, 1998), COPE (Carver, Scheier, & Weintraub, 1989), Satisfaction With Life scale (Diener, Emmons, & Larson, 1985), and General Health Questionnaire 12 (Goldberg, 1978). The anxiety related questions on my survey influenced by the summation of this work were:

6. My previous classroom experiences make me feel less self-assured during training.
7. I avoid telling my peers what my level of education is.
8. I get nervous when the trainer asks me questions in a training class.
9. My anxiety about training affects my sleep the night before the class.

The final source for the survey questions that dealt with anxiety was the work of 60 scholars who developed and validated the START survey instrument, led by Weinstein and Palmer (1994a), who posited that anxiety creates a situation where learners sabotage their own efforts. Specifically designed for the workplace, the locations of where the authors tested the instrument, including a manufacturing plant, were of particular interest to me for my project study (Weinstein & Palmer, 1994b). Influenced by their work, I created three workplace specific anxiety questions:

10. I am concerned with making mistakes in front of my coworkers
11. I am worried that taking training will negatively impact my home life
12. I volunteer to participate in classroom or online training activities, even if there is risk of failure

The 10 questions I asked on the survey regarding a student's ability to focus on training were based on other validated surveys and research in this area. Research that dealt with the topics of ability to focus, but not in relation to levels of education and choice in attendance, though did deal with adult training in the workplace, influenced the creation of the survey questions regarding ability to focus.

For example, Sudol and Hall (1991) created a survey to measure distraction pressures, such as irrelevant course content, behaviors, and supervision of their teaching by less experienced instructors. I based survey questions regarding modern technology distractions on work by those trying to understand this rapidly evolving issue such as Barak, Lipson, and Lerman (2006), who found mixed benefits and distractions of using laptops in conjunction with training. In addition, I included survey questions to reflect the work of researchers, such as Kay and Lauricella (2011), who included balancing the positives of classroom technology for students, including life/work balance, such as smartphones allowing for the efficient handling of child care issues, and the distractions of such technology, such as social media, games, and movies. Questions created for this project study survey reflecting this research work were:

13. My workload impacts my ability to focus on training.
14. My job requires me to be on-call, available to be contacted even in trainings.
15. Family or relationship issues often arise that affect my ability to focus on training.
16. Financial worries distract me from focusing on training.
17. When in training, I am worried I am missing out on family time.

Factors such as learning disabilities that are factors outside of the control of both the trainer and the student are assessed in my survey, per my observation that GE trainers struggled when students with learning obstacles lose focus on the training. This idea was captured in the question:

18. New material comes slowly to me.

From Lin-shuang and Zi-jiang's work (2007), I drew the importance of attitude toward training. This was reflected through questions:

19. I often check the time during training to see how much is left.

20. I am often unable to arrive on time for training.

From Denger (2008), I borrowed the element of technology effecting classroom engagement. The single question for this area is:

21. I use technology to keep connected to my outside life when I'm in training.

The START instrument's survey questions pertaining to motivation toward training influenced work related questions for my project study survey (Weinstein & Palmer, 1994b), as is:

22. I think that taking training at work will not improve my life.

Calculations of Scores

The independent variables were level of formal education completed and choice in attendance, and I sought to find relationships between the response data from these with the response data from the dependent variables of the attributes of anxiety and ability to focus using the means of a created survey tool. The independent variable of formal education had seven categories, and, thus, when comparing means, I used an ANOVA, after first checking that the data met the criteria for this test. As the choice in attendance only had two choices to compare independently against the attributes of anxiety and ability to focus, I used an independent samples *t* test to compare means.

Setting and Sample

The setting for this project study was GE's pollution control trainings, presented to nonGE employees. In person trainings are delivered at a customer facility, such as a cement plant or an oil platform in the desert, at various GE facilities, or at a conference center. The sessions are hosted by GE trainers who are experts in pollution control, but are not experts in learning.

Pilot

A commonly recommended technique for increasing face validity and reliability is to host a pilot, or test of the survey instrument (Barta, 2009; Ben-Jacob & Liebaum, 2009). Thus, before the survey was available to the customers registering for GE's pollution control classes, who are not GE employees, and as part of the validation process, 35 GE employees took the online survey to pilot this study. As soon as I received approval for data collection, the 25 GE trainers of the environmental protection classes, and 10 GE coworkers took the project study survey. I included a check on response bias to ensure allowing nonresponses would not have significantly changed the validity of the results by asking half of the responders to answer every question as a mandate, and allowing the other half to leave blank answers.

After taking the pilot survey, I contacted all participants, either in person or by phone, to discuss their feedback. Based upon the feedback, I modified the survey and redistributed it to five additional GE workers. These workers, different from the first group of employees, were then asked for feedback for a final improvement to the survey. I physically observed all aspects of administration of the surveys, to see if areas of the

instrument caused the participants delays, perhaps indicating an unclear or confusing question.

Those involved with the pilot test were GE employees, unlike those attending the GE pollution control classes, who are not GE employees. In addition, the pilot contributors were purposefully selected, and thus, lacked the status of anonymity that was afforded those who participated in the project study's data collection surveys taken by nonGE employees. To ensure adequate protection of human subjects, all protocols for the protection of participants that were in place for the full study were in place for those who pilot tested. Pilot test participation was voluntary, confidential, and pilot participants were free to withdraw from the pilot process at any time. Participants were provided notice of their rights using the document in Appendix C.

From the results of the pilot, I could determine that the survey made practical sense. Participants were not confused by questions, and I revealed in follow up sessions that the survey did address the research questions. Thus, the pilot succeeded in proving that the project I was undertaking would, in terms of face validity, result in data that could elucidate the issue of inconsistent knowledge transfer to GE's customers.

Population

The population under consideration for this study was nonGE employees, who were adult learners, registering to purchase and participate in GE's environmental protection trainings. These classes draw from an industrial work force of 11.5 million people within the U.S. (United States Department of Labor, 2012, para. 1). Of this

number, an estimated 450,000 have jobs that would make them candidates to attend the environmental trainings under consideration (US Department of Energy, 2012, para. 1).

Sampling Method

From the estimated population of 450,000 potential students who could register for GE's pollution control class, I considered the first 1,000 registrations after IRB approval. It took 146 days for 1,000 people to register. Every person who registered for GE's environmental protection classes was given the option of taking a survey which would provide data for this project study, or to opt out of the optional survey and go straight into the registration process. This purposeful sampling was most efficacious for the project study.

Of the initial 1,000 registrants I analyzed for GE's pollution control classes, 756 opted into taking the survey, giving a response rate of 75.6%. I analyzed the results from these 756 students, which comprised the sample of the study, and exceeded the minimum benchmark level for survey designs of 350 (Creswell, 2008; Udemgba, 2009; Wade, 2009). A response rate of at least 70%, or 700 responses, was the ideal target suggested by statisticians, including Cresswell (2008) and Ritter and Sue (2007), and was also used as common practice amongst other social science researchers (Giancola, Grawitch, & Borchert, 2009).

Eligibility Requirements

All registering customers of GE's environmental protection trainings, (all external to GE), were eligible to participate in the study by agreeing to the survey's online "Terms and Conditions". Students that did not complete the registration process did not have their

surveys included in the study. Because I desired a diverse sampling, no participants who registered for the class and opted into taking the survey were excluded.

Characteristics of the Sample

The sample was entirely comprised of nonGE employees. These students are from companies who buy pollution control services and products from GE and are from a wide variety of industries, such as cement plants, power producers, and mining companies. Those who attend GE's trainings represent diverse backgrounds that include a breadth of jobs, ages, races, education levels, and socio-economic classes.

Validity

Many of the survey questions were based upon the validated instruments of other researchers. When adapting these questions for the needs of my project study, I followed recommended techniques. For example, to avoid nonresponse bias, all survey questions were mandatory to answer. The survey specified that the student should answer regarding feelings and actions towards trainings in general, not the specific trainings for which they might be registering. I added a statement regarding how the confidential survey might improve future sessions of the GE learning, and how their cooperation was appreciated. A copy of the questions appears in Appendix B.

When building the survey, I was careful to use terms that resulted in questions that measured what I intended to measure, and I utilized a software tool, Macmillian Readers Level Test, to ensure the questions were worded at a sufficiently understandable, sixth grade level. This technique, as well as ensuring that questions only focused on one variable, is based on best practice (Creswell, 2009). Once the survey was finalized and

pilot tested, an appropriate name was given to the survey instrument, General Electric Training Survey. For the pilot, the survey was given a more nondescript title, Training Questionnaire, in the hopes of not over-informing or influencing the participants and their results.

Reliability

For my own survey instrument, I adopted the best practice of keeping response types consistent across the independent variables, *"not at all typical of me"* valued at 1, "*somewhat typical of me*," valued at 2, "*typical of me*," valued at 3, "*mostly typical of me*," valued at 4, and "*very typical of me*," valued at 5. In addition, the number of questions pertaining to each dependent variable was both 10 questions, per best practice (Creswell, 2009). I ensured reliability in scoring and testing by having a GE worker rescore the tests separately from knowing my score tabulations. In addition, I kept questions short and focused each on only one concept, again, building off of established best practices for survey collection (Zatz, 2012).

Much like validity, the reliability of my survey instrument was supported by the work of previous researchers (Barak, Lipson, & Lerman, 2006; Carver, Scheier, & Weintraub, 1989; Denger, 2008; Diener, Emmons, & Larson, 1985; Giancola et al., 2009; Goldberg, 1978; Hammer, Grigsby, & Woods, 1998; Hawkins, Reddy, and Bunker, 2007; Lin-shuang and Zi-jiang, 2007; Skinner & Brewer, 2002). For example, to ensure reliability of their survey instrument, the START creation team tested the reliability among 226 test participants over time, in various corporate training classes (Weinstein & Palmer, 1994). Statistical analysis resulted in high reliability of the instrument.

While the reliability of this survey was supported by previous research, it needed a reliability test of its own to determine if the survey had reasonable internal consistency. To achieve this, I analyzed Cronbach's alphas from the pilot test responses, and the first 100 survey respondents. Again, other project studies in the social sciences that sought similar knowledge enhancements and that used surveys, utilized a Cronbach's alpha test to determine if any survey questions were redundant, unnecessary, or contradictory. For this project, I utilized a baseline of 0.6, again based upon previous research and understanding that this was the first attempt at utilizing this survey. Cronbach's alphas were first computed on the pilot group responses and are shown in Tables 3, 4, 5, and 6.

Table 3

Cronbach's Alpha for Survey Questions Related to Anxiety in Pilot Group

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	*N*
.636	.656	35

Table 4

Cronbach's Alpha Results for Anxiety by Question in Pilot Group

Survey Anxiety Question (*N=35)*	Cronbach's Alpha if Item Deleted
Q1. I avoid attending training because I didn't do well in school.	.434
Q2. When I am in training, I feel anxious.	.404
Q3. I have negative memories of school.	.367
Q4. My previous classroom experiences make me feel less self-assured during training.	.415
Q5. I avoid telling my peers what my level of education is.	.464
Q6. I get nervous when the trainer asks me questions in a class.	.434
Q7. My anxiety about training affects my sleep the night before the class.	.428
Q8. I am concerned with making mistakes in front of my coworkers.	.471
Q9. I am concerned that taking training will negatively impact my home life.	.399
Q10. I volunteer to participate in classroom or online training activities, even if there is risk of failure.	.585

Table 5

Cronbach's Alpha for Survey Questions Related to Focus in Pilot Group

Cronbach's Alpha (*N=35)*	Cronbach's Alpha Based on Standardized Items
.622	.657

Table 6

Cronbach's Alpha Results for Ability to Focus by Question in Pilot Group

Survey Anxiety Question (*N=35)*	Cronbach's Alpha if Item Deleted
Q11. My workload impacts my ability to focus on training.	.300
Q12. My job requires me to be on-call available to be contacted even in training.	.344
Q13. Family or relationship issues often arise that affect my ability to focus on training.	.467
Q14. Financial worries distract me from focusing on training.	.197
Q15. When in training, I am worried I am missing out on family time.	.452
Q16. New material comes slowly to me.	.023
Q17. I often check the time during training to see how much is left.	.542
Q18. I am often unable to arrive on time for training.	.580
Q19. I use technology to keep connected to my outside life when I'm in training.	.187
Q20. I think that taking training at work will not improve my life.	.541

After I determined from the pilot study, made up of GE employees, that no survey questions needed dismissing, I analyzed the first 100 responses provided by nonGE employees registering for pollution control classes. The reliability of questions 14, 16, and 19 were quite low. However, I chose to include these in the surveys until further analysis could be done, especially with the target sample. The sample, unlike the pilot group, has the luxury of anonymity, and this anonymity might influence a person's response. To this end, I performed a Cronbach's alpha test on these 100 responses from the nonGE employees. The analysis determined that the removal of any one question did

not significantly improve the overall legitimacy of any answers, and so all questions remained, as seen in Tables 7, 8, 9, and 10.

Table 7

Cronbach's Alpha Results for Survey Questions Related to Anxiety

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	*N*
.771	.790	100

Table 8

Cronbach's Alpha Results for Anxiety by Question

Survey Anxiety Question (*N*=100)	Cronbach's Alpha if Item Deleted
Q1. I avoid attending training because I didn't do well in school.	.721
Q2. When I am in training, I feel anxious.	.724
Q3. I have negative memories of school.	.724
Q4. My previous classroom experiences make me feel less self-assured during training.	.713
Q5. I avoid telling my peers what my level of education is.	.730
Q6. I get nervous when the trainer asks me questions in a class.	.729
Q7. My anxiety about training affects my sleep the night before the class.	.735
Q8. I am concerned with making mistakes in front of my coworkers.	.748
Q9. I am concerned that taking training will negatively impact my home life.	.771
Q10. I volunteer to participate in classroom or online training activities, even if there is risk of failure.	.865

Table 9

Cronbach's Alpha Results for Survey Questions Related to Ability to Focus

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	*N*
.681	.689	100

Table 10

Cronbach's Alpha Results for Ability to Focus by Question

Survey Ability to Focus Question (*N*=100)	Cronbach's Alpha if Item Deleted
Q11. My workload impacts my ability to focus on training.	.670
Q12. My job requires me to be on-call available to be contacted even in training.	.706
Q13. Family or relationship issues often arise that affect my ability to focus on training.	.634
Q14. Financial worries distract me from focusing on training.	.671
Q15. When in training, I am worried I am missing out on family time.	.652
Q16. New material comes slowly to me.	.649
Q17. I often check the time during training to see how much is left.	.638
Q18. I am often unable to arrive on time for training.	.630
Q19. I use technology to keep connected to my outside life when I'm in training.	.648
Q20. I think that taking training at work will not improve my life.	.670

From both the analysis on the pilot group responses, made up of GE employees, as well as the first 100 respondents to the questionnaire, who were all employees of outside companies, analysis of Cronbach's alpha tests revealed that the subtraction of any one question did not improve the reliability of the survey.

Data Collection and Analysis

The data collection and analysis was built to explore the inconsistent results for the nonGE employee customers who purchase and attend GE's pollution control training. Thus, a better understanding of the situation was needed, as addressed by four guiding research questions:

1. For adult learners in GE's environmental protection course, is there a relationship between their level of formal education and their anxiety towards training?

2. For adult learners in GE's environmental protection course, is there a relationship between their level of formal education and their ability to focus on the training?

3. For adult learners in GE's environmental protection course, is there a relationship between their choice in attendance and their anxiety towards training?

4. For adult learners in GE's environmental protection course, is there a relationship between their choice in attendance and their ability to focus on the training?

An understanding of relationships supported by data collected through a survey allowed me to examine each research question, compare means, and address hypotheses.

Data Collection

I administered the surveys through an online survey tool available to people outside of the GE company, SurveyCentral, which is free, and is often used to collect data from GE customers, who are not employees of GE. It is this tool that is used to register the nonGE students for GE's pollution control events. This sophisticated online survey instrument has the flexibility to create matrix questions, branching answers, and customizable questions. When students, who are individuals outside GE, register for a GE environmental protection external training, they were first presented with a pop-up window asking if they would be interested in taking an optional, 22 question anonymous survey.

SurveyCentral took those who do not want to participate directly to the registration process for GE's environmental protection classes. Those registering students who chose to participate were given the optional 22 question survey before automatically being directed to the course registration process. No specific customer information was tied to the optional survey data, such that any specific piece of data could be attributed to any one individual. The answers to the 22 questions that registering students were asked were collected by SurveyCentral's online tool. Results were then exported to Microsoft Excel and then into the Statistical Package for the Social Sciences (SPSS), version 21, to analyze the results.

Nature of the Scale for Each Variable

Anxiety and ability to focus on training were all measured on 5-point Likert scales, wherein it was assumed that there is an equal distance between values. To revisit,

the scale was "*not at all typical of me"* valued at 1, "*somewhat typical of me*," valued at 2, "*typical of me*," valued at 3, "*mostly typical of me*," valued at 4, and "*very typical of me*," valued at 5. The demographic variables were categorical, with responses assigned numerical values that had the effect of labels rather than to show statistical significance:

1. Less than high school
2. High school/GED
3. Some college no degree
4. 2-year college degree (associates)
5. 4-year college degrees (BS, BA, etc.)
6. Master's Degree
7. Doctorate Degree

The second variable asked: Are you attending this training session by choice? With a 1 assigned to those who chose to attend, and a 2 affixed to those who were mandated to attend. The statistics that resulted from the survey data collection were parametric, based on the logical assumption of normally distributed data (Green & Salkind, 2011).

Results from the two dependent variables were examined to ensure even distribution. The variable regarding if a student had elected to attend or was mandatorily required by an outside entity showed an expected spread that neared 50%. This can be seen in Table 11.

Table 11

Distribution of student election to attend course

Q21. Are you attending this training by choice?	*n*	Percentage
Attending by choice	374	49.4%
Attending by compulsion	382	50.6%
Total	756	100%

The distribution of students' highest level of formal education completed was normally distributed. The breakdown can be seen in Table 12.

Table 12

Distribution of students' level of education

Q22. What is the highest level of education you have completed	*n*	Percentage
1 = Less than high school	151	19.9%
2 = High school/GED	153	20.2%
3 = Some college no degree	135	17.8%
4 = 2-year college degree (associates)	74	9.7%
5 = 4-year college degrees	117	15.4%
6 = Master's Degree	82	10.8%
7 = Doctorate Degree	44	5.8%
Total	756	100%

Data Analysis

This project was developed to address inconsistent results of knowledge transfer to nonGE employees attending training on pollution control hosted by GE. To explore potential reasons for this random result, I investigated relationships between mandatory or elective attendance in training, education level, and adult behaviors. 14,000 invitations were directly distributed to nonGE employee customers that the GE marketing team had identified as most likely to attend the GE hosted pollution control seminar. However, anyone outside of the GE corporation can register to attend, regardless of if they received a direct invitation. Once 1,000 students registered, data collection began on the 756 students who elected to fill out the survey. Survey responses were analyzed using IBM SPSS, version 21. Each participant was assigned categorical numbers reflecting two independent variables: formal level of education completed, and choice of attendance. These independent variables were compared singularly with the means of the dependent variables of anxiety and ability to focus on training. Data were analyzed for relationships using a *t* test, and an ANOVA test, with a $p < .05$ level of significance, per best practice (Green & Salkind, 2011). With the *p* values set at < .05, I was indicating that less than 5% of results could be due to chance, which is a standard benchmark for social science investigations (Creswell, 2008). With this analysis, I could address my four hypotheses by either accepting or rejecting the null hypotheses.

A quantitative analysis of the responses of these 756 surveys from those registering for GE's pollution control classes helped me to use data to elucidate the evident disparity of learning effectiveness. By sampling and surveying the actual students

of the class, I was in the best position to accept or reject my hypotheses based on direct student feedback. In addition, a quantitative analysis of the students' level of formal education and choice in attendance allowed for comparisons to be made to behaviors, such as anxiety, and ability to focus.

Next, I separated the survey questions related to the dependent variables into two sets of ten, one set focused on anxiety and the other on ability to focus in training courses. With the scores from the Cronbach's alpha tests being high, it is possible to combine the questions' scores, and calculate a combined means for the two datasets. These combined means for the questions related to anxiety and ability to focus can be used for both the ANOVA calculation and the *t* test. I then sought statistically significant differences in the combined means between these dependent variables and the two independent variables of level of education completed and choice in attending the class.

First, in preparation for the ANOVA tests that I performed to uncover statistically significant relationships between the means of the dependent variables and the independent variable of level of formal education, I tested for homogeneity of variance. The homogeneity of variance test informed decisions related to further tests, such as if a Brown-Forsythe or Welch, was needed. This data set met the variance test with a significance of 0.375 for anxiety and 0.584 for focus, as seen in tables listed in Appendix E. Thus, no further tests were needed, and I could proceed with the ANOVA analysis. First, I addressed the two hypotheses explored the relationships between level of formal education and anxiety and ability to focus. These comparisons addressed the first two hypotheses.

***H_1*1: A student's level of education and anxiety toward the learning.** Using the IBM SPSS computer program, and with the tests for homogeneity meeting the standards for an ANOVA, I first used an ANOVA test to compare the means between the seven levels of formal education for anxiety to address the first hypothesis of: Adult learners in GE's environmental protection course with differing levels of completed formal education will have differing anxiety levels towards training. I combined the tenquestions regarding anxiety to produce one measure.

First, the data analysis revealed that there was a difference in the combined mean regarding anxiety related questions, when compared to formal level of education. There was a notable significance for the ANOVA $F(6,755) = 25.087$, $p = .000$. Tables that show the ANOVA calculations are located in Appendix E. The ANOVA test only reveals if there are differences in means, not, when all answers related to anxiety are combined and compared against level of education, which level or levels of education influenced the statistical significant. Thus, a post hoc test was necessary, to reveal which factors had statistically significant mean differences. I ran a Scheffé post hoc test, per best practice (Field, 2013), that ensured the combined means of the ten questions related to anxiety had a similar effect on the mean difference. Because nearly all the means of each of the ten anxiety questions were statistically significant at a $p<0.00$ level, I could safely combine these questions' means to determine which variability in means between the seven groups, produced the statistically significant differences. The test revealed that the difference in means were influenced most by two groups, those without a high school diploma or equivalency, and those with only a high school diploma or equivalency. Thus,

it can be stated that those without any college experience self-reported a higher level of anxiety than the other four groups.

However, it should be noted that the difference in means could be considered low. The combined mean of those without a college degree is 2.87, compared to the combine mean of the group of students that identified as having a degree of 3.33, on a 5-point scale. This difference of 16% reveals a pattern, especially with the sample size, but dramatic findings are not evident. However, the data analysis allowed for rejection of the null hypotheses. There was a difference in means between groups of people with differing levels of education and perceived, self-reported levels of anxiety that was statistically significance. The null hypothesis that stated that there is no difference between those with differing levels of formal education and anxiety, and, thus, the alternative hypothesis can be accepted. However, again, there is certainly not an indication that the anxiety is dramatically different.

***H_1*2: A student's level of education and ability to focus on the learning.** Next, I performed the data analysis to address the second hypothesis: Adult learners in GE's environmental protection courses with differing levels of completed formal education will have differing abilities to focus on the class. I followed a similar process as when I addressed the first hypothesis. First, I took the combined mean for the questions related to ability to focus, and then performed an ANOVA to determine if there was a significant difference in the means of this combined mean when compared to the levels of formal education. Again, there was a model significance for the ANOVA $F(6,755) = 17.69$, $p = .000$. Tables that show the ANOVA calculations are located in Appendix E.

At this point, the null hypothesis can be rejected, as there is a statistically significant difference in the combined means. The alternative hypothesis that there is a difference in means can be accepted. After determining a significant difference in means existed, I ran a Scheffé post hoc test to determine which of the seven levels of formal education had a statistically significant difference in means when compared to the combined means of the questions related to ability to focus. Similar to the first hypothesis, I felt scholastically responsible in evaluating a combined means for the post hoc test, as most questions were at or near a significance level of $p<0.00$ This post hoc test revealed that, again, two groups caused the statistical significance, those without a high school degree or equivalent and those with only a high school degree or equivalent. These groups' combined mean of 2.75 compared to the other five groups' combined mean of 3.4 on a scale of 5 is a difference of 23%. Thus, it can be said that the group without any college experience self-identified a pattern of behavior that struggles more with ability to focus, but are not necessarily overly challenged by focusing. Thinking of a 5-point scale, with 3 as a mid-point, and the group of responders that had a statistically significant means difference, a mean of 2.75 cannot be said to be dramatically more unable to focus.

***H_1*3: A student's choice in attending the training and anxiety toward the learning.** Next, I addressed the third hypotheses, regarding anxiety and choice in attending the class. Considering the independent variable of choice in attending by choice, there are two, unrelated groups, wherein, a person who took the survey could only be in the group categorized as mandated to attend the course, or not mandated to attend.

A single person could not be in both groups. In addition, the groups were normally distributed. The dependent variable of anxiety was measured with a continuous, 5-point Likert scale, while the independent variable of choice in attendance consists of two, categorical groups. As previously discussed, the Levene's test ensured that there was a homogeneity of variance, again, as seen in the tables listed in Appendix E. Thus, when I considered all of these factors, I concluded that the data analysis should be done by running an independent samples *t* tests to either reject or accept the third hypothesis, that there is no difference between the means.

Similar to my approach to the ANOVA, I used the combined means for the questions related to anxiety. These combined means were then analyzed for statistical significance when compared to the two groups of those who chose to attend the pollution control courses, and for those who were mandated to attend. By running an independent *t* test, I was able to evaluate if the differences in the combined means was statistically significant with a *p* value of < 0.5.

Again, I used the SPSS tool to perform the analysis. First, I again combined the means for the questions regarding anxiety to form one mean. I then used this singular, combined mean, to compare against the means of the groups who attended by choice, and those who attended under mandate. From the *t* test I found statistically significant results, with those who were mandated to attend having slightly more anxiety ($M = 3.02$, $SD = 0.15$, $p = 0.0000$) compared to those who chose to attend ($M = 2.35$, $SD = 0.27$, $p = 0.000$). This is a difference in means of 22%. While the difference in means is significant, based on the *p* value, a glance at the mean shows that it 3.02 is extremely close to the true

mid-point of the 5-point scale of 3. While it is possible to say that those who are registering to attend GE's pollution control classes enter the class with a greater self-reported anxiety, I must be cautious when basing decisions around this group. However, when designing a solution to mitigate the uneven transfer of knowledge, it can be noted that all students, regardless of choice in attendance, tend to have some anxiety, though not particularly high or low levels.

***H_1*4: A student's choice in attending the training and ability to focus on the learning.** For the final hypothesis regarding a person's choice in attendance and that person's self-reported ability to focus, I took a similar approach as the analysis for the previous hypothesis. Again, within the independent variable of choice in attending by choice, there are two unrelated groups and the groups were normally distributed. The dependent variable of ability to focus was also measured with a continuous, 5-point Likert scale, while the independent variable of choice in attendance consisted, again, of two, categorical groups. Thus, it was once again best to use an independent *t* test to compare the means of those students who chose to attend the course with those who attended under a mandate with the combined means of the ten questions pertaining to ability to focus.

First, I again combined the questions related to focus, to produce a singular mean. When comparing the means between the group that chose to attend to the combined mean regarding the ability to focus ($M = 3.33$, $ST = 0.26$, $p = 0.000$), against the group that was mandated to attend ($M = 2.87$, $ST = 017$, $p = 0.000$), the null hypothesis can be rejected. The null hypothesis stated that no difference in means would be found. Because the

statistical analysis did find a significant difference in means, the alternative hypothesis can be accepted. However, again, the difference is not dramatic. There is a smaller difference between means as compared to the difference in means for the third hypothesis, 22% difference for the third hypothesis compared to 13% for this, the fourth hypothesis.

Regardless, there is still a statistically significant difference in means. First, this allows the rejection of the null hypothesis, that there would be no difference in means, and acceptance of the alternative hypothesis, that this is a difference in means. Second, I noted that there is a self-reported of issues with focusing on training. If the means had been near 1 on this 5-point scale, I might be able to dismiss focus as an issue for students. However, even if the differences in means were not dramatic, there is a pattern of behavior that suggests focus could be an issue for students. Thus, addressing this issue might result in less disparity of knowledge transfer within GE's pollution control classes.

The results from both the third and fourth hypotheses, while significant statistically, showed that, regardless of choice in attendance, students registering for GE's pollution control classes have anxieties and varying struggles with focusing. While not intensely overly or under anxious, nor especially distracted or highly focused, there is a pattern of behavior that can be addressed. Because it is known that students leave GE's pollution control classes with varying degrees of knowledge, something must be done to improve this fact. An area in which to start is informed by these hypotheses that statistically prove that there is a difference in means between the factors of anxiety and ability to focus, against level of education and choice in attendance. Even if the

difference is slight, students do report some anxiety and inability to focus, and this must be addressed if there is any hope to alleviate the disparity of knowledge transfer.

Assumptions, Limitations, Scope, and Delimitations

This research, similar to most all of social science research, has assumptions and limitations, many of which are inherent to the design. In addition, the scope and delimitations provide context for future scholars regarding the results and conclusions I make with the project study.

Assumptions

1. All survey participants were not employees of GE, and were, instead, employees from outside companies that were paying to attend GE's hosted training.
2. Participants gave thoughtful, truthful answers to the survey questions.
3. No GE staff influenced the results of the surveys.
4. Participants who might have had any distress while taking the survey ended their participation immediately, utilizing the survey's escape feature.

Limitations

1. The project study only dealt with nonGE employees who are purchasing training opportunities from GE, and may not reflect any unforeseen views of customers of competitors' environmental protection trainings.
2. Due to the limitations of the study, gender differences were not addressed, and no survey question asked for gender identification.

3. Participants might have software that blocks the pop-up survey used by SurveyCentral.
4. The survey was only available in English, as is GE's training.

Scope

1. The project focused on those students in GE's environmental protection classes only.
2. Changes to the pollution control class were out of scope, as the approvals necessary for this highly regulated class could take years. However, what was in scope is anything that can be done to improve the delivery of the class.
3. Contractors and GE employees who might have volunteered to attend the training for job or product understanding or at the mandate of their managers were in scope of the project, as they too are adult learners.
4. Any differences related to gender were not included in the scope of the project.

Delimitations

1. No directional hypotheses were posited, only that there was a difference between means.
2. The U.S. boundaries delimited the project study.
3. Any industry that works with environmental protection was involved.
4. Students must attend the class in person, not via a surrogate and they may not miss more than 10% of the class to receive class credit, but their survey

responses, due to the nature of the study and its anonymity, were still included.

5. All 25 GE trainers were in place for the pilot of the study.

Raw Data Availability and Management

The raw data are comprised of survey responses, number of participants, response rates, relevant survey information, and pilot results. The anonymity of the survey protected respondents, so no names are available for accidental identification. I programmed the data collection tool to automatically purge the survey from its database 5 years from the completion of the data collection, per best practice outlined by Sieber (1998).

Summary of Findings

Through this project study, I was able to reject all null hypotheses and accept the alternative hypotheses. Patterns emerged from the self-identified survey responses, though the statistical differences, while significant, were not dramatic differences. However, the patterns identified are useful for addressing the purpose of this project study, to mitigate the inconsistent transfer of knowledge amongst participants in GE's pollution control trainings. For example, the survey results revealed that, regardless of choice in attendance, students report having some anxiety, while not an extremely high or low factor.

While the class material might not be able to change, the delivery style of the GE trainers can much more easily be adapted. To address the disparity of knowledge transfer in GE's pollution control classes immediate changes can be made, based on the project

study. Students, particularly those without college experience as revealed through the ANOVA and post hoc tests, self-reported anxiety and inability to focus on the class. Regardless of what degree anxiety and inability to focus can effect a student, the trainers should be taught adaptation methods to deal with these factors as a means to addressing some of the inequality of results from the GE pollution control course. Future, directional studies would be revealing, and this project study has provided a framework, along with relevant data, for future scholars to explore relationships between anxiety, ability to focus, choice in attendance, and level of education. However, immediately, measures can be taken to alleviate the issue of knowledge transfer I sought to address in this project study.

Participant Protection

Protection of the individuals who took the time to assist with this project study was of the utmost importance. In addition to my own study, my research procedures were designed to ensure that I protect GE's reputation by maintaining vigilance with customer data. For example, GE policy forbids compensation of customers for feedback; I helped customers understand that participating in this study was optional, but that participation would assist me in completing this project study. Additionally, in pursuit of the protection of my project's participants, I completed the National Institute of Health's Protecting Human Research Participants course, found in Appendix E.

All those who took a survey were asked to accept the Terms and Conditions of SurveyCentral. These Terms and Conditions outline the customers' willingness to participate and have their data utilized without compensation. Those who participated in

the optional 22 question survey related to this study received an electronic consent form to accept as part of the Terms and Conditions, the same as the pilot group received, shown in Appendix D. The survey was anonymous, and customers were able to see the results of the survey once they had completed taking it; both techniques are best practices (Creswell, 2009).

This project study did not purposefully target marginalized populations such as the disabled or pregnant women, though the possibility existed that members of these populations may choose to register for classes and, thus, were eligible to participate in the study. All participants were kept anonymous, and pilot test participants were kept confidential, as anonymity was not possible. The survey participants were protected by the Terms and Conditions, and the anonymity offered by SurveyCentral's software. I only knew and was able to refer to individuals by a survey number, protecting participant anonymity at all times. At the end of each survey question page, a "skip forward to registration" encouraged any participants who might have felt emotional, physical, or psychological distress, to immediately end their survey taking and move directly to registering for the GE class.

Furthermore, the project used words devoid of bias and embraced inclusion throughout, as informed by other social science projects that utilized survey data for quantitative analysis such as Stier's (2010) project that was dedicated to sampling bias. Challenges to reliability and validity were addressed with a variety of techniques, many of them informed by Delice's (2010) project on quantitative sampling challenges, wherein I also provided only valid results by refusing to suppress or falsify data to meet

the project requirements or any other prejudiced goal. In addition, the results of the study were made available to all participants upon their request, the procedure for which is described in the Terms and Conditions.

Summary

In an effort to address the inconsistent results of GE's environmental protection classes, I used a survey to collect data from those registering for this training. The survey was divided into ten questions dealing with anxiety, ten questions regarding the ability to focus in class, and two demographic questions, the level of completed formal education, and whether or not the student attended by choice. The influence of the adult learners' level of formal education completion and their choice in attendance served as independent variables, while the adult learner's anxiety and ability to focus on the training were the dependent variables of the project study.

Using an ANOVA test with a post hoc Scheffé analysis, I analyzed the data to find differences in the means between those with differing levels of education with anxiety and ability to focus. The post hoc test allowed me to pinpoint which groups had the most statistically significant means differentiation. Regarding comparing the differences between choice in attendance, a two category independent variable, and the sets of questions regarding anxiety and ability to focus, I performed an independent *t* test. All statistical analysis had a confidence factor of 95%.

This research project was successful in adding to knowledge regarding potential effects of mandatory education and level of education on anxiety, and ability to focus. Most importantly, a solution can be posited that will help to address the disparate levels

of knowledge transfer from GE's pollution control courses. Further study could include directional hypotheses, but a valuable solution to disparate knowledge transfer can result from this project study.

This project was informed by comparing the means of survey respondents in the behavioral areas of anxiety and ability to focus, with the demographic information of formal education level completed and choice in attendance. Even though the project did not test for directional hypotheses, analysis performed did show patterns that can inform remedies to the variation of results in knowledge transfer from GE's pollution control courses. In all cases, the alternative hypotheses could be accepted, and the null hypotheses, that there was no statistical difference among groups, could be rejected. Thus, a remedy to the issue of disparate knowledge transfer is needed and possible with the input from this project study's findings.

The next section will describe the proposed solution, in detail, from the findings of the project study, based upon the data collection and analysis. This solution is a train-the-trainer class that will enable the trainers to understand that, based upon registration information, they can be prepared with techniques to address anxiety and ability to focus, as needed. The pollution control classes are rigorously audited to ensure they contain the information required by regulations, and by bodies that issue CEUs. Thus, content changes to the pollution control course are not being suggested. Instead, what can be altered is the approach the trainers have to the material. In addition, the following section will outline how the class will be implemented, including its purpose, goals, strategies and organizational logistics.

Section 3: The Project

Introduction

This project study was developed to address the issue of inconsistent knowledge transfer from GE's pollution control courses. I investigated relationships between the attributes of anxiety and ability to focus with formal education obtained and voluntary attendance in the training. With the data provided by students of GE's pollution control classes at the time of registration, adaptations can be made by the instructors to facilitate stronger classes with more predictable results. Again, those that participate in GE's pollution control classes are not themselves employees of GE, so little more is known about the individuals than information they provide during registration. However, using the data analysis from this project, it is possible to introduce a solution which will make trainers aware of important characteristics within their student populations, and give techniques for mitigating the disparity of knowledge transfer. Changes to the pollution control class materials require lengthy approval processes, so what is most logical to address the most immediate needs is to enable the instructors with more skills.

Description and Goals

The goal of this project study is for students, who are not GE employees, to return to their companies with less variation in the amount of knowledge gained, and able to more uniformly apply key concepts. Minimizing the disparity in knowledge transfer will address the concerns that prompted this study. To achieve this goal, I will use the statistical comparisons I found while performing the analysis for this project study, while keeping in mind that the comparisons in means that I found were small, but uncovered

patterns nonetheless. In addition, I will utilize leverage best practices I discovered in the literature review, to inform a strategy for lessening the variability in knowledge transfer stemming from GE's pollution control classes.

With the goal of lessening the disparity among learners attending GE's pollution classes, GE's trainers might better understand the different classroom styles they might face, as informed by the findings of this project study. These trainers are industry experts with formal education ranging from high school graduation to doctoral studies. All trainers are extremely knowledgeable regarding pollution control, engineering, mechanics, and industry terminology. However, no trainers have a training background; rather, these trainers were first hired as subject matter experts, and then positioned to instruct customers. As I found with the literature review, this scenario is not uncommon in corporations, such as with E*Trade, Accenture, and Time Warner Cable (Cushard, 2012).

A best practice that I found in numerous research projects, that mitigates disparate knowledge transfer, is a train-the-trainer course. This technique proved useful in Leschinsky and Messemer's 2010 study with accountant SME trainers at a pharmaceutical company. This study had similar experts as the GE trainers who "come to the table with either little or no formal background" in training, but who are responsible for compliance training (p. 18). Here compliance training by SMEs is a common theme; though the focus of the compliance is different, financial compliance versus pollution control compliance.

Researchers (Ross-Gordon, 2001) have found that trainers who "prepare themselves for the training/mentoring role by participating in Training of Trainers type workshops increase their potential to enhance the professional growth and development of classroom teachers, and increase learning outcomes" (p. 23). This will be an important research theory as I progress into the solution for my project. Thus, I will be conscious to create awareness on the part of the trainers that there exists different classroom types, and it is important to adapt teaching methods to make the transfer of knowledge most effective.

Currently, at GE, there is no supporting mechanism to increase the instructional skills of these specific trainers, and a course needs to be introduced, such as a train-the-trainer program. This genre of methodology is supported by researchers such as Cushard (2012), as well as Reivich, Seligman, and McBride's project to improve SME trainers within the U.S. Army (2011). Suhrheinrich (2011) performed a study that combined several seminal train-the-trainer researcher projects and found a "sound body of literature supporting its effectiveness in a variety of contexts" (p. 11). The development of the train-the-trainer will be done in an iterative fashion, as suggested by Nadler and Nadler (2012). In addition, feedback will be sought after each iteration from the future classroom participants, as suggested by Rothwell and Kazanas (2011). The train-the-trainer program created has many facets, such as scenarios, cohorts, and feedback based on brainstorming, meaning it is considered a complex instructional design. With this is mind, the instructional design methods will follow a systematic, or complex design, as

outlined by Van Merrenboer and Kirschner (2012). This approach will be detailed through the description of the class development below.

The train-the-trainer class will be informed by the patterns that emerged from the self-reported data of this project, focusing upon anxieties felt and abilities to focus. General scholarship and techniques for training improvement will be leveraged that will improve the skills of the trainers. The principles of the Analyze, Design, Develop, Implement, and Evaluate (ADDIE) model was helpful in designing the train-the-trainer course. Numerous scholars have devoted much time and resources to understanding and working with this ADDIE model (Eshun & Osei-Poku, 2013; Magliaro & Shambaugh, 2006; Mellard, Fall, & Woods, 2013).

The proposed train-the-trainer course for those GE trainers who host the pollution control class will be offered on a monthly basis, and has the goal of the pollution control trainers attending at least one three day session each year. The ongoing sessions will include those new trainers just hired, as well as any trainers whose managers have identified learning opportunities. The frequency of the train-the-trainer offering is based upon Salas, Tannenbaum, Kraiger, and Smith-Jentsch (2012), that consolidated the results of 84 train-the-trainer studies to find the optimal regularity.

This three day, intensive study course will be divided into practical applications, role plays, understanding the customer/student, the introduction of skills and demographic data to evaluate each session individually. The train-the-trainer class will focus on understanding that each of the pollution control training session is made up of

individuals. These individuals have varying levels of anxiety and ability to focus, as well as level of education and choice in attendance.

A rigorous agenda has been created and is shown in Appendix A, but if one area requires more discussion, then the class will be allowed to exhaust that area before moving to another topic. Again, the class has the ultimate goal of producing more consistent results from the pollution control classes offered by GE. As a beneficial byproduct, the train-the-trainer course hopes to infuse the SME trainers with adult learning principles and teaching techniques themselves.

Currently, each pollution control class has a rigorous preparation element. However there is no tailoring of each class for the information gained from registration data. There are scholastic best practices for developing train-the-trainer programs for which this project study can be based. For example, Kofeel and Reidt (2014) have formulated a train-the-trainer workshop based upon improving confidence and results through design and evaluation. Thus, a train-the-trainer course, built on successes such as Kofeel and Reidt's will serve as the foundation to mitigate the disparity of knowledge transferred during GE's pollution control courses.

While changes to the fundamental content of the pollution control classes are cumbersome and may not be implemented for a period of years, changes to how trainers instruct can have an immediate impact. In addition, any improvement to the trainers' skills is transferable to any course the trainers might teach in the future. For example, an ability to assess registration information, as well as fundamental adult learning strategies will improve the outcome of all classes these trainers instruct.

Course Description

This section will explain this project study's outcome, which is a train-the-trainer course for GE's pollution control trainers. Through this project study I have found that students of GE's pollution control classes, regardless of level of formal education or choice in attendance, have a slightly higher anxiety than the mean of a random group. While this is a slight elevation, it still suggests the need to address anxiety in the classroom. A similar statement can be made regarding the slightly elevated, self-reported sense that focus was difficult to maintain in GE's pollution control classes, than if a random group had been surveyed. In Appendix A, there are training notes, the PowerPoint presentation for the course, the agenda, and relevant materials.

On the first of the three days of class, goals and objectives, as well as ground rules for the course, will be discussed. It is important to establish these goals and objectives and ground rules, a best practice succinctly established by Thomas (2012). Only after the purpose of the class is understood by all attendees will the instructor move on to an activity.

This activity will focus on encouraging the class to begin to think through the difficulties that they face in the classroom. Open ended questions will be asked of the class, such as "What frustrates you in the classroom," "How much information do you feel your students retain," and "What skills do you want to gain to be more effective as an instructor." This will create a dialogue as the trainers, who in this situation are students, build upon one another's thoughts and experiences. It is presumed that many of the trainers will share the same experiences, though barriers to the transfer of knowledge and

shared frustrations might not be readily thought of by all. To this end, the discussion will incite thoughts and experiences from all participants that can be used to enrich the classroom experience. Open ended questions, as described by Half (2010), allow for students to reflect, and, through the practice of articulation, connect seemingly disparate thoughts into concise reasoning.

Following the activity on identifying key issues in the classroom will be an exploration of training tools available to the GE trainers. These tools will be examined to see how they might or might not be used by the GE trainers. During this section, the students of the train-the-trainer class will break into pairs, and explore how each person uses which resources, the reasons, and why others are not used. The use of pairs is based on the theory of cooperative learning, wherein students "work together to help one another" which also fosters support and feedback (Tsay & Brady, 2010, p. 79). Cooperative learning has been much researched and validated by numerous projects (Hsiung, 2012; Slavin, 2014; Tadesse & Gillies, 2015).

This activity will consist of brainstorming and then recording how each tool could be used in a reflective journal. The effectiveness of journaling when adopting new tools is a tactic recommended by scholars such as Birney (2012), who "found the practice of writing in reflective journals aids in the development of critical reflection skills" (p. 8). Tools will be recorded by the class instructors, and following the class, they will ensure that all tools have visibility to all trainers of GE's pollution control classes. As discussion on tools occurs, trainers will make note of anyone who self-reports as a skilled or expert user of the tool, so that future trainers can utilize those with expertise as mentors. The

establishment of more experienced mentors with those that have less experience is a best practice based on works like that of Bell and Goldsmith (2013) that found a decrease in the length of time it takes for knowledge transfer, and an increase in effectiveness. In addition, Bichy and O'Brien (2014) found mentorships reduce costs through a decrease in employee turnover and increased employee satisfaction.

After a break, the class will reconvene and begin to dissect and understand the registration information that each student who signs up to attend GE's pollution control training class completes. At this point, this project study and the trends that it suggests are introduced. Understanding patterns that the data suggests is pivotal to the success of utilizing this project study and making it actionable.

First, the registration form itself will be reviewed by the entire class. Some minor edits might be made to the form for each class, such as event space specific questions such as accessibility needs for the disabled, but core questions, such as choice in attendance is always asked on each form. Questions will be read through, and any students with specific needs for clarification will be invited to speak.

At this point, the class will divide into groups of three to four 4 people, again relying upon the principles of cooperative learning, to discuss how each question could inform teaching strategies. This exercise has the purpose of having the trainers who review the registration information for each class to begin to think of the registration process as more than a simple form that helps students sign up and GE collect tuition money. Each group will report to the whole class its findings and ideas. The instructor

will encourage discussion around registration questions that connect to the project study areas of anxiety, ability to focus, choice in attendance, and level of formal education.

The instructor will then lead a whole class interaction on the registration data, again using open ended questions such as "What are you looking for when you review the registration forms of your pending student," "What changes do the answers to the questions lead you to making when preparing for a class," and "What underlying issues might be revealed if you had a class that was mostly comprised of attendees who were mandated to attend." During this discussion, particular attention will be paid to demographic information, such as the level of completed education and choice in attendance. From this, the class will be encouraged to hypothesize how this demographic and behavior information might influence instruction style, the behaviors of the students, and mitigating practices. Allowing the class to first hypothesize before having the instructor introduce the project study's hypotheses helps the learner engage and maintain motivation to learn, as is supported by studies such as Margol (2015) who focused on learners' motivation, and Rabourn, Shoup, and BrckaLorenz (2015), who studied adult learners' barriers to engagement.

Following lunch, the class will begin to explore principles related to adult learning. This section has the goal of encouraging the class to begin thinking about ways in which they could utilize registration data to create an environment more suited to adult learners using the principles of andragogy (Knowles, 1968). This section begins with an interactive portion that asks the class to reflect on how they remember early schooling,

any collegiate experience they have, and contrast that to how they felt during classroom sessions where they did not have the choice to attend.

The instructor will outline the six principles of andragogy and how they differ from pedagogy, the need to know, the learner's self-concept, the role of experience, readiness to learn, orientation to learning, and motivation. The bulk of this time will be spent understanding the effects that experiences have on adults. The class will be asked to brainstorm what specific experiences attendees of GE's pollution control classes might share. There will be exploration as to how readiness to learn changes throughout a person's life. The class will brainstorm how they think readiness to learn effects the people who come to GE's classes. The practice of brainstorming has been widely research and I have chosen to include many brainstorming elements because it engages the learner (Wlodkowski, 2011). Researchers have also shown that brainstorming stimulates the brain in a way that passive listening does not (Hunter, 2014; Tate, 2012).

Trainers that show the most enthusiasm for the topic of adult learning will be asked to use GE's internal blogging tool to moderate an intranet site where all trainers, can contribute ideas, recommendations, suggestions, and posit questions about adult learning issues they might face. The use of a blogging tool is based upon work such as that done by Greenhow, Robelia, and Huges (2009) that found that 50% of adults use social media to discuss learning related issues and this results in an 80% increase in knowledge transfer.

Following an afternoon break, the class will reconvene and begin a discussion on learning in the workplace, such as that which the students of GE's pollution control

classes might face. To aid with this exercise, GE has purchased numerous copies of the START survey tool, developed by Weinstein and Palmer (1994a). By having the students take the survey, they can begin to self-evaluate their own workplace training habits. In addition, this will facilitate the different variants that might impact an adult learner. For the final portion of this section, copies of ASTD's State of the Industry Report will be distributed to be used as a future reference piece. Time will be spent looking at specific reports, such as the investments that industries, such as the companies who are sending students to GE's trainings, are making in both human capital and tuition expenditures.

This class day will end with a review of the day's material. In particular, attention will be paid to areas that were brought up by the students as opportunities to leverage tools, resources, or as an opportunity to rely upon other experts. The day will wrap up with a question and answer session so any immediate thoughts or curiosities can be addressed. The practice of dedicating time to ensuring there is no confusion or unanswered questions helps to mitigate potential misunderstandings, it makes more advanced concepts more approachable, keeps the participants enthusiastic for more information, and meets the needs of different styles of learning such as auditory learners (Robinson, 2015).

The second of the three training days will begin with a review of the first day's learnings. Questions or thoughts that might have arisen overnight will be first on the agenda. Research by has shown that additional ideas and questions by students may not arise until after an evening to ponder key principles, such as andragogy and the registration information, and a refresher of the previous day increases the probability of

learning retention, again based upon Robinson's work (2015). Before more information is introduced, it is imperative that the class has a firm grasp on what has already been discussed.

Immediately following this review, the class will be given two sample registration roster information sheets. Applying the theories and learnings from the previous day, combined with the concerns and classroom struggles that have been self-identified, the trainer will go through the individual responses to each question. The class will be invited to respond to open ended questions that focus on behavioral and demographic information. The purpose is to have the class begin to connect registration data to this type of information that results in the understanding that each class has a unique dynamic.

The class will again divide up into groups to evaluate the sample registration provided and identify commonalities, demographic anomalies, and consider the tools and resources available to brainstorm what this registration data might reveal about this particular class. Each team will then report out on their logic behind how they defined dominate class traits. The process of reporting out and receiving feedback is an important area for learning. Boero, and Novarese (2012) found that feedback is applied, either consciously or unconsciously by adults even after training is done, and helps those adult learners to make the best choices when faced with similar situations to those on which they received feedback.

The class trainer will emphasize any mentioning of choice in attendance, level of education, and behaviors, particularly anxiety and ability to focus. A minimum of an hour

will be dedicated to techniques that can be utilized in each classroom scenario to mitigate anxiety and lack of focus. These techniques will be based upon the principles of andragogy, and cover areas such as presentation skills, handling conflict, engaging adult learners, motivating learners, and using the experience of the adults as a learning tool. Other anxiety mitigation strategies will be based on the scholarly work of Kolb. Many adult learners who have been removed from the world of learning for any period of time often, as Kolb (2015) writes, approach learning with anxiety and "a sense of fear…[they think] 'I've forgotten how to study" (p. 6).

About 30-minutes will be dedicated to the introduction of autogenic learning, a technique to reduce classroom stress. GE has widely adopted this practice and has best practices located on its intranet. However, not all trainers may be familiar with, or comfortable in leading autogenic relaxation sessions within the pollution control program. GE has based much of its use of autogenics on the work of Wagener (2013). Relaxation, mindfulness, and awareness techniques will all be explained and then practiced.

The class will then move on to discussing the ability to focus. If a class registration form indicates that there will be a likely high number of people who will struggle to separate themselves from their daily work, and will need more frequent breaks, the instructor can announce that there will be frequent pauses in instruction with the purpose of allowing students to check in on work situations. This can mitigate the lack of focus shown in a class made up primarily of this demographic, a best practice suggested by Yap, Rogers, Holmes, Hannan, and Cukie (2010).

After a lunch break, the trainer will introduce additional techniques to improve focus in class, such as introducing ground rules on the use of electronic devices. Ground rule examples will be provided, such as those proven effective for the Northern Michigan School of Instruction and Design. This institution has the policy that includes not checking outside email and "turn off instant messaging during class time and refrain from playing games on your computer" (p. 5). However, just like in the train-the-trainer class, the GE pollution control classes will not require the elimination of outside electronic devices as significant research, such as that done by Zhu, Kaplan, Dershimer, and Bergom (2011) found the appropriate use of electronics can aid learning: "laptops and other portable devices are like any classroom tool; they function best when they fulfill a clear instructional goal and when they are used in specific ways that support student learning" (p. 5).

Next, a discussion on enabling those students who might have learning difficulties, such as ADHD, will be introduced and solutions discussed. Much of this work is based on Rutledge, van den Bos, McClure, and Schweitzer (2012) who found that creating specific events with a set agenda, such as the ones that are created for the train-the-trainer course "can yield improvement in impulsivity in ADHD (p. 546). The class itself has these techniques infused throughout it, but it is worth pointing out to the trainers that not all students will have the same level of abilities.

Next, the class will break into cohorts of three to four individuals. Each group will be given a worksheet, as shown in Appendix A. This worksheet will provide sample answers to registration questions from fictitious students. The cohorts will then match the

student answers with the classroom situation and behavioral traits they might show. Again awareness of differences amongst students is paramount, such that each class is not treated the same regardless of behavioral traits, feelings of anxiety or educational background.

Within each cohort, the students will discuss their strategies for dealing with each situation, such as enforcing a strict policy against electronic devices in the class balanced with ensuring that it is clear that numerous breaks will be allowed for the checking of outside needs. In addition, autogenics will be discussed, along with other anxiety mitigation techniques. The cohorts will be provided with solutions from previous training sessions to facilitate idea generation. Using flip charts and brainstorming, the cohorts will draw from their various instructing histories to develop best practices.

The class will reconvene, and share with the larger group the findings from their smaller group discussions. Dialogue and an open forum will help to facilitate discussion amongst the class members as ideas are exchanged on how to address common issues of anxiety and inability to focus on the class. These ideas will be recorded and posted online, as well as used in future trainings.

Similar to the first day of training, the end of the day will conclude with a question and answer session. This time is intended to ensure all students have questions answered and there are no outstanding items. This section will also include priorities for the next day's training.

The third and final day of training will begin similarly to the second, wherein the instructor will lead the class through a review of previous material. Any questions or

unknowns that may have arisen over the night will be addressed. Finally, the class trainer will use this time to probe for any topics that must be covered before the end of class to ensure that all classroom participants will walk away from the class with a feeling of success, and able to act upon suggestions that will minimize disparity in the transfer of knowledge.

After this calibration, the class will discuss best practices on building lesson plans. This is a weakness for these trainers, as they lack instructional design or training backgrounds. An awareness of how to effectively build lesson plans will help to drive consistency in the outcome of the learnings (Knowles, Holton, & Swanson, 2014). Fortunately, there are numerous tools available to GE employees, such as the trainers of the pollution control class, on creating lesson plans. The class instructor will show a video, introducing learning plans, referenced in Appendix A. The class will then break into pairs and develop a sample lesson plan for one of the pollution control topics. Time will be allotted at the end of the section for the teams to present their sample lesson plan.

Following lunch, the class will divide into five groups to practice preparing for the types of trainings they will encounter. After lunch, there are two hours dedicated for the five groups to practice delivering their plans. The train-the-trainer students will be asked to mimic the traits of those classes that have differing levels of completed education, choice in attendance, and a mixture of anxiety and focus. Feedback will then be provided. This role play exercise takes into the account of research, such as that done by Jarvis (2011) that explains that a collective effort is more efficacious and negates many of the negativities that might come from introspection.

As the day comes to an end, the instructor will ensure that all questions have been addressed. The final question and answer session will be double in length. The issues and frustrations that the instructors mentioned at the opening of the class will be paid particular attention to, ensuring no one leaves the session with confusion. Instead, the sharing of ideas and the empowerment to adapt each class to meet the needs of the students should give each trainer the confidence and knowledge to deliver an experience that results in more consistency.

To verify the effectiveness of this train-the-trainer course, a survey will be distributed at the end of the course, as seen in Appendix A. A portion of the survey is dedicated to free form notes, wherein the students can write any suggestions to improve the course. These survey results will be used to build a better subsequent course, just as the brainstorming results will be collected by the facilitator for use in future classes. The seminal work of Kirkpatrick (1994) argues conclusively for the use of surveying in program evaluation, and many scholars have built upon the Kirkpatrick philosophy (Boud, Cohen, & Sampson, 2014; Strother, 2002).

A rubric, shown in Appendix A, will be used to evaluate the performance of the trainers who have gone through the train-the-trainer course. The use of a rubric provides a standardized measurement tool so participants and evaluators have an objective tool for measuring success and identifying areas of improvement, which is supported by the work of Murphy and Carson-Warner (2012). Each instructor will be observed by a mentor three times. Each trainer would be scored against the rubric, for three separate pollution control classes, which would be over a period of about 6 months. The train-the-trainer

course will be deemed successful if scores on the rubric and performance appraisal numeric rise by 20% from the first to the last observation.

Rationale

By adapting their styles, based upon the findings of this project, trainers can host more effective classes that result in more predictable knowledge transfer for the students of GE's pollution control classes and the companies that depend upon them. When students register for GE's pollution control classes, they are asked a number of mandatory demographic questions, but little has been previously done to help the trainers adapt their styles according to the characteristics of their students. A train-the-trainer course could lessen the variation seen in learning results from GE's pollution control courses. A decrease in variability should, in turn, increase student attendance. This will not only allow GE to further establish itself as a thought leader in the industry, it will also give confidence to managers outside of GE who are paying to send their employees to the class.

Review of the Literature

With the completion of the data analysis of this project study, and with the proposed solution to address some of the disparate knowledge transfer in GE's pollution control classes, I again searched for scholarship around topics related to my efforts. This second literature review was informed by the data collection and analysis process I underwent. Using research databases, including Education Resources Information Center (ERIC), SAGE Publications, and Google Scholar, I again searched for peer reviewed articles. I kept the search terms consistent with the first literature review, and included

"adult learning or education or training and anxiety," "adult learning or education or training and focus," "adult learning or education or training and mandatory," "adult learning or education or training and choice," "adult learning or education or training and graduation," "adult learning or training and education and level," using the Boolean approach. While there are hundreds of resources that explore the topics of mandatory learning, anxiety, and ability to focus in the class, I was not able to find scholarship that explores relationships between these factors. The second review of the literature, thus, reinforced that the specific hypotheses of this study had yet to be addressed by other researchers. Other scholars have studied similar scholastic areas, such as adult learners with low levels of formal education (Kaplan & Owings, 2008) or classrooms that mixed students with differing amounts of education (Kelly, 2010). However, the four specific hypotheses I considered had not been analyzed.

With the new data from the statistical analysis, I found research to inform the project study results. For example, Izgar's (2009) study on school principals, Rojewski, Lee, and Gemici's (2012) work on career-technical research, and Li and Lomax's (2011) project on statistical software used the same type of train-the-trainer solution I used for this project study. Rubrics, surveying, cohorts, mentorship, and feedback sessions are all key components of their research. On the topic of mentorship, the second literature review explained the benefit of both mentors and mentees, such as the research done by Murphy and Carson-Warner (2012) that found mentors of trainers "experience growth in the following areas:

- Exposure to new and diverse perspectives as they work with classroom teachers,
- Improved coaching and listening skills,
- Increased satisfaction with work,
- Leadership skills,
- Professional involvements" (p. 27).

Further supporting this project study's goal are workplace statistics, as revealed by the second literature review. The U.S. will add jobs in the environmental sector by a factor of 28% by 2016 (United States Department of Labor, 2012), coupled with an increase in government regulations (US Department of Energy, 2012). These increases will result in a demand for GE environmental protection training. Industries across the world are investing in training to limit their impact on the climate, meet environmental regulations (Bahn & Barratt-Pugh, 2012), to enhance community good will (Haugen, 2006a), or in response to a regulatory violation (OSHA Regional News Release, 2012).

For example, to ensure the energy they produce does not harm the environment, plant managers and environmental engineers at power plants are seeking to understand environmental protection, and are turning to those they know in the industry for assistance. GE manufactures the equipment that creates one-fourth of the worlds' energy, and the equipment that controls the pollutions this energy makes. GE is seen as a leader in understanding a variety of pollution control products and services, and leverages this expertise to provide training to its large customer base (Linebaugh, 2012).

Theoretical Framework

Once again, while executing the project study, the theories of andragogy provided the theoretical foundation of this project. According to Knowles (1998), adult education instructors should use the 6 assumptions to create a climate of learning, the need to know, the learner's self-concept, the role of experience, readiness to learn, the orientation to learning, and motivation, which will lead to active participation by the learner. Knowles also suggests an assessment method for andragogy (Merriam & Caffarella, 2007) that provides the basis for the evaluation methodology of this project study.

Motivation plays a role in each of the six assumptions. Houde (2006) stated "motivation plays an implicit role" (p. 90). Understanding the motivations behind adults and why they are learning feeds into understanding the ability to focus, and why some students are more anxious than other. Regarding motivations, Knowles (1998) made one of his strongest assumptions by stating that, while adults do have external motivators, it is the internal pressures that are "the most potent motivators" (p. 68). Instructional designers can leverage internal motivators when creating programs, such the train-the-trainer program I suggest with this project study to address the issue of disparate knowledge transfer.

Some scholars, like Klapan (2001) expanded the concept of motivations to include needs and wishes, "Needs are tightly connected to wishes, desires, strivings to reduce the lacks of some situation, to steady it and to bring it into the state of balance" (p. 3). Supporters of andragogy practices like Houde (2006) added to motivation the

importance of an adult's experience as a usable resource for educators as "the learner's experience is a valuable resource in the classroom" (p. 93).

While the theory of andragogy created a framework for my project study, I did not lose sight of its critics. For example, Wartenberg (1994) expressed the concern that andragogy may be employed in an application which undermines the very assumption of motivation, "adults frequently have an urgency to learn and often get frustrated when presented with a lengthy step-by-step approach to learning" (p.6). Thus, the train-the-trainer program I created avoids lengthy prescriptive solutions, and favors collaborative approaches, and demonstrations within a safe space.

Review of Dependent Variables

Some students in GE's environmental protection courses exhibit behaviors of anxiety, such as nervousness when called upon to give answers. Because attendees of GE's pollution control classes are not employees of GE, but rather customers of GE who use GE as a pollution control supplier, it happens with regularity that these students come from companies that compete in the marketplace. Having a competitor in the same classroom, an unchangeable economic reality, could cause student anxiety. I uncovered in my second literature review some research that discusses the problems with having students that know trade secrets in a class together (Johnson, Duckworth, Apelbaum, & McNamara, 2010), but no research on how to mitigate the issue. Other students do not exhibit any signs of the anxiety they feel, but only reveal anxiety in private, and other may suffer in silence. Research shows that these hidden anxieties are more disruptive to learning retention than overt anxieties (Wimshurst, Wortley, Bates, & Allard, 2006).

I noted further effects of anxiety in the second literature review that supported my efforts to mitigate the anxiety (Ben-Jacob & Liebman, 2009; Shedletsky, 2006). For a positive learning experience, including the successful transfer of knowledge, this literature review supported the notion that adult learners should have as little anxiety about the experience as possible (Fleming, 2008). Anxiety negatively impacts adult learners in a variety of ways, including the loss of ability to utilize the learning (Mitchell, 2009).

Specific techniques I suggest for the train-the-trainer course, such as autogenic exercises to reduce stress in the classroom, were also supported by research I found in the second literature review, such as the work of Kanji**,** White**,** & Ernst (2006), who were able to statistically prove that autogenic learning reduces classroom stress. To further inform the autogenic portion of the train-the-trainer section on combating anxiety, I searched for other refining terms such as meditation, and discovered research such as the work by Parish (2010) on mindfulness.

Similar to more extensive information on anxiety, through the second literature review I found more research on the negative impact that results from an inability to focus, such as research that investigates the effect of limited class participation (Rose, 2008). Distractions included outside technology intrusion, such as by cellphones and laptops (Garcia, 2012), as well as research that reported a rise in the reports of personal issues interrupting class (Thomas & Hasher, 2012). A few scholars cited family concerns (Parish, 2010) and financial concerns as distracting students (Saunders, 2009). Additionally, many sources indicate an increase in employee productivity (United States

Department of Labor, 2012), but this also comes at the expense of the inability to separate from work (Kazis et al., 2007) even during crucial times such as training.

As easy access to outside information through technology increases, trainers must compete for the focus of students. An abundance of research on the subject of modern technology distractions in the classroom exists, and the second literature review I found that this subject seems to be proliferating in recent years (Burns & Lohenry, 2010; Cole, 2010; Johnson, 2010; Nworie & Haughton, 2008; Schachter, 2009).

Other researchers have looked into general classroom distractions, such as poor health of adult students (National Center for Chronic Disease Prevention and Health Promotion, 2009, para. 11), and the effects of multiple life distractions (Kane, 2010). Some research includes guides for combating key challenges in the area of focus in the classroom (Kemper, McDowd, & Metcalf, 2008); however, none can help GE's trainers understand how to deal with classroom behaviors without an informed train-the-trainer course.

Regardless of impediments, stakeholders in charge of environmental regulatory compliance are keenly interested in having well-trained employees who can ensure the company is seen as a good neighbor to the community. Green companies can also attract more lucrative clients, including governmental ones (Karabell, 2008). In addition, huge fines could be avoided by companies which meet regulatory compliance.

Review of the Independent Variables

Regarding mandatory learning, I focused the second literature review on uncovering insights that might inform the train-the-trainer program with the hopes of

mitigating the disparity in knowledge transfer. Much of what I found suggested changes to the training itself, which, as discussed, is problematic for such a highly regulated class. However, some researchers did have suggestions on making mandatory learning more palatable. Suggestions included ensuring terms like mandatory, and required were absent from marketing and class material. "You cannot force people to learn by requiring training, you can only make sure they do not want to attend." (Cushard, 2011).

As I previously discovered in my first literature review, workplace training, along with governmental compliance that could be part of a person's job, makes up the majority of mandatory education. Through the second literature review, I found more information specific to mandatory Human Resources classes such as sexual harassment classes. However, even within this research, I found helpful techniques that I could leverage.

The trainers for GE's pollution control classes have a wealth of experience that would resonate with the class participants, and this technique is effective according to some researchers. "Stories make training live. Try to utilize trainers with lots of real world, real-time, workplace experience who have real stories" (Heathfield, 2015). When customers of GE reveal that they are taking the course under a mandate, trainers respond according to their skill levels as trainers, which aligns with research found through the literature reviews (Swenson, 2003). Thus, trainers with more experience handle the situations more flexibly than those who have little exposure to those being mandated to attend courses.

An interesting nuance was presented by Baldwin, and Magjuka (1990), who "found that the level of pretraining motivation increases when the training is perceived as

mandatory and when the learner has an expectation of posttraining accountability to management" (p. 29). While this aligns with the project study findings, it does add another insight regarding motivation and mandatory learning, especially if the nonGE employees who take GE's classes know there will be accountability for what they can execute when they return to their companies, then motivation to stay engaged is increased. Trainers can make this accountability transparent during the pollution control courses.

I also found parallels in the second literature review when I searched for research that compared voluntary and mandatory learning. The most common topic I uncovered was on workplace human resources topic training, and investigating whether voluntary or mandatory diversity training was most effective. An example is what Sweeney and Martindale (2012) found as they researched voluntary training issues and motivation, "The motivation to transfer is the intention of the learner to use the skills on the job and motivation to learn is the intention of the learner to absorb knowledge enabling them to perform skills or retain knowledge (p. 6). When looking at diversity training, Attewell, Lavin, Domina, and Levey (2006) found that the higher the participation in voluntary training, the greater the discrepancy in quality of mandatory learning: "High rates of participation in voluntary training may indicate deficiencies in the mandatory training programs" (p. 895).

When searching for how people with differing levels of formal education might improve their ability to focus and reduce their anxiety, I found more information on autogenics, as well as more research on mindfulness. The work of Kabat-Zinn at his

Center for Mindfulness has attracted more than 20,000 students, though many of his results are aimed at individuals seeking out a lifelong reduction of stress and requires a conscious dedication for improvement. This intensive mindfulness approach does not translate well to simple techniques that I could infuse in a train-the-trainer course. In contrast, work that I found that did support the introduction of autogenic relaxation for people of all levels of education, were similar to that of Richmond (2014), who, in his work around Progressive Muscle Relaxation (PMR), that he notes is synonymous with autogenics, says is "one of the most simple and easily learned techniques for relaxation" (p. 1).

Since my first review, more research had been published on the connection between classroom success and need to focus. This research supported my own findings through this project study, that there was an importance on focusing, but that the impact was not debilitating. This matched what I found through the statistical comparisons of means; there was a difference in the means between what people self-reported as their ability to focus dependent upon their level of education, but the difference was best described as a pattern of behavior, rather than a sizeable gap. An example of research that supported this is Nalliah and Allareddy's work (2014) on internet-based activities that found students engaged with devices unrelated to the learning, performed at approximate "the same level as those who are focused on the lecture."

Throughout the second literature review, when the topics of level of education and behaviors were searched, I found researchers had addressed the problem through quantitative analysis (Jonsson & Svingby, 2007; Winter, 2009). This matched the tactic I

used when seeking patterns between anxiety, ability to focus and levels of education. As I had found in the project study, more insights into why some individuals self-identified with certain behaviors can be gained from a future qualitative approach, as shown by Rose, and Jeris (2011), whose study worked to reveal the feelings and behaviors that adults manifest in learning scenarios.

Potential resources and existing supports. For the success of a train-the-trainer program, several items must be considered, including resources, barriers, timetables, and responsibilities. Fortunately, many resources exist within GE to support a train-the-trainer program. The seminars sold are self-funded and are given a high level of managerial support. In fact, the profitability of learning is such that any peripheral materials needed to effectively create the train-the-trainer course, whether it is visual aids, software, or educational material such as articles from ASTD, should be easy to acquire.

Furthermore, there is already time allotted for training for every employee, including the GE trainers. No assumptions can be made regarding if the nonGE employees who comprise the pollution control courses, have time allotted for their training. However, it should not be difficult to introduce the train-the-trainer course or have it approved as a required course. The trainers themselves will most likely be interested in the improvement as the course retains the autonomy of the instructor, while improving the course outcomes.

Potential barriers. Any situation that requires change will also encounter some resistance. The findings of the study are specific and significant, all of which can be supported by data. These factors will most likely mitigate any managerial objections.

Trainers themselves may pose a barrier to change, as they will be required to take the train-the-trainer course, which could be viewed as additional work, and thus create resistance. Many trainers have experience in the classroom, though no formalized training knowledge, and could potentially see the train-the-trainer course as unnecessary or beneath their skillset.

To counter resistance, the program will include an internal marketing campaign that follows the themes of the pollution control classes, such as the theme of having "one less worry" (General Electric, 2014, para. 1). These improvements may include lower stress, more empowerment, greater job satisfaction, and improved personnel reviews for the trainers. As train-the-trainer classes are held, subsequent marketing material will quote, from the post-class surveys, the portions of the training that were found most useful and fulfilling.

Proposal for implementation and timetable. To mitigate possible barriers, managerial support is paramount. In addition, involving trainers in the formation of the train-the-trainer program will increase acceptance and the implementation time-frame, per best practice (Gilbert, 2009). My work to gain support and then design the train-the-trainer program can begin immediately. As classrooms are continuously filling for GE, the sooner the trainers can improve their delivery and match the needs of each class, the more impact will be gained. A timetable for the project implementation is shown in Figure 1.

Figure 1. Project timeline.

Roles and responsibilities of student and others. I will have the responsibility of convincing management that investment in a train-the-trainer program is worthwhile. The management or leadership of GE has the responsibility of determining if the disparity in learning results in GE's pollution control training is threatening enough to introduce a train-the-trainer program, it will then be my role to introduce and launch the program.

A robust support structure exists for such an initiative. For example, invitations will be handled by the internal communications department. Registration will be ensured by the managers of the GE trainers. The marketing department will champion the creation of the internal campaign, in conjunction with a third party advertising agency. This agency will create the train-the-trainer materials to reflect the material they create for the pollution control classes themselves. The Human Resources department, especially the member of the team that oversees the training group, will be responsible to ensure that each trainer is participating. The learning and development teams will partner with me to

ensure that the class remains viable and valuable, as well as to serve as an outside observer. Equally important, it will be the role of the trainers themselves to engage with the train-the-trainer module, inform themselves, and take action to improve the learning experience for GE's students.

Project Evaluation

The effectiveness of the train-the-trainer program will be measured according to several factors. First, the scores from the post class surveys will have a goal of 90% satisfaction. Regarding the classroom observation, following the third trainer review, every trainer should achieve a 4 or 5 in each category. The data will be collected on trainers over three consecutive sessions, which should span a period of three to four months. Furthermore, students who request refunds for the class due to lack of quality will be reduced to no more than three per month from the current average of 12. Lastly, it is expected that scores on the training rubric, which appears in Appendix A, should rise by 20% after the third observed skilled verification of the training following attendance in the train-the-trainer course.

In conjunction, an improvement in the performance ratings of the trainers should also follow; an improvement of 4 on a 5 point performance scale during summative yearly reviews is sought. However, if there is no observed change in the behavior of the trainers, or if the students continue to show variable results, a formative evaluation will begin after six classes. This method of combining formative and summative rubrics has proven effective in train-the-trainer courses (Maxwell, 2010).

Results of each evaluation will be reviewed to inform revisions to the train-the-trainer course. This process will be led by the instructional designer, but aided by the SMEs, mentors, and senior management. Thus, numeric, goal-based outcomes are needed regarding student satisfaction, managerial complaints, and trainer evaluation. The level of these goals will be verified in conjunction with GE leadership during the introduction, implementation, and acceptance of the project.

Informal evaluations will also be included. For example, I will distribute a survey after every session, and each trainer will be assigned a mentor, in alignment with Bell and Goldsmith's best practices (2013) that attributes significantly stronger retention and understanding as compared to groups that do not adopt mentorship. After three months of classes following the train-the-trainer implementation, I will host roundtables with the trainers to understand effectiveness and where further changes can be made. This evaluation will begin with analysis of the suggested improvements by the instructional designer in conjunction with the SMEs. Mentors will be asked to compare rubrics to see if there is consistency in evaluations, if there is a resistance to change, if more time is needed for the changes to begin to work, or if there are missing components in the program.

Implications Including Social Change

Local Community

This project could have a large social impact simply because of the scope of work performed by GE. In 2011, 10,000 customers attended environmental protection training hosted by GE. As a Fortune 10 company, GE is considered an industry leader, partly

because of its reputation as a thought leader (Denning, 2012). From aviation to nuclear science, from home appliances to advanced wind turbine applications, GE is often considered an innovation leader. While its deep content knowledge for environmental regulatory compliance stands alone in its field, GE must find strategies to ensure that the content can be transmitted to the 11.5 million workers who will enact pollution control advances.

This project has potential for social impact on many different levels. The students who attend a training that is adapted for their needs will be learning in an environment more suited to their situations. This will result in students with less anxiety which are able to come out of the class able to act on what is taught. With the range of education levels and access that exists amongst this group of students, every training opportunity should be maximized. The wealth of knowledge that is to be transferred in GE's pollution control classes could help the students gain more lucrative, safer, more stable positions. This, in turn, would improve the lives of the students and their families. The companies who send and pay for the training would also be positively impacted, as they would have a more knowledgeable workforce that could act upon their increased awareness of the latest environmental protection methods.

In addition to these thousands of students, the lives of the trainers will improve through the empowerment that comes with the ability to knowledgeably change the learning environment to tailor it to each class. GE would then have a more robust training program that would garner a stronger reputation as well as a happier, more engaged training department. Customers would be easier to recruit to a program that included a

greater chance of success for each student, and thus GE's reputation and profitability would increase.

Far-Reaching

The train-the-trainer program might help an even broader audience than those immediately in the class, or even those who touch the people in the class. Because the topics of GE's pollution control classes deal with improving environmental protection, the communities that house some of the dirtiest businesses could be more protected from emissions with more knowledgeable workers at those facilities. If, for example, coal burning power plants that have been built inside large metropolitan areas could produce less smog, the area would have less greenhouse gas emissions, cleaner drinking water, and overall improved health. Catastrophes, such as the oil spill in the Gulf of Mexico, might be altogether avoided if drilling platforms could be staffed with employees who have a deeper insight into their operations.

Thus, even though a train-the-trainer program might seem like a small alteration, the potential exists to touch 11.5 million workers. The portion that attends GE's pollution control classes will be able to inform co-workers and management at their facilities about improvements, which might further reduce climate change impacts and minimize risks to their communities. With the power of maximized education, adapted for the learner and informed by this study, the potential for wide, sweeping social change exists.

Conclusion

In this section, I created a detailed overview of a solution to the random results produced by GE's pollution control training. First, I overviewed the project itself and the

rationale for why I chose a train-the-trainer course. The goals of the course were defined and then compared against the purpose of the project. I also discussed implementation of the suggested outcome, a train-the-trainer program, as well as the roles of those involved in the program. Finally, I took time to analyze the implications of the projects, paying particular attention to the impact for potential change.

In the next section, I will reflect upon the project and my own work as a developer and scholar. This important section will provide me with insights into my own scholasticism and provide an opportunity for me to find ways to improve upon my methods. Perhaps most important of all, section will provide recommendations for future scholars and suggestions for study for the next generation of thinkers who engage this topic.

Section 4: Reflections and Conclusions

Introduction

The current project strove to improve the consistency of knowledge transfer from GE's pollution control training. The solution to the irregularity within the scope of this project was through the introduction of a train-the-trainer course. I explored the possible relationship between the level of formal education completed and choice in attendance with specific attributes such as anxiety and ability of focus, I believe an informed train-the-trainer course can be developed. This section reviews the project and provides reflection. Strengths and limitations of the project will be discussed, along with recommendations for improvements and future steps. Also, I will use this section to reflect on the process and philosophical implications of the project and the contributions to scholarship and social change that can be made.

Project Strengths

Two strengths of this project are its wide applicability and its dedication to correcting the unpredictable results of a real-world curriculum. With 11.5 million industrial workers in the U.S., most of whom undergo training of some kind (ASTD, 2010), any improvement to their training offerings is an immediate benefit to the student, the community, employers, and the government. The relationship between formal level of education, choice of attendance, and the attributes of anxiety and ability to focus is little researched, even as the importance of training efficacy increases. This project provides insights for a correction that might mitigate issues with disparate knowledge transfer, as well as starting points for future project studies.

When beginning the project study, I allowed the literature review to inform the study; while the topics and foci were driven by real needs, they were also influenced by gaps in scholarship, further increasing the project's applicability. By grounding this study in data and allowing the facts to influence the direction of the study, the recommended actions address significant needs.

During the data collection phase, I took great care to include the opinions of a diverse group of workers for the pilot survey, though the pilot only involved GE employees, where all of the attendees of GE's pollution control classes are not employees of GE. The survey, and thus the project, gained strength when I applied Cronbach's alpha tests to ensure that the survey questions being asked added value and were not duplicative. In addition, the electronic option as an addendum to the registration process resulted in greater privacy, and more protection for the participants, as well as eliminating the potential peer pressure of a live request for data.

Project Limitations

The project was limited to those students registering for GE's pollution control classes, who are not GE employees. The scope of the project did not allow for data samples to be drawn from other pollution control classes taught by companies other than GE, which limited the study. In addition, changes to the content itself would be cumbersome and entail multi-national certification bodies that might, ultimately, reject proposed changes. The proprietary nature of the educational material, and the fact that the only other pollution control classes are offered by competitors of GE, means that it is not possible to observe other student situations in this specific setting. This could diminish

the generalizability of the study, as some scholars argue that this methodology may not apply to the larger population (Hatch, 2002; Merriam, 2003; Yin, 2003).

Recommendations Based on Findings

The findings of the study support the creation of a train-the-trainer program for the pollution control education of GE to minimize disparities in knowledge transfer. As patterns did appear, especially regarding level of education previously completed and whether or not the person attended by choice, it would be possible to prepare better the trainers for classes based upon the demographic information received at the time a student registers.

Trainers, regardless of their talent and abilities, must produce a consistently high quality of results. Supported by other scholars who have performed needs assessments (Edwards, 2011; Tzanis, 2012) I believe the instructors can produce a more standardized result with the support of a train-the-trainer course which leverages registration data. In addition, mentoring of the less experienced trainers by those with more experience is a component of success, as shown by other scholars (Fischler & Zachary, 2009; Mullen, 2009) who have researched the impact of mentorships.

Finally, the concept of best practices that build upon one another from class to class, again a scholastic technique proven effective by other scholastic research (Brock, 2010) i included. A rubric, a recommended best practice (Jonsson & Svingby, 2007) will be utilized in the evaluation of the trainers to ensure that all participants are clear on what comprises a successful course, as shown in Appendix A.

The train-the-trainer program will be revisited after every 6 sessions to see if improvements are needed. This revisiting will take place through a cohort consisting of the instructional designer, a mixture of experienced and novice trainers, as well as senior leadership of GE. Once a year, the program manager will contact the management of those GE customers who participated in the program to conduct an informal qualitative interview to discuss if improvements have been noticed, and if there is feedback from the users.

Scholarship

This project study contributes to scholarship, particularly in the areas of adult learning and compulsory training. The research shows an increasing amount of mandatory education for adults, and the literature reviews did uncover a similar increase in scholarship around this topic. Understanding and uncovering relationships between demographic and behavioral characteristics adds to this field of study.

In addition, the data collected from surveys can contribute to the knowledge base in the areas of student anxiety, ability to focus, level of formal education, and compulsory learning. Thus, future scholars can utilize this data to make further strides in the improvement of adult education. Certainly, this project was created with the direction of past scholarship, but fills in gaps, while creating further questions for future educators to explore. Overall, the importance of a more consistent training result has a new understanding and increased value. Hopefully, with this study and its data, future instructional designers will not have to expend much effort in finding solutions to inconsistent training results.

Project Development and Evaluation

Throughout this project study, I utilized a detailed project plan, relying heavily on Microsoft Project and Excel spreadsheets. This allowed me to track due dates, critical stages, and areas upon which I needed to focus. At first, I overlaid a Gantt chart with Walden's suggested timing. It was important that I kept this chart as a rough guide, not a marker of success or failure. Instead, the Gantt chart was easy to adjust, sliding dates as feedback or my own work either slowed or exceeded expectations.

However, I felt a sense of urgency toward the entire project, as the need for improvement was obvious. At GE, I serve as the education leader, and oversee diverse training that includes skill improvements such as communications training, as well as safety training that protects the lives of employees and customers. Day after day, I see hundreds of thousands of training dollars and hundreds of man hours squandered in a well-intentioned pursuit of learning. GE invests over $1 billion a year in training, yet there are still various levels of engagement that equates to different outcomes and personal growth efficiency (GE Annual Report, 2010, p. 42). A project, such as this, might bring equity and improvement to my role and those who surround me.

Leadership and Change

Through the execution of this project, I learned much regarding leadership and change. As a life-long principle, I try to accept people as they are. This includes an acceptance of people at the education level they have, or want to have. This view served me well as I completed this project, as it was important to appreciate the views of all

participants, regardless of the participants' views on education, the class, or the role of training.

With this approach focusing on equality, I then could appreciate the privilege that some people enjoyed, most importantly, the privilege of education. Different people have had different abilities, opportunities, and expectations of education due to a myriad of factors, some of which are beyond the bounds of this study. Regardless, each participant's input and views was equally critical in contributing to the final goals of the project. Even those students who have lacked the privilege of formal education have experience as a foundation. Wartenberg (1994), in his effort to fight illiteracy, said "adults, even nonreaders, have acquired wide experiences just from living. They, like children, bring these experiences to any learning situation" (p. 3).

Equally important was my evolving view of change. The project helped me to understand that each person wanted to succeed in the class, no one wants to fail, and everyone would accept change that would help them become heroes in the eyes of those around them. Included in this thought process was not if the individuals were smart, but in what way they were smart. Each member of the class came with intelligence, just an array of types of intelligences, some easily discernable, some more hidden away.

It was just as important for me to understand what I could change, what I could not change, and what I could leave for future generations to change. At times it was difficult to accept that there were items that were in scope and there were things that were out of scope of the project. Leaders know what they can and cannot control, so as to

maintain a focus for the project. This attitude allowed me to use an already established process as a tool.

Analysis of Self as Scholar

Through the execution of this project, I found that I have a good ability to synthesize data. I am able to look across datasets and see commonalities and variability that was not necessarily apparent without quantitative analysis. This entailed drawing upon past experiences to give context to the data.

However, I found myself hungering for more data, or deeper analysis that would take me outside the scope of the project. I wanted to drill down into why some of the data returned as it did. I wanted to explore the history of individuals to see how they came to answer survey questions as they did. Fortunately, with a rigid project scope, and a dedication to a quantitative study, rather than qualitative, I remained on track and within scope. Thus, I found that it is critical for me to always have a framework for projects so that I can instantly check my thinking against the goal.

From this project, I learned much not only about the topic, but about the process of scholarship itself. One of the most important lessons I learned is that scholarship is a process that might have a definable beginning, but has no discernible end. Endeavoring to improve any learning will open more pathways of learning. While determining where to begin this project's investigation was easy, I underestimated the work that would be needed to understand the project's end point. Defining what was in and what was out of scope of the project became pivotal. Additionally, I found I needed a substantial change

in mindset when it came to writing in a scholarly manner. I was particularly challenged by using the first person, limiting direct quotes, and avoiding anthropomorphism.

Initially most striking for me was the transition in the process of scholarship from when I researched at a collegiate level, which was before the readily available use of the Internet, to the present day. The information age has brought our society an on-demand world. As part of this, knowledge from around the globe is instantly available, and is easy to sort. Yet all this brings the new complication of discerning valuable information from within the millions of available bits of data.

During my primary literature review, I found myself swayed by each argument, though a reread of the first article would sway me back. Fortunately, with the aid of my committee and classwork, I began to understand that scholarship of this level goes beyond a mere synthesizing of others' ideas. Pivotal to the contribution of a scholar to scholarship is the uniqueness that scholars bring to the work. As it was impossible to always reconcile the ideas of conflicting scholars, I realized more and more how necessary it was for me to insert my own experiences, views, and expertise into the project. This allowed me to be influenced, but not subjugated, by the material, resulting in a unique scholastic work I hope will further this area of scholarship.

Analysis of Self as Practitioner

Through this project, I understood more about myself as a practitioner of scholarship. Firstly, I discovered that what I can accomplish is just as important as how I accomplish it. I could be an extremely skilled designer, but if I alienate my peers and those I studied, and am unethical, I am not the world class best practitioner I desire to be.

Additionally, integrity is extraordinarily important throughout all phases of scholasticism, and I was pleased to find how naturally I adopted this rigor. This question moves beyond Descartes (1644) and his position "I think therefore I am." We could now position this as, I think about the right thing, thus I exist for the right purpose.

For example, overt plagiarism, as I have seen from governmental leaders and even academic pundits, is an easy-to-judge misconduct. Walden's policy on plagiarism helps elucidate our thinking, and has helped me to understand some of the intrusions (Walden, 2014). Indeed, this is an error that would be easy to make, but fundamentally would be plagiarism. With no relativism regarding plagiarism, this action is just as egregious as photocopying a page out of the Encyclopedia and turning that in as homework.

I discovered that in many small moments, integrity, with all of its infinite meanings, can be challenged. Previous to this project, I had viewed integrity as a fair, consistent matrix, with clear rigidity of right and wrong. As I face my own challenges in developing education for a large, diverse, and far-flung audience for GE, I have already faced many questions of integrity. However, with a clearly defined integrity policy, a scholar, such as myself, has a definitive guide. It is this guidance that I can take with me as I pursue other scholastic, future, activities.

Analysis of Self as Project Developer

As I developed the project, I quickly understood that I needed a philosophical framework from which to judge my progress, and success or failure of components. For this project, as with much of the work I do with GE's training, I assumed a Utilitarian goal that successful education is the greatest quality of education for the greatest quantity

of people. Certainly, even this philosophy causes issues at a macrocosmic level, but serves the purpose of guidance for a project such as this. For example, if GE invests millions of dollars, quite literally, into building a learning institution, I will copyright all of the information I develop. Instantly, this is in conflict with the purpose of disseminating information to the greatest number of people. To adhere to the principles of Utilitarianism, I would have to violate integrity by giving out that copyrighted information to those who could not afford to take our classes. I ethically trusted in the parameters set by the project, and diligently began collecting approvals from GE and participants as soon as was feasible.

It is the integrity principles that allow utilitarian philosophy to be actualized. Institutions like Walden and GE put millions and millions of development dollars and resources into these programs. This investment would never have been made in the first place if these institutions knew they could not recoup their investments. Worse, if the institutions did not care about recouping their losses, those institutions would not survive long enough to create any education.

Thus, without copyright laws, rules against plagiarism, and the balance against Utilitarianism, the education from which are all benefitting, would never have been developed. By limiting the access to the information, I can decrease the number of those who are educated. However, if I were able to life copyright and intellectual property protections so all could partake, there would be no quality to that which is available, a violation of the first of our Utilitarian look at education.

Setting the principles of Utilitarianism in the context of the rules of integrity, personal accountability for myself as a project developer is easier to manage. The consequences of accountability are far reaching and must be taken seriously as a project manager. One small lapse of integrity on my part might have legal ramifications, to the point that a record of misconduct would follow me the rest of my life, and severely decrease the possibility I will be able to effect positive change in the future. My own marketability would be destroyed, as well as my ability to obtain the resources I would need in the future to promote education. Thus, how I develop a project ultimately not only will follow me, but eventually define who I am as a scholar.

The Project's Potential Impact on Social Change

Education, like many constructs of society, can be a resource limited to the economically privileged, or those who are privileged because they were raised in households where education was prioritized. Others, who may lack that privilege, might have been forced into situations where they needed to care for younger siblings, or take on jobs to help to economically support the family, and thus, could not focus attention or energy on education. Some might even have lacked the privilege of being able to have a support structure that included transportation to school, or mentoring to relieve anxieties. This project illustrated to me that the privilege of education is uncommonly shared. However, bit by bit and piece by piece, old privileges can be eroded. This erosion can stem from an offensive attempt by those without privilege to gain plurality, or from those in a privilege position purposefully sharing their opportunities.

Many of the students of GE's pollution control trainings, none of which are GE employees, are the reason I wanted to design a classroom with more predictable, and thus, more effective results. These customers of GE, who work for companies external to GE but rely upon GE to provide expertise, work dangerous, difficult, and dirty jobs. Climbing to the top of a wind turbine to smooth a blade, adjusting the wheels on a train's coal cars, or journeying into a kiln that turns limestone into lava are jobs that must be done just right or lives could be lost. Philosophically, I want my customers to be able to have the best life, and be able to contribute to society. However, I must also uphold my responsibility to GE, and minimize the impact of taking trainers out of production for three days for a train-the-trainer class.

This creates a precarious balance for which I must be ever vigilant. While it would be ideologically wrong for one of the world's largest companies to deny people education that could result in opportunities for a better life, it would be equally wrong to take money from outside companies who are sending their employee's to GE to gain skills and knowledge from a class that has haphazard results. This project helps to create a more predictable outcome for the nonGE employees whose companies are paying for pollution control training, and, through a three-day investment in the trainers, hopes to create that more predictable outcome.

With 11.5 million workers performing these tasks, the potential impact is vast. The investment, both monetarily and temporally of having customers of GE, who are not GE employees, attend a GE pollution control training must be maximized. This is not

only for the benefit of the outside companies involved, but, most importantly, for the participants and trainers on a human scale.

Implications, Applications, and Directions for Future Research

The project ventured into new areas of scholarship and revealed relationships in a statistical way that were either only guessed at previously or were simply not known. Not only did the execution of this project bring needed attention to the haphazard approach that had previously dominated the learning sessions, it could help those involved to organize their thoughts and begin to systematically look for improvements. A train-the-trainer program is already being formulated from the results of this project, but that is only the beginning of what is being accomplished with this data. With this baseline understanding of students within GE's pollution control classes, a more consistent learning situation can result.

Certainly, as I work to create future improvements that will mitigate the unevenness of knowledge transfer, a universal application can be gained from this project as many curriculum designers who work with a similar student population will be able to apply these findings to know that anxiety and ability to focus do have a self-reported pattern that reveals a relationship to level of formal education and choice in attendance. These self-reported patterns that might be illuminating. In addition, instructional designers who might struggle with uneven knowledge transfer can gain from this project through a similar train-the-trainer program. Future researchers will hopefully be able to take the data provided by this study and apply it to other industrial training scenarios, or to similar situations where there exists a mix of formal education completed and a mix of

those who volunteered and were volunteered to attend the class. Certainly this mix, and the focus on what behaviors relate to students' situations, will influence GE's management and training choices, as they seek to optimize their pollution control trainings for their thousands of annual attendees.

Conclusion

While perhaps this project is only the first in a series of endeavors to understand a group of learners, it is an important starting point. The effects of mandatory education and formal education as they relate to focus and anxiety brings a greater understanding of the learning context within GE's pollution control classes. Perhaps just as important, the exercise of data collection and analysis forms a foundation for future inquiry about a large industrial learning population. Certainly, patterns were gained that apply to this particular group of students who come to GE from a myriad of outside companies to learn. Equal to this is what I learned about myself as a scholar, a practitioner of knowledge, and as an agent of change.

References

American Bar Association. (2012). CLE requirements by state. Retrieved from http://www.americanbar.org

American Medical Association. (2012). Education and careers. Retrieved from http://AMA.com

American Psychological Association. (2015). Anxiety. Retrieved from http://www.apa.org

American Society for Training and Development. (2010). *2010 state of the industry report*. Alexandria, VA: American Society for Training and Development.

Ashton, S. (2010). Authenticity in adult learning. *International Journal of Lifelong Education, 29*(1), 3–19. doi:10.1080/02601370903475602

Attewell, P., Lavin, D., Domina, T., & Levey, T. (2006). New evidence on college remediation. *Journal of Higher Education, 77*(5), 886–924.

Backhaus, K., & Liff, J. P. (2007). Cognitive styles and approaches to studying in management education. *Journal of Management Education, 31*(4), 445–465. doi:10.1177/1052562905284674

Bahn, S., & Barratt-Pugh, L. (2012). Evaluation of the mandatory construction induction training program in Western Australia: Unanticipated consequences. *Evaluation and Program Planning, 35*(3), 337–343. doi:10.1016/j.evalprogplan.2011.11.006

Baker, W., Lusk, E., & Neuhauser, K. (2012). On the use of cell phones and other electronic devices in the classroom: Evidence from a survey of faculty and students. *Journal of Education for Business 87*(5), 275–289.

doi:10.1080/08832323.2011.622814

Baldwin, T. T., & Magjuka, R. J. (1990). Organizational training and signals of importance: Linking pretraining perceptions to intentions to transfer. *Human Resource Development Quarterly, 2*(1), 25–36.

Barak, M., Lipson, A., & Lerman, S. (2006). Wireless laptops as means for promoting active learning in large lecture halls. *Journal of Research on Technology in Education, 38*(3), 245–263.

Barcyzk, C. C., & Duncan, D. G. (2013). Facebook in the university classroom: Do students perceive that it enhances community of practice and sense of community? *International Journal of Business and Social Science 4*(3), 1–14.

Barta, M. (2009). *Culture, customer-centricity, and customer relationship management in an online postsecondary learning institution* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 3344734)

Baskus, R. S. (2011). *Applying adult learning and development theories to educational practice* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 3196736)

Bates, R. A. (1997). *The impact of training content validity, organizational commitment, learning, performance utility, and transfer climate on transfer of training in an industrial setting* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 9735977)

Bell, C. R., & Goldsmith, M. (2013). *Managers as mentors: Building partnerships for learning*. San Francisco, CA: Berrett-Koehler Publishers.

Ben-Jacob, M. G., & Liebman, J. T. (2009). Technophobia and the effective use of library resources at the college/university level. *Journal of Educational Technology Systems*, *38*(1), 35–38.

Bherer, L., Erikson, K. I., & Liu-Amrose, T. (2013). A review of the effects of physical activity and exercise on cognitive and brain functions in older adults. *Journal of Aging Research*, *13*(3), 1–8. doi:10.1155/2013/657508

Biederman, J., Mick, E., Ronna, F., Aleardi, M., Potter, A., & Herzig, K. (2005). A simulated workplace experience for nonmedicated adults with and without ADHD. *Psychiatric Services*, *56*(12), 1617–1620.

Bichy, C., & O'Brien, E. (2014). Course redesign: Developing peer mentors to facilitate student learning. *Learning Assistance Review (TLAR)*, *19*(2), 43–57.

Bigdeli, S. (2010). Affective learning: The anxiety construct in adult learners. *Social and Behavioral Science*, *9*(1), 674–678.

Birney, R. (2012). *Reflective writing: Quantitative assessment and identification of linguistic features* (Doctoral dissertation). Retrieved from http://www.repository.wit.ie

Bleizeffer, D. (2011). Oil and gas leaders seek to stem deaths on the job. *WyoFile Energy Report*. Retrieved from http://wyofile.com

Boero, R., & Novarese, M. (2012). Feedback and learning. *Encyclopedia of the Sciences of Learning*, 1282–1285.

Book, P. (2014). All hands on deck: Ten lessons from early adopters of competency-based education. Boulder, CO: WICHE Cooperative for Educational

Technologies.

Boud, D., Cohen, R., & Sampson, J. (Eds.). (2014). *Peer learning in higher education: Learning from and with each other*. New York, NY: Routledge.

Brand, L. (2010). *The effect of technology on attention and concentration within the classroom context* (Master's thesis). Retrieved from http://UniSA.com

Broady, T., Chan, A., & Caputi, P. (2008). Comparison of older and younger adults' attitudes towards and abilities with computers: Implications for training and learning. *British Journal of Educational Technology, 41*(3), 473–485. doi:10.1111/j.1467-8535.2008.00914.x

Brock, S. (2010). Measuring the pre-cursor steps to transformative learning. *Adult and Continuing Education 60*(2), 122–142. doi:101177/0741713609333084

Bufford, T. (2008). Critical operations power systems. Retrieved from http://www.geindustrial.com/Newsletter/cops.pdf

Bugeja, M. (2007). Distractions in the wireless classroom. *Chronicle of Higher Education, 53*(21), C1–C4.

Bunce, D. M., Flens, E. A., & Neiles, K. Y. (2010). How long can students pay attention in class? A study of student attention decline using clickers. *Journal of Chemical Education, 87*(1), 1438–1443.

Burke, M. J., Salvador, R. O., Smith-Crowe, K., Chan-Serafin, S., Smith, A., & Sonesh, S. (2011). The dread factor: How hazards and safety training influence learning and performance. *Journal of Applied Psychology, 96*(1), 46–70. doi:10.1037/a0021838

Burns, J. Z., Schaefer, K., & Hayde, J. M. (2005). New trade and industrial teacher's perceptions of formal learning versus informal learning and teaching proficiency. *Journal of Industrial Teacher Education, 42*(3), 66–87.

Burns, S., & Lohenry, K. (2010). Cellular phone use in class: Implications for teaching and learning. *College Student Journal, 44*(3), 805–810.

CA Independent Voter Network. (2011). California budget crisis decimating adult education programs. Retrieved from http://caivn.org

Callahan, K. (2011). N.H. bleeds blue-collar jobs. *New Hampshire Business Review*. Retrieved from www.nhbr.com

Cameron, D. (2000). Meeting older adults learning needs when using information technologies. *Proceedings of the Technological Education and National Development Conference*, Abu Dhabi, United Arab Emirates. Retrieved from http://www.eric.ed.gov/PDFS/ED446267.pdf

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology, 56*, 267–283.

Chu, H., & Hsieh, M. (2007). *A Study of career development, learning active participation, and learning satisfaction of adult learners in unconventional scheduling graduate programs.* Retrieved from http://www.eric.ed.gov/PDFS/ED504762.pdf

Clifford, S. (2010). For GE, a human face on its role in health care. *Media and Advertising*. Retrieved from www.nytimes.com

Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education*. New York, NY: Routledge.

Cole, S. (2010). Quit surfing and start "Clicking": One professor's effort to combat the problems of teaching the U.S. Survey in a large lecture hall. *History Teacher, 43*(3), 397–410.

Colling, T. K. (2010). *Assessing the impact of local agency traffic safety training using ethnographic techniques* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 3403365)

Congressional Budget Office. (2012). Spending for research and development and for education. Retrieved from www.cbo.gov

Cooper, M. ed. (1992, June 6). *Citizenship, adult learning and old age*. Paper presented at the City Literary Institute, London, United Kingdom.

Coryell, J. E., & Clark, M. C. (2009). One right way, intercultural participation, and language learning anxiety: A qualitative analysis of adult online heritage and nonheritage language learners. *Foreign Language Annals, 42*(3), 483–504. doi:10.1111/j.1944-9720.2009.01037.x

Creswell, J. W. (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (3rd ed.). Upper Saddle River, NJ: Pearson Education.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Thousand Oaks, CA: Sage.

Croasmun, J., & Ostrom, L. (2011). Using Likert-type scales in the social sciences.

Journal of Adult Education, 40(1), 19–22.

Cushard, B. (2011). 3 ways to make mandatory training less mandatory, more effective. *Mindflash*. Retrieved from www.midflash.com.

Cushard, B. (2012). How to turn your resident experts into star trainers. *Mindflash*. Retrieved from www.mindflash.com.

Dastoor, B. (1993). Training 101: The psychology of learning. *Training & Development 47*(6), 17–22.

DeFulio, A., Iati, C., Needham, M., & Silverman, K. (2009). Modification of perseverative responding that increased earnings but impeded skill acquisition in a job-skills training program. *Journal of Applied Behavior Analysis, 42*(3), 627–637.

Delice, A. (2010). The Sampling Issues in Quantitative Research. *Educational Sciences: Theory and Practice*, *10*(4), 2001–2018.

Dengler, M. (2008). Classroom Active Learning Complemented by an Online Discussion Forum to Teach Sustainability. *Journal of Geography in Higher Education, 32*(3), 481–494. doi:10.1080/03098260701514108

Denning, S. (2012). David Brooks: Competitiveness vs creativity: GE vs Apple. *Forbes*. Retrieved from www.forbes.com

Descartes, R., Laurence J. L.(trans.) (1960). *Discourse on Method and Meditations*. New York, NY: The Liberal Arts Press.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, *49*(1), 71–75.

DiBiase, D., & Kidwai, K. (2010). Wasted on the young? Comparing the performance and attitudes of younger and older US adults in an online class on geographic information. *Journal of Geography in Higher Education, 34*(3), 299–326. Retrieved from https://www.e-education.psu.edu

DMV.com. (2012). Traffic/driving schools in Texas. Retrieved from http://www.dmv.com

Ebell, M. H., Cervero, R., & Joaquin, E. (2011). Questions asked by physicians as the basis for continuing education needs assessment. *Journal of Continuing Education in the Health Professions, (31)*1, 3–14. doi:10.1002/chp.20095

Edwards, E. (2011). The 5 most important analysis questions you'll ever ask. Retrieved from http://www.alleninteractions.com

Elnashaie, S. S. E. H., Fateen, S., El-Ahwany, A., & Moustafa, T. M. (2008). Integrated system approach to sustainability bio-fuels and bio-refineries. *Bulletin of Science Technology & Society, 28*(6), 510–520. doi:10.1177/0270467608317218

Environmental Leader. (2011). Environmental enforcement: $150m cleanup begins at Pfizer Site. Retrieved from http://www.environmentalleader.com

Environmental Protection Agency. (2012a). Our mission and what we do. Retrieved from www.epa.gov

Environmental Protection Agency. (2012b). Training schedule. Retrieved from www.epa.gov

Esack, S. (2011). Proposed grant cut would crush vo-techs. *The Morning Call*. Retrieved from http://articles.mcall.com

Eshun, E., & Osei-Poku, P. (2013). Design students' perspectives on assessment rubric in studio-based learning. *Journal of University Teaching and Learning Practice, 10*(1).

Fahrenthold, D. (2008). Mining giant to pay $20 million EPA fine. Retrieved from http://www.washingtonpost.com

Federal Aviation Administration. (2012). Certalert. Retrieved from www.faa.gov

FedEx. (2012). Dangerous goods and hazardous materials. Retrieved from FedEx.com

Field, A. (2013). *Discovering Statistics Using IBM SPSS Statistics.* (4th ed.). New York, NY: SAGE Publications.

Field, J. (2011). Researching the benefits of learning: the persuasive power of longitudinal studies. *London Review of Education, 9*(3). doi:10.1080/14748460.2011.616320

Findsen, B., McEwan, B., & McCullough, S. (2011). Later life learning for adults in Scotland: Tracking the engagement with and impact of learning for working-class men and women. *International Journal of Lifelong Education, 30*(4), 527–547. doi:10.1080/02601370.2011.588465

Fischler, L. A., & Zachary, L. J. (2009). Shifting gears: The mentee in the driver's seat. *Adult Learning, 20(*1-2), 5–9.

Fleming, T. (2008). A secure base for adult learning: Attachment theory and adult education. *Adult Learner: The Irish Journal of Adult and Community Education*, 33–53.

Fletcher, J. (2010). Construct validity of reading measures in adults with significant

reading difficulties. *Journal of Learning Disabilities, 43*(2), 166–168. doi:10.1177/0022219409359346

Florida Highways Safety and Motor Vehicles. (2012). Basic driver improvement courses. Retrieved from http://www.flhsmv.gov

Food Safety and Inspection Service. (2012). Training as a condition of employment. Retrieved from: http://inside.fsis.usda.gov

Foroutan, M., & Noordin, N. (2012). Effect of dialogue journal writing through the use of conventional tools and e-mail on writing anxiety in the ESL context. *English Language Teaching, 5*(1), 10–19.

Foster, A. C. (2003). Differences in union and nonunion earning in blue-collar and service occupations. *Bureau of Labor Statistics*. Retrieved from www.bls.gov

Fryer, B. (2011). New Strategy Same Old Problems. *Adults Learning, 22*(10), 12–14.

Gajadhar, A., Pozio, E., Gamble, H., Nöckler, K., Maddox-Hyttel, C., Forbes, L., Vallée, I., Rossi, P., Marinculić, A., & Boireau, P. (2009). Trichinella diagnostics and control: Mandatory and best practices for ensuring food safety. *Veterinary Parasitology, 159*(3-4), 197–205.

Gafoor, K., & Pg, J. (2011). Cracking the illiteracy kernel: Need for new model. Presented in Second national colloquium on empowerment of youth

Garcia, A. (2012). Adventures with text and beyond: Like reading and literacy challenges in a digital age. *English Journal, 101*(6), 93–96.

Gardner, H., & Moran, S. (2006). The science of multiple intelligences theory: A response to Lynn Waterhouse. *Educational Psychologist, 41*(4), 227–232.

General Electric Company. (2012). Customer education events. Retrieved from www.ge-energy.com/onelessworry

Giancola, J. K., Grawitch, M. J., & Borchert, D. (2009). Dealing with the stress of college: A model for adult students. *Adult Education Quarterly, 59*(3), 246–253. doi:10.1177/0741713609331479

Gilardi S., & Guglielmetti, C. (2011). University life of non-traditional students: Engagement styles and impact on attrition. *Journal of Higher Education, 82*(1), 33–53. doi:10.1353/jhe.2011.0005

Gilbert, J. (2009). The change management life cycle; Involve your people to ensure success. *Business Analyst Times*. Retrieved from www.batimes.com

Goldberg D. (1978). *Manual of the General Health Questionnaire*. Windsor, United Kingdom: NFER-Wilson.

Goldman, J., & Layne, R. (2011). Obama Asks GE's Immelt to Head Economic Advisory Panel, Replacing Volcker. Retrieved from www.bloomberg.com

Gregg, N. (2007). Underserved and unprepared: Postsecondary learning disabilities. *Learning Disabilities Research & Practice, 22*(4), 219–228. doi:10.1111/j.1540-5826.2007.00250.x

Green, S. B., & Salkind, N. J. (2011). *Using SPSS for Windows and Macintosh: Analyzing and understanding data*. Upper Saddle River, NJ: Pearson Education.

Greenhow, C., Robelia, B., & Hughes, J. (2009). Learning, teaching, and scholarship in a digital age – Web 2.0 and classroom research: What path should we take now? *Educational Researcher, 38*(4), 246–259. doi:10.3102/0013189X09336671

Grenier, R. S. (2009). The role of learning in the development of expertise in museum docents. *Adult Education Quarterly, 59*(2), 142–157. doi:10.1177/0741713608327369

Half, R. (2010). The three questions you need to answer if you want an effective training program. *Laurel and Associates*. Retrieved from laurelandassociates.com

Hamilton, M., & Pitt, K. (2011). Changing policy discourses: Constructing literacy inequalities. *International Journal of Educational Development, 31,* 596–605.

Hammer, L. B., Grigsby, T. D., & Woods, S. (1998). The conflicting demands of work, family, and school among students at an urban university. *Journal of Psychology, 132*, 220–226.

Hanna, M., Salzman, J., Reynolds, S., & Fergus, K. (2010). Engaging teachers as learners: Modeling professional development for adult literacy providers. *Adult Basic Education and Literacy Journal, 4*(3), 173–177.

Hasch, B. (2011). The Tri-States' hottest blue collar jobs. Retrieved from connecttristates.com

Hatch, J. (2002). *Doing qualitative research in education settings.* Albany, NY: State University of New York Press.

Haugen, C. (2006a). *Environmental adult education theory and adult learning principles: Implications for training* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 1434415)

Haugen, C. (2006b) Environmental adult education training: Suggestions for effective practice. *Convergence, 39*(4), 91–106.

Hawkins, K., Reddy, P., & Bunker, S (2007).Evaluation of a stress management course in adult education centres in rural Australia. *The Australian Journal of Rural Health, 15(*2*),* 107-113. doi:10.1111/j.1440-1584.2007.00862.x

Hawthorn, D. (2007). Interface design and engagement with older people. *Behaviour & Information Technology, 26*(4), 333–341. doi:10.1080/01449290601176930

Hayslip, B., & Cooper, A. (2012) Subjective and objective intellectual change in older adults, *Educational Gerontology, 38*(3), 190–200. doi:10.1080/03601277.2010.532069

Heathfield, S. (2015).Make HR training effective. *About Money*. Retrieved from humanresources.about.com

Hechtel, K. W. (2010). *An examination of the social capital requirements for the selection, training, performance, and retention of industrial sales personnel* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI. No. 3411015)

Hogg, S. (2006). Adult education in the workplace: An engineer's journey to foster self-direction in others. *Adult Learning*, *17*(4), 24–26.

Houde, J. (2006, Feb, 22-26). *Andragogy and active participation: An examination of the principles of andragogy through two active participation theories.* Paper presented at the Academy of Human Resource Development International Conference, Columbus, OH.

Holton, E. F., Wilson, L. S., & Bates, R. A. (2009). Toward development of a generalized instrument to measure andragogy. *Human Resource Development Quarterly,*

20(2), 169–193. doi:10.1002/hrdq.20014

Hsiung, C. M. (2012). The effectiveness of cooperative learning. *Journal of Engineering Education*, *101*(1), 119–137.

Hunter, C. (2014). Implications for adult learning. *New Horizons in Adult Education & Human Resource Development*, *26*(2), 49–53.

Industry Today. (2012). Camfil launch 2012 CIBSE accredited webinar programme. Retrieved from http://www.industrytoday.co.uk

Izgar, H. (2009). An investigation of depression and loneliness among school principals. *Educational Sciences: Theory and Practice, 9*(1), 247–258.

Jarrell, J. (1994). *Regulated mandatory continuing education and transfer/implementation of learning* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 9502563)

Jarvis, P. (2011). *Adult learning in the social context*. New York, NY: Routledge.

Johnson, C., Duckworth, V, Apelbaum, C., & McNamara, M. (2010). A tale of two adult learners: From adult basic education to degree completion. *NADE Digest 5*(1), 14–33.

Johnson, D. (2010). Taming the chaos. *Learning & Leading with Technology, 38*(3), 20–23.

Johnson, S. (2012). Jury returns $1 million verdict against ASU in harassment suit. *Montgomery Advertiser*. Retrieved from www.montogomeryadvertiser.com

Jonsson, A., & Svingby, G. (2007). The use of scoring rubrics: Reliability, validity and educational consequences. *Educational Research Review, 2*(2), 130–144.

doi:10.1016/j.edurev.2007.05.002

Junco, R., G., Heiberger, G., & Loken, E. (2011). The effect of Twitter on college student engagement and grades. *Journal of Computer Assisted Learning, 27*(2), 119–132.

Justice, E. M., & Dornan, T. M. (2001). *Metacognitive differences between traditional-age and nontraditional-age college students, 53*(3), 236–249. doi:10.1177/074171360105100305

Kane, R. G. (2010). Teaching as counterinsurgency: Enhancing pedagogical effectiveness and student learning in a culture of distraction. *History Teacher, 43*(3), 375–496.

Kanji N.**,** White A.**,** & Ernst E. (2006). Autogenic training to reduce anxiety in nursing students: randomized controlled trial. Retrieved from www.pubmed.gov.

Kaplan, A. (2001, May 25-27). *Educational needs of the adults: The key question of andragogy*. Paper presented at the International Andragogocial School in Bosnia and Herzegovina, 1–11.

Kaplan, L., & Owings, W. (2008). *Class counts: Education, inequality, and the shrinking middle class*. New York, NY: Rowman & Littlefield.

Karabell, Z. (2008). Green really means business. Retrieved from www.newsweek.com

Kassa, H. (2001). An outbreak of Norwalk-like viral gastroenteritis in a frequently penalized food service operation: A case for mandatory training of food handlers in safety and hygiene. *Journal of Environmental Health, 64*(5), 37–38. Retrieved from http://www.ncbi.nlm.nih.gov

Kay, R., & Lauricella, S. (2011). Unstructured vs. structured use of laptops in higher education. *Journal of Information Technology Education, 10*, 33–42.

Kazis, R., Callahan, A., Davidson, C., McLeod, A., Bosworth, B., Choitz, V., & Hoops, J. (2007). Adult learners in higher education results: Barriers to success and strategies to improve. *Employment and Training Administration, 3*(1).

Kelly, S. (2010). *African American women working in the twin cities during the mid-twentieth century: Discovering their vocational identity* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 3398316)

Kelting-Gibson, L. (2005). Comparison of curriculum development practices. *Educational Research Quarterly, 29*(1), 26–36.

Kemper, S., McDowd, J., & Metcalf, K. (2008). Young and older adults' reading of distracters. *Educational Gerontology, 34*(6), 489–502. doi:10.1080/03601270701835858

Kilgore, D. (2003). Meeting the special needs of adult learners: Planning programs for adults. *New Directions for Student Services, 102*, 81–90.

Kim, K. J. (2009). Active participational challenges of adult learners in self-directed e-learning. *Journal of Interactive Learning Research, 20*(3), 317–335.

Kim, T. (2007). *Accelerated learning: A study of the impact on adult learning, attention, and attitudes* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 3288785)

Kirday, M. (2012). The best paying blue-collar jobs. *Forbes Magazine*. Retrieved from Forbes.com

Kirkpatrick, D. L. (1994). *Evaluating Training Programs.* Oakland, CA: Berrett-Koehler

Publishers.

Kitsap County Government. (2012). Mandatory parenting classes. Retrieved from http://www.kitsapgov.com

Klassen, R. M., Krawchuk, L. L., Lynch, S. L., & Rajani, S. (2008). Procrastination and motivation of undergraduates with learning disabilities: A mixed-methods inquiry. *Learning Disabilities Research & Practice, 23*(3), 137–147. doi:10.1111/j.1540-5826.2008.00271.x

Knowles, M., Holton, E., & Swanson, R. (1998). The adult learner: The definitive classic in adult education and human resources development. Houston, TX: Gulf Publishing Company.

Kofell, J., & Reidt, S. (2014.) An interprofessional train-the-trainer evidence-based practice workshop: Design and evaluation. *Journal of Interprofessional Care, 1–3*. doi:10.3109/13561820.2014.962127

Kolb, D. (2015). *Experiential Learning: Experience As the Source of Learning and Development*. Pearson Education: Upper Saddle River, NJ.

Kruidenier, J. R., MacArthur, C. A., & Wrigley, H. S. (2010). Adult education literacy instruction: A review of the research. *National Institute for Literacy*. Retrieved from http://lincs.ed.gov/publications/pdf/adult_ed_2010.pdf

Kumar, R., & Lightner, R. (2007). Games as an interactive classroom technique: Perceptions of corporate trainers, college instructors and students. *International Journal of Teaching and Learning in Higher Education, 19*(1), 53–63. Retrieved from http://www.isetl.org

Larson, L. (2011). *House research: Conditions of continuing employment for K-12 teachers*. Retrieved from http://www.house.leg.state.mn.us/hrd/pubs/ss/sscet.pdf

Leschinsky, M., & Messemer, J. (2010). Providing system compliance training to accountants of a global pharmaceutical company: The Switzerland case. *Adult Learning, 21*(3-4), 13–20.

Li, J., & Lomax, R. (2011). Analysis of variance: What is your statistical software actually doing? *Journal of Experimental Education, 79*(3), 279–294.

Lin-shuang, Y., & Zi-jiang, Q. (2007). Survey on adult student opinions of English classroom activities. *US-China Education Review, 4*(5), 32–38.

Linebaugh, K. (2012). The new GE way: Go deep, not wide. Retrieved from http://online.wsj.com

LKLP Parent's Self Help Project. (2012). Self help parenting class. Retrieved from http://www.lklp.org

Lodico, M. G., Spaulding, D. T., & Voegtle, D. H. (2010). Methods in educational research: From theory to practice. Hoboken, NJ: John Wiley & Sons.

Lynch, J. (2009). Print literacy engagement of parents from low-income backgrounds: Implications for adult and family literacy programs. *Journal of Adolescent & Adult Literacy, 52*(6), 509–521. doi:10.1598/JAAL.52.6.5

Macdonald, I., & Kozak, R. (2010). Learner support requirements for online workplace training in the South African furniture industry. *Journal of Asynchronous Learning Networks, 14*(3), 48–58.

McAdoo, B., & Manwaring, M. (2009). Teaching for implementation: Designing

negotiation curricula to maximize long-term learning. *Negotiation Journal, 25*(2), 195–215. doi:10.1111/j.1571-9979.2009.00220.x

McDaniel, B. (2012). Information about traffic schools. Retrieved from www.ehow.com

McVey, S. D. (2010). *Outcomes of adult learners who participate in family literacy programs* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 3438057)

Magliaro, S. G., & Shambaugh, N. (2006). Student models of instructional design. *Educational Technology Research and Development, 54*(1), 83–106.

Margol, E. (2015). *The why and what of motivation*. Retrieved from www.trainingindustry.com.

Maxwell, S. (2010). Using rubrics to support graded assessment in a competency based environment. NCVER.

Mellard, D. F., Fall, E. E., & Woods, K. L. (2013). Relation and interactions among reading fluency and competence for adult education learners. *Learning Disabilities Research & Practice, 28*(2), 70–80.

Menardi. (2012). *Seminars/training*. Retrieved from http://www.menardifilters.com

Merriam, S. (2008). *Qualitative research: A guide to design and implementation* (2nd ed.). San Francisco, CA: Jossey-Bass.

Merriam, S. (2003). *Qualitative research in practice: Examples for discussion and analysis*. San Francisco, CA: Jossey Bass.

Merriam, S., Caffarella, R., & Baumgartner, L. (2007). *Learning in adulthood: A comprehensive guide* (3rd ed.). San Francisco, CA: Jossey-Bass.

Meuser, T., Carr, D., Irmiter, C., Schwartzberg, J., & Ulfarsson, G. (2012). The American Medical Association older driver curriculum for health professionals: Changes in trainee confidence, attitudes, and practice behavior. *Gerontology & Geriatrics Education, 31*(4), 290–309. doi:10.1080/02701960.2010.528273

Mezirow, J., & Taylor, E. (2009). *Transformative Learning in Practice: Insights from Community, Workplace, and Higher Practice*. Hoboken, NJ: John Wiley and Sons.

Michaels, D. (2012). Meet Assistant Secretary of Labor for OSHA David Michaels. Retrieved from www.osha.gov

Mikkelson, S. (2012). MnSCU penalized for hazardous waste violations in St. Cloud, Brainerd. Retrieved from http://www.pca.state.mn.us

Midwesco Filter Resources. (2012). *Baghouse 101/201 seminars.* Retrieved from http://www.midwescofilter.com/Downloads/seminars.pdf

Mitchell, E. (2009). *The impact of anxiety on verbal learning performance in older adults* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 1463835)

Mitchell, R., Myles, F. & Marsden, E. (2013). *Second language learning theories* (3rd ed.). New York, NY: Routledge.

Moore, S. (2011, April 1). We've become a nation of takers, not makers. *Wall Street Journal.* Retrieved from http://online.wsj.com

Mosley, M., & Zoch, M. (2011). Tools that come from within: Learning to teach in a cross-cultural adult literacy practicum. *Teaching and Teacher Education, 28*(1),

66–77. doi:10.1016/j.tate.2011.09.003

Mullen, C. A. (2009). Re-Imagining the human dimension of mentoring: A framework for research administration and the academy. *Journal of Research Administration, 40*(1), 10–31.

Mun, E. (2010). Sex typing of jobs in hiring: Evidence from Japan. *Social Forces, 88*(5), 1999–2028. doi:10.1353/sof.2010.0046

Murphy, J. C., & Carson-Warner, C. (2012). TLMP training the trainer manual. Retrieved from www.docstoc.com.

Nadler, Z., & Nadler, L. (2012). *Designing training programs*. New York, NY: Routledge.

Nalliah R.P., & Allareddy V. (2014) Students distracted by electronic devices perform at the same level as those who are focused on the lecture. *PeerJ, 2*(572). doi:10.7717/peerj.572

Nassaji, H. (2013). Participation structure and incidental focus on form in adult ESL classrooms. *Language Learning, 63*(4), 835–869.

National Center for Chronic Disease Prevention and Health Promotion. (2009). Fostering school connectedness: Improving Student Health and Academic Achievement. Information for School Districts and School Administrators. Retrieved from www.cdc.gov

National Center for Public Policy and Higher Education. (2009). *Postsecondary Education Spending Priorities for the American Recovery and Reinvestment Act of 2009*. Retrieved from

http://www.highereducation.org/reports/ARRA/ARRA_Statement.pdf.

National Conference of State Legislatures. (2012). *New laws ring in the New Year*. Retrieved from www.ncsl.org

National Electric Installation Standards. (2012). State electrical regulations. Retrieved from http://www.neca-neis.org

National Institute on Drug Abuse. (2012). DrugFacts: Treatment for drug abusers in the criminal justice system 2006. Retrieved from: http://www.drugabuse.gov

National Substance Abuse Index. (2012). Federal alcohol laws. Retrieved from http://nationalsubstanceabuseindex.org

Nicholson, H. J. (2007). *A Comparison of the active participations and learning strategies employed by adult learners in industrial training programs* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 3290793)

Nigg, J.T. (2010). Attention-deficit/ hyperactivity disorder: Endophenotypes, structure, and etiological pathways. *Current Directions in Psychology Science, 19*(1), 24–29. doi:10.1177/0963721409359282

Norman, G. (2010). Likert scales, levels of measurement and the ‘‘laws’’ of statistics. *Advances in Health Sciences Education, 15*(5), 625–632. doi:10.1007/s10459-010-9222-y

Northern Michigan University Instructional Design and Technology. (2010). Suggestions for laptop use in classrooms. Retrieved from http://idt.nmu.edu/laptopuse.php

Nursing.com. (2012). Nursing continuing education requirements by state. Retrieved

from http://ce.nurse.com/state-nurse-ce-requirements

Nworie, J., & Haughton, N. (2008). Good Intentions and Unanticipated Effects: The Unintended Consequences of the Application of Technology in Teaching and Learning Environments. *TechTrends: Linking Research & Practice to Improve Learning, 52*(5), 52–58. doi:10.1007/s11528-008-0197-y

Occupational Health and Safety. (2011). OSHA brews up $46,550 in fines for Georgia coffee, tea manufacturer. Retrieved from http://ohsonline.com

Occupational Safety and Health Administration. (2010). Making the business case for safety and health: Costs of workplace injuries and illnesses. Retrieved from www.osha.gov

Occupational Safety and Health Administration. (2012a). About OSHA. Retrieved from www.osha.gov

Occupational Safety and Health Administration. (2012b). All about VPP. Retrieved from www.osha.gov

Occupational Safety and Health Administration. (2012c). OSHA training: Courses, Materials and Resources. Retrieved from www.osha.gov

Occupational Safety and Health Administration. (2012d). Worker Fatalities. Retrieved from www.osha.gov

Online OSHA Safety Training. (2012). BP Oil Spill Safety Training Bulletin. Retrieved from http://www.onlineoshasafetytraining.com

OSHA Regional News Release. (2012). US Labor Department's OSHA cites 2 companies, proposes $288,000 in fines for workplace safety and health violations

involving foreign students summer workers repackaged Hershey candies at Palmyra, Pa., facility. Retrieved from www.osha.gov

Ozturk, E. (2012, Feb 1-4). "What If" analyses: Ways to interpret statistical significance test results. Paper presented at the Annual Meeting of the Southwest Educational Research Association, New Orleans, LA.

Pallarito, K. (2015). 10 tricks for paying attention. *Health*. Retrieved from www.health.com.

Parker, K., Lenhart, A., & Patten, E. (2010).The digital revolution and higher education. Pew Research Center.

Parish, K. (2010). *Quieting the cacophony of the mind: The role of mindfulness in adult learning* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 3419854)

Pearce, J., Mann, M. K., Jones, C., van Buschbach, S., Olff, M., & Bisson, J. (2012). The most effective way of delivering a Train-the-Trainers program: A systematic review. *Journal of Continuing Education in the Health Professions, 32*(3), 215–226. doi:10.1002/chp.21148

Pew Charitable Trust. (2007). *Public safety, public spending: Forecasting America's prison population 2007–2011*. Retrieved from http://www.pewtrusts.org

Pinder, R. A. (2011). *Adult learners' understandings and expectations of literacy and their impact on participation in adult literacy programs* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 3459078)

Pontefract, D. (2012). Why you must define the so-what of learning. *Chief Learning Officer*. Retrieved from www.clomedia.com

Preskill, H. (1989, Oct). *Adult learning and the teaching of evaluation: A study of an experiential learning project*. Paper presented at the Annual conference of the American Evaluation Association, San Francisco, CA.

Prins, E. (2009). Examining interpersonal dynamics among adult learners through the lens of place. *International Journal of Lifelong Education 28*(1). 91–106.

Rabourn, K. E., Shoup, R., & BrckaLorenz, A. (2015, May 25). Barriers in Returning to Learning: Engagement and Support of Adult Learners. Paper presented at the Annual Forum of the Association for Institutional Research, Denver, CO.

Rasikchandra, R. (2009). *Post-secondary technical vocational education training: A qualitative case study of Industrial Training Institute (ITI) in Maharasthra State, India* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 3355628)

Real Estate Express. (2012). How to get a real estate license. Retrieved from http://www.realestateexpress.com

Reivich, K., Seligman, M., & McBride, S. (2011). Master resilience training in the U.S. Army. *American Psychologist, 66*(1), 25–34.

Richmond, R. (2014). *Autogenic training*. Retrieved from http://www.guidetopsychology.com

Ritter, L., & Sue V. (2007). Selecting a sample. *New Directions for Evaluation, 115*(7), 23–28. doi:10.1002/ev.232

Robinson, K. (2015). *Designing participant centered curriculum*. Thousand Oaks, CA: Sage.

Rojewski, J., Lee, I., & Gemici, S. (2012). Use of "t"-Test and ANOVA in career-technical education research. *Career and Technical Education Research,* 37(3), 263–275. doi:10.5328/cter37.3.263

Rose, A. D., & Jeris, L. (2011). Finding the worker: Adult education and workers' education. *Adult Learning, 22*(1), 28–31.

Rose, A. D., Jeris, L., & Smith R. L. (2005). Is adult education a calling? Shaping identity and practice in steel mill learning centers. *Teachers College Record, 107*(6), 1305–1334.

Rose, G. L. (2008). *Language acculturation anxiety in Spanish speaking adult immigrants learning English in the United States* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 3315370)

Rosen, B., & DeMaria, A. (2012). Statistical significance vs. practical significance: An exploration through health education. *American Journal of Health Education, 43*(4), 235–241.

Ross-Gordon, J. (2001). *Contemporary viewpoints on teaching adults effectively*. San Francisco: CA. Jossey-Bass.

Rothenberg, L., & Harrington, C. (1994, April 4-8). *The relationship between anxiety and achievement in Adult Learners.* Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA.

Rothwell, W. J., & Kazanas, H. C. (2011). *Mastering the instructional design process: A systematic approach*. Hoboken, NJ: John Wiley & Sons.

Runningen, R. (2011). Obama recruits Motorola, Groupon for expanded employment skills training. *Bloomberg*. Retrieved from: http://www.bloomberg.com

Rutledge, K., van den Bos, W., McClure, S., & Schweitzer, J. (2012). Training cognitional ADHD: Current findings borrowed concepts, and future directors. *Neurotherapeutics 9*(3), 542–558. doi:10.1007/s13311-012-0134-9

Salas, E., Tannenbaum, S., Kraiger, K., & Smith-Jentsch, K. (2012). The science of training and development in organizations: What matters in practice. *Psychological Science in the Public Interest, 13*(2), 74–101.

Saunders, P. (2009). Poverty, deprivation and consistent poverty. *Economic Record, 85*(271), 417–432.

Schachter, R. (2009). Mobile devices in the classroom. *District Administration, 45*(10), 31–34.

Shedletsky, L. J. (2006). Internet training for older adult learners: An intergenerational mentoring approach. *The LLI Review, 10*(1), 34–43.

Shi, Y., & Tsang, M. (2008). Evaluation of adult literacy education in the United States: A review of methodological issues. *Educational Research Review, 3*(2), 187–217. doi:10.1016/j.edurev.2007.10.004

Shibley, I., Amaral, K. E., Shank, J. D., & Shibley, L. R. (2011). Designing a blended course: Using ADDIE to guide instructional design. *Journal of College Science Teaching, 40*(6), 80–85.

Shinkareva, O., & Benson, A. (2007). The relationship between adult students' instructional technology competency and self-directed learning ability in an online course. *Human Resource Development International, 10*(4), 417–435.

Shipton, B. (2011). Expanding police educator's understanding of teaching: Are they as learner-centered as they think? *Journal of learning design, 4*(2), 1–19.

Short, T., & Harris, R. (2010). Challenges in aligning workplace learning with business goals: A perspective from HRD professionals in New Zealand. *Australian Journal of Adult Learning, 50*(2), 358–389.

Sieber, J. E. (1998). Planning ethically responsible research. In L. Bickman & DJ. Rog (Eds.), *Handbook of Applied Social Research Methods*. Thousand Oaks, CA: Sage.

Sizemore, O. J., & Lewandowki, G. W. (2009). Learning might not equal liking: Research methods course changes knowledge but not attitudes. *Teaching of Psychology, 36*, 90–95. doi:10.1080/00986280902739727

Skinner, N., & Brewer, N. (2002). The dynamics of threat and challenge appraisals prior to stressful achievement events. *Journal of Personality and Social Psychology, 83*(3), 678–692. doi:10.1037/0022-3514.83.3.678

Slavin, R. E. (2014). Making cooperative learning powerful. *Educational Leadership Magazine, 72*(2), 22–26.

Smith, J. (2011). Top 20: America's best-paying blue-collar jobs. *ABC News*. Retrieved from http://abcnews.go.com

Somerville, M., & Lloyd, A. (2006). Codified knowledge and embodied learning: The

problem of safety training. *Studies in Continuing Education 28*(3), 279–289.

Sparrow, L., & Hurst, C. (2010). Effecting affect: Developing a positive attitude to primary mathematics learning. *Australian Primary Mathematics Classroom, 15*(1), 18–24.

Spinella, S. (2011, Feb 2-5). *Using the descriptive bootstrap to evaluate result replicability*. Paper presented at the Annual Meeting of the Southwest Educational Research Association, San Antonio, TX.

Steier, E. J. (2010). *Application of theories, principles and methods of adult learning for managers to improve workplace reactions to learning, knowledge and performance* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 3421848)

Stier, S. (2010). Is knowledge random? Introducing sampling and bias through outdoor inquiry. *Science Scope, 33*(5), 45–49.

Study Guides and Strategies. (2015). *Paying attention in the classroom*. Retrieved from http://www.studygs.net

Sweeney, J., & Martindale, E. (2012). *Increasing Employee Participation in Voluntary Training: Issues and Solutions*. Retrieved from http://www.memphis.edu/icl/idt/clrc/aect-sweeney-martindale.pdf.

Swenson, C. (2003). Accelerated and Traditional Formats: Using learning as a criterion for quality. *New Directions for Adults and Continuing Education, 97,* 83–92.

Sudol, D., & Hall, A. M. (1991, March 21-23). *Back to school: Warnings and advice to the older graduate student*. Paper presented at the Annual Meeting of the

Conference on College Composition and Communication, Boston, MA.

Tadesse, T., & Gillies, R. M. (2015). Nurturing cooperative learning pedagogies in higher education classrooms: Evidence of instructional reform and potential challenges. *Current Issues in Education, 18*(2), 1–18.

Tate, M. L. (2012). *"Sit and Get" Won't Grow Dendrites: 20 Professional Learning Strategies That Engage the Adult Brain*. Thousand Oaks, CA: Corwin Press.

Thomas, M. (2012). Training best practices and organizational success. Retrieved from www.trainingindustry.com

Thomas, R., & Hasher, L. (2012). Reflections of distraction in memory: Transfer of previous distraction improves recall in younger and older adults. *Journal of Experimental Psychology. 38*(1), 30–39. doi:10.1037/a0024882.

Thompson, B. (2011). Choosing the best correction formula for the Pearson r^2 effect size. *The Journal of Experimental Education. 79*(1), 257–278.

Tongish, D. (2010). Repeat drunk driver charged in deadly crash. *The 33 TV*. Retrieved from http://www.the33tv.com.

Tsai, H., Lowell, K., & Liu, P. (2004). Graduate student perspectives on the development of electronic portfolios. *TechTrends: Linking Research & Practice to Improve Learning, 48*(3), 56–60.

Tsay, M., & Brady, M. (2010). A case study of cooperative learning and communication pedagogy: Does working in teams make a difference? *Journal of the Scholarship of Teaching and Learning, 10*(2), 78 – 89.

Tuttle, J. A. (1999). *Instructional and knowledge sharing preferences of industrial and*

technical workers in their organizational context (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 9941237)

Tzanis, J. (2012). Online course development process. Retrieved from http://www.tzanis.org

Udemgba, S. I. (2009). *Implications of literacy to perceived wellness and positive self-concept: A causal comparative analysis of enrolled versus non-enrolled adults in literacy programs* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 3372750)

U. S. Census Bureau. (2011). Educational attainment in the United States: 2011 - detailed tables. *Educational Attainment*. Retrieved from http://www.census.gov

U. S. Citizenship and Immigration Services. (2012). The naturalization test. Retrieved from USCIS.gov

U. S. Department of Education. (2012). Forecast of funding opportunities under the Department of Education discretionary grant programs for fiscal year 2012. Retrieved from http://www2.ed.gov/

U. S. Department of Energy. (2012). Course catalog. Retrieved from www.ntc.doe.gov

U. S. Department of Energy. (2011). *Resource adequacy implications of forthcoming EPA air quality regulations.* Retrieved from http://energy.gov/sites/prod/files/2011%20Air%20Quality%20Regulations%20Report_120111.pdf

U. S. Department of Health and Human Services. (2012). Mandatory reporters of child

abuse and neglect. Retrieved from http://www.childwelfare.gov

U. S. Department of Labor. (2012). *Employment projections: 2010-2020 summary.* Retrieved from http://www.bls.gov/news.release/ecopro.toc.htm

U. S. Department of Labor. (2012, March 22). Human resources, training, and labor relations manages and specialists. Retrieved from www.bls.gov

University of Kentucky, (2012). 50 States' certification requirements. Retrieved March 14, 2012 from http://education.uky.edu

Van Dusen, A. (2008). Eight reasons why you can't pay attention. Retrieved April 1, 2015 from Forbes.com.

Van Hook, S. (2008). *Theories of intelligence, learning, and active participation as a basic educational praxis.* Retrieved from http://wwmr.us/VanHook-Learning.pdf

Van Merriënboer, J. J., & Kirschner, P. A. (2012). *Ten steps to complex learning: A systematic approach to four-component instructional design*. New York, NY: Routledge.

Virginia Department of Professional and Occupational Regulation. (2012). Laws and regulations. Retrieved from http://www.dpor.virginia.gov

Wade, B. A. (2009). *Statistical literacy in adult college students* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 3374560)

Wagener, B. (2013). Autogenic training, metacognition and higher education. *Educational Psychology, 33*(7), 849–861.

Walden University. (2014). Institutional Review Board for Ethical Standards in Research.

Retrieved from http://researchcenter.waldenu.edu

Walter, L. (2008). Pfizer agrees to $975,000 penalty for clean air act violations. Retrieved from http://ehstoday.com

Walters, C. J. (2008). *The adult educator's impact on transfer of learning to the work site* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 3332295)

Wartenberg, A. D. (1994, March 15). *Andragogy and whole language*. Paper presented at the Annual Meeting of the Delaware Valley Reading Association, Merion, PA.

Watkins, T. (2010). Gang moms and dads sent to parenting classes: New law lets judges order parenting classes when kids are convicted of gang crimes. Retrieved from http://www.msnbc.msn.com

Weinstein, C. E., & Palmer, D. P. (1994a). *START: Increasing training effectiveness by improving learning and job performance*. Clearwater, FL: H&H Publishing.

Weinstein, C. E., & Palmer, D. P. (1994b). *START trainer's guide.* Clearwater, FL: H&H Publishing.

West, J. C. (2005). *The relationship between environmental sustainability training and environmental compliance: An investigation of performance in federal organizations* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 3196736)

The White House. (2010, April 28). Presidential proclamation: Workers Memorial Day. Retrieved from www.whitehouse.gov

Wimshurst, K., Wortley, R., Bates, M., & Allard, T. (2006). The impact of institutional

factors on student academic results: implications for 'quality' in universities. *Higher Education Research & Development, 25*(2), 131–145.

Winter, B. (2009). Gender related attitudes toward achievement in college. *The Community College Enterprise. 15*(1), p 83–91

Wister, A., Malloy-Weir, L., Rootman, I., & Desjardins, R. (2010). Lifelong educational practices and resources in enabling health literacy among older adults. *Journal of Aging and Health, 22*, 827–854. doi:10.1177/0898264310373502

Wlodkowski, R. J. (2008). *Enhancing adult active participation to learn: A comprehensive guide for teaching all adults* (3rd ed.). San Francisco, CA: Jossey-Bass. doi:10.1177/0741713609350425

Woolf, N., & Quinn, J. (2009). Learners' perceptions of instructional design practice in a situated learning activity. *Education Tech Research Development, 57*(1), 25–43. doi:10.1007/s11423-007-9034-9

Wyatt, L. (2011). Nontraditional student engagement: Increasing adult student success and retention. *Journal of Continuing Higher Education, 59*(1), 10–20. doi:10.1080/07377363.2011.544977

Yap, M., Rogers, T., Holmes, M. R., Hannan, C. A., & Cukie, W. (2010). The relationship between diversity training, organizational commitment, and career satisfaction. *Journal of European Industrial Training 34*(6), 519–538. doi:10.1108/0309059101106120

Yin. R. K. (2003). *Case study research*. (3rd ed.). Thousand Oaks, CA: Sage Publications.

Zatz, D. (2012). Tips for building a valid survey. *Toolkit Information*. Retrieved from www.toolpak.info

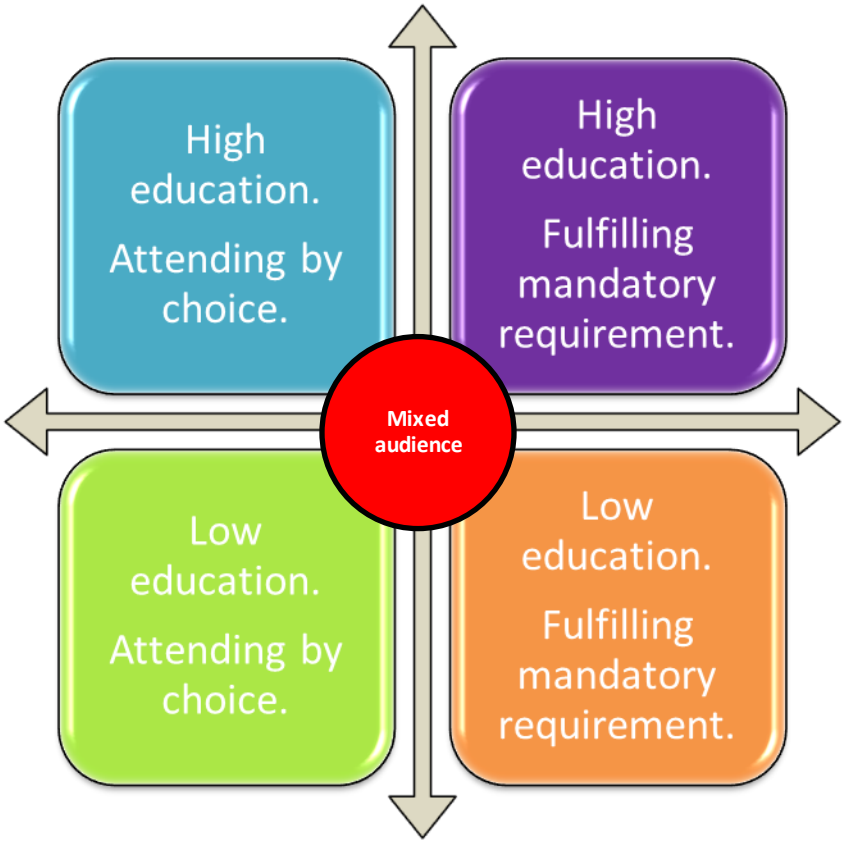
Zhong, X. (2002). *Mobile collaborative augmented reality: A prototype for industrial training* (Master's thesis). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 0-612-76659-4)

Zhu, E., Kaplan, M., Dershimer, R. C., & Bergom, I. (2011). Use of laptops in the classroom: Research and best practices. *Center for Research on Learning and Teaching*, *30*, 1–5.

Appendix A: The Project

Registration questions that reveal the demographic of the student:

1. Are you attending this course to fulfill a mandate?
2. Do you need CEUs for this course?
3. What is your job title?
4. How did you hear about this class?
5. What is the highest level of formal education you have completed?
6. How much interactivity do you like in your classroom experiences?
7. Are you on call even during training sessions?
8. How did you hear about this course?
9. On a scale of 1-10, 10 being the highest, how much benefit do you think you'll receive from this class.
10. What do you hope to gain from this class?
11. How many trainings on environmental protection have you attended this year?



GE's Train the Trainer Program:
For Environmental Protection Classes

AGENDA

MM/DD/YYYY

8:00-5:00

Conference Room D

8:00-8:30 – Understanding the purpose of the class

8:30-9:00 – What is your greatest classroom struggle?

9:00-10:30 – What tools do we have?

10:30-10:45- Break

10:45-12:00 – Registration information

12:00-1:00 – Lunch (Salon A-4)

1:00-3:00 – How adults learn

3:00-3:15 – Break

3:15- 4:30 – Learning in the workplace

4:30 – 5:00 – Daily wrap-up and Q&A

GE's Train the Trainer Program:
For Environmental Protection Classes

AGENDA

MM/DD/YYYY

8:00-5:00

Conference Room D

8:00-8:30 – Review and discussion on previous day

8:30-10:00 – Sample registration data

10:00-10:15 - Break

10:15-12:00 – Understanding the five types of classes

12:00-1:00 – Lunch (Salon A-4)

1:00-3:00 – Techniques for teaching adult learners

3:00-3:15 – Break

3:15- 4:30 – Small group work sessions

4:30 – 5:00 – Daily wrap-up and Q&A

GE's Train the Trainer Program:
For Environmental Protection Classes

AGENDA

MM/DD/YYYY

8:00-5:00

Conference Room D

8:00-8:30 – Review and discussion on previous day

8:30-10:00 – Preparing lesson plans for each type of class

10:00-10:15 - Break

10:15-12:00 – Prepare for the five class types

12:00-1:00 – Lunch (Salon A-4)

1:00-3:45 – Group presentations and simulations

3:45-4:00 – Break

4:00-5:00 – Final wrap-up and Q&A

Training notes for the GE pollution control train-the-trainer program

Materials: Flip charts, markers, ensure on-line connection, printed registrations form one per student, one worksheet per person, one START survey per student, pens.

Day 1

8:00-8:30 – Understanding the purpose of the class

Review agendas for entire class. Ensure that everyone understands there will be numerous breaks, and opportunities to ensure that they will be able to handle pressing issues outside of the classroom, without needing to interrupt classroom time.

The purpose of this section is to gain understanding, at a general level, of the reason for holding the class. You, the leader of the class should talk about, in a neutral way, and cautious to never blame any person, that GE's pollution control classes are not producing students who can consistently act upon the information once they return to the companies who sent them. Understand that most of the trainers will be very familiar with one another, as the often will have co-led several trainings together.

Introduce yourself and use expertise statements, such as "When I worked at a cement plant, I valued the training I received as it allowed me to do X and now I want to train others because of X."

8:30-9:00 – What is your greatest classroom struggle?

This section's purpose is to ensure that the leader of the train-the-training class has visibility to all of the various issues that the many trainers will face.

Using a round-robin style, and, using the white board or flipcharts, document the person, what they train on, and what issue(s) they struggle with the most in the classroom. Throughout the course, refer back to these issues and make sure you are addressing their immediate needs. Call out any similarities or commonalities amongst training issues. If any items are mentioned that pertain to anxieties or lack of focus, make sure to highlight those items, and if they are repeated.

9:00-10:30 – What tools do we have?

The purpose of this section is to gather, and explore the various analytical tools and resources that all trainers of GE's pollution control classes have available that might mitigate the disparity of results from the pollution control classes. At the end of this section, each trainer should have been invited to contribute a tool that he or she uses or a tool that needs further exploration. The goal of each of these tools is to collect, gain visibility, and, at a fundamental level, understand the purpose of each tool.

Begin by engaging with the portal to GE's training intranet site and exploring the various resources available. Have trainers pair up and explore how each person uses which resources, the reasons, and why others are not used. Make sure there is adequate time for discussion of the many resources.

Have the class regroup and each team presents their two to three favorite tools, how they use them, and why.

Within each train-the-trainer course, you will find some experts on some tools. Be prepared that you yourself may be introduced to tools that you might have not had

exposure to previously. Thus, be willing to lean on classroom experts to expound upon the tool, and react appropriately to assimilate the tools. Record the tools mentioned on flip chart paper, and any experts that emerge. This will be your toolkit. Link these tools to classroom struggles, paying particular attention to areas that involve anxiety, ability to focus, choice in attendance, or level of formal education.

Following this three day class, record all tools and experts in the pollution control shared intranet site.

10:30-10:45- Break

While the class breaks, ensure that you, the instructor, are available for one-off questions or to address any issues that attendees may have but do not feel comfortable positing in front of peers.

10:45-12:00 – Registration information

The goal of this section is to review all of the questions that customers of GE, who are not themselves employees of GE, answer while registering for the class.

Using your online connection, access the most current registration form. Ensure that everyone knows where the latest registration form can be found on GE's intranet. Ask the class if they have any general questions about the form or the registration process. When general questions have been addressed, divide the class into groups of 3 people, with some groups of 4 people.

Direct each group to brainstorm amongst themselves what registration questions could yield more than tactical information. Give the groups about 30 minutes to gather ideas, and record insights in preparation for a class report out. Then have each group spend about five minutes highlighting specific questions and what information is could be gleaned from the questions.

If any groups directly discuss the registration questions that ask about level of education or choice in attendance, or pinpoint questions that uncover if a person has outside responsibilities or issues that might relate to ability to focus or anxiety, make sure to highlight, and encourage that discussion.

After each group has reported out, review each question, and, one by one, invite the attendees to share what they gain from each question. Questions that you might pose include: What are you looking for when you review the registration forms of your pending students? Which questions give you a mental picture of the student's possible behaviors in class? Which answers to the questions lead you to making any changes in how you prepare for the classes?

Listen for adaptation that the trainers make for their classes. Do the companies that the students are coming from impact how they prepare the class? Do the job types? The level of experience? How involved the company is with GE, or dependent upon GE's products and services? Finish by brainstorming what other insights might be gained from the registration information. If, by chance, no one has mentioned insights related to the areas of mandatory attendance, level of education, anxiety, or distractions from the classroom, make sure these items are specifically discussed.

12:00-1:00 – Lunch (Salon A-4)

The classroom coordinator will handle all aspects of lunch and it is not necessary for you to manage any aspects. Simply ensure the students get to the Salon on time, and then make yourself generally available for student interactions.

1:00-3:00 – How adults learn

This section is intended to begin the discussion on pedagogy vs. andragogy. These will be new concepts to most of our trainers, and the first portion is dedicated to a lecture. The lecture will contain materials on the history of pedagogy and andragogy, high level concepts, and how these concepts apply to those in GE's pollution control classes.

To begin, use the physical props of a sponge and a sifter. In a bowl of water, soak up water into a sponge and parallel this to the mind of a child. Over a separate bowl, pour in couscous into a sifter. Some will fall through and compare that to knowledge learned, but as more couscous is added, the sifter will clog and smaller and smaller amounts of couscous will make it through. Draw the parallel to brains that are full of experience, anxieties, and outside distractions, and might block out some learnings.

Next, outline the six principles of andragogy and how they differ from pedagogy, the need to know, the learner's self-concept, the role of experience, readiness to learn, orientation to learning, and motivation. Spend significant time on understanding the effects that experience have on adults, and then ask the class to put that experience through the filter of the various experience levels of the students who attend GE's

pollution control classes. Explore how readiness to learn changes throughout a person's life and have the class brainstorm how they think this effects the people who come to GE's classes. Lastly, highlight how the internal motivations of adults differ from the external motivators faced by younger students, and how that changes the ways in which a person engages, or can be challenged to focus on learning, later in life.

Involve the students in conversations that force reflection on how they remember early schooling, any collegiate experience they have, and contrast that to how they felt during classroom sessions where they did not have the choice to attend. Give examples of these latter classes, such as required HR courses, or trainings they must take to continually ensure they have their certifications up to date.

Pay careful attention as to which of the students, who are also trainers, shows the most interest and passion for adult learning theory. Ask this person to serve as a moderator for GE's intranet site that is dedicated to training. This person will address issues and curate resources that can help all learning within GE.

3:00-3:15 – Break

3:15- 4:30 – Learning in the workplace

Now that there is a foundation for understanding some of what is faced by GE's students, specific concepts that apply to learning in the workplace will be considered in this section.

Previously purchased have been hundreds of copies of the START survey, and distribute this survey to the trainers. Take about 15 minutes to have the students fill out the survey. Have the trainers react to the survey and interpret it in their own words.

Finally, distribute the purchased copies of ASTD's state of the industry report. Highlight the areas where industrial education are discussed, where job-specific information is elucidated, and then facilitate a discussion beginning with the ways that the trainers see GE removing, or supporting barriers to learning. Have the class pay particular attention to areas concerning workplace training, industrial learning, and company investments in both time and finances to develop staff.

4:30 – 5:00 – Daily wrap-up and Q&A

Ensure that there is at least 30 minutes at the end of the day to review what was discussed, paying particular attention to anything that is highlighted on the white boards or flip charts. Make sure that any questions that arose have been addressed. If they haven't been addressed, acknowledge those questions and state how and when in the future days the areas will be discussed. Finally, ensure that no student leaves with any pressing concerns or disconnects by asking open ended questions. Ask for, and then record what the trainers felt were significant learnings during the day.

Day 2

8:00-8:30 – Review and discussion on previous day

Keeping in mind that the students will have had a night to think and reflect on the training, ask if any questions arose pertaining to the previous day's class. After immediate concerns are addressed, go through the agenda from the previous day and highlight areas on which the class tended to focus.

It is particularly important that, during this second day, at every possibility, it is important that the class begins to think through what implications exist and how the experience of the class members might create a more consistent learning opportunity.

8:30-10:00 – Sample registration data

The goal of this section is to enable the students of the train-the-trainer class to recognize that different pollution control classes have different makeups.

In preparation for this section, print off a copy of the two latest registration roster reports that contains all of the students' responses to registration data. Applying the theories and learnings from the previous day, combined with the concerns and classroom struggles that have been self-identified, go through the individual responses to each question. Have the class respond to open ended questions that focus on behavioral and demographic information. Begin to have the class recognize that there are classes that can be thought of in general terms. By the end of this section, the class should be able to think of the training sessions as having unique characteristics.

10:00-10:15 – Break

10:15-12:00 – Understanding the five types of classes

This section has the goal of identifying the five predominate class types that the trainers will encounter. Because companies send large numbers of students that tend to have the same demographic makeup, it is possible to make informed decisions on what will be predominate traits in the class.

Using a flipchart to record classroom ideas, list predominant traits that the class feels is important to determining the predominate characteristics of a class. Encourage discussion around items that relate to anxiety, ability to focus, choice in attendance, and level of education.

Following this brainstorming session, project the chart found in the PowerPoint of the graph of the five types of possible class combinations, four based upon the mixture of choice in attendance, level of education. The fifth possibility is a class with blended traits.

Using the flip chart or white board, if available, begin by referring back to the two registration reports you reviewed before break. Have the class split up into pairs and, over a period of 15 minutes, have the teams make a case for what is the dominate trait of those classes. Have the teams report out on their logic behind how they defined dominate class traits, such as choice in attendance, level of education, and behaviors.

Finally, lead the group through a discussion on how you would classify the course traits, based upon the classes' input and referring back to the comments of the students. Be cognizant to keep the group focused on the areas that the project study addresses, while still being open to feedback.

12:00-1:00 – Lunch (Salon A-4)

Use the same availability techniques you used for the previous days' lunch to answer questions, and make sure that student's needs are met.

1:00-3:00 – Techniques for teaching adult learners

The goal of this section is to establish baseline techniques for interacting with classes, and the ability to adapt to different class demographics that have been identified through the registration process. Included will be techniques for handling anxiety through autogenic learning and mitigating lack of focus.

Begin to refer to the project study that informs this train-the-trainer program. Introduce patterns in data, revealed by the project study, such as the self-identified tendency for those who are mandated to attend, feel more anxious than those that choose to attend.

Next, lead a brainstorming session, relying upon the project study literature reviews, to create a class dialogue regarding techniques to address disparate knowledge transfer. Areas you will cover include presentation skills, handling conflict, engaging adult learners, motivating learners, and using the experience of the adults as a learning

tool. End the section by introducing autogenic learning, based upon the GE intranet information, with the goal of gaining understanding around how autogenic learning can help to reduce anxiety in the classroom.

3:00-3:15 – Break

3:15- 4:30 – Small group work sessions

The goal for this section is to create solutions for addressing the disparity in knowledge transfer between classes.

Break the classroom into cohorts of 3 to 4 individuals. Give each group the registration worksheet with sample answers to registration questions from fictitious students. The cohorts will then match the student answers with the classroom situation and behavioral traits they might show.

Within each cohort, have the students discuss their strategies for dealing with each situation, such as enforcing a strict policy against electronic devices in the class balanced with ensuring that it is clear that numerous breaks will be allowed for the checking of outside needs.

After 45 minutes, have the class reconvene and share with the larger group the ideas from their smaller group discussions. Facilitate dialogue amongst the class members as ideas are exchanged on how to address common issues, such as anxiety and inability to focus on the class. Ensure the ideas are recorded, as the ideas will be put on the intranet site and inform future train-the-trainer courses.

4:30 – 5:00 – Daily wrap-up and Q&A

Staying consistent with the previous day's end of class, conclude with a question and answer session. This time is intended to ensure all students have questions answered and there are no outstanding items. Also include priorities for the next day's session.

Day 3

8:00-8:30 – Review and discussion on previous day

Lead the class through a review of previous material. Any questions or unknowns that may have arisen over the night will be addressed. Finally, the trainers will use this time to probe for any topics that must be covered before the end of class to ensure that all classroom participants will walk away from the class with a feeling of success.

8:30-10:00 – Preparing lesson plans for each type of class

The purpose of this section is to ensure that the pollution control trainers have exposure to methodologies related to building lesson plans.

Keep in mind that the students in your class, who are trainers themselves, are Subject Matter Experts in pollution control, not in training. Do not assume any level of consistent knowledge regarding instructional design or teaching methods.

Begin by playing the video from The Teaching Channel, stored on GE's intranet site, explaining the step by step best practices for creating successful learning plans.

After the video, break the class up into teams of two. Have the pairs map out a sample lesson plan based upon a topic from the pollution control courses. Allow the pairs to choose their own topics. Keep a careful eye on time, and allow for at least 15 minutes for each group to present their learning plan.

10:00-10:15 - Break

10:15-12:00 – Prepare for the five class types

The purpose of this section is to give the class a safe space to practice executing the skills that have been discussed in previous sections of the class.

Divide the class into 5 groups. Assign each group one of the five class types that has been discussed, classes with no choice in attendance and no college education, those with choice and no college education, classes with choice and college experience, classes with no choice an college experience, and a blended class.

Challenge each of the sections to brainstorm and document a lesson plan, mitigation practices for their class type, including how to handle objections, gain and retain class focus, reduce anxiety, and create a safe learning space that results in a consistent level of knowledge transfer.

12:00-1:00 – Lunch (Salon A-4)

Use the same availability techniques you used for the previous days' lunch to answer questions, and make sure that student's needs are met.

1:00-3:45 – Group presentations and simulations

This section is dedicated to having each group practice their training skills in a safe environment.

After lunch, have each of the five groups demonstrate how they would team teach their selected class style. Instruct the rest of the class to act in a manner consistent with the class type, (i.e. as if they were all mandated to attend, and had no college experience).

Remind the class of the challenges that might appear in each class, such as more anxiety, or a greater chance of an inability to focus.

After the presenters have had a chance to demonstrate adaptability, and best practices for managing a consistency of knowledge transfer, invite the class to give feedback. Ensure that someone takes notes that can be posted to the GE intranet site to inform future classes, and as a reference for attendees. Open discussions by the whole class will allow for everyone to learn from the scenarios and watch best practices in action.

3:45-4:00 – Break

4:00 – 5:00 – Final wrap-up and Q&A

The purpose of this section is to ensure that all questions have been answered, and that any previously mentioned concerns have been addressed.

To being this final wrap-up phase, confirm that all questions have been addressed. Pay particular attention to the issues and frustrations that the class mentioned at the opening of the training and ensure that no one leaves the session with confusion. Ask probing questions to investigate if all of the class can now successfully adapt styles and skills to meet the needs of each class. Remember that the goal is to promote a more consistent knowledge transfer.


Pollution Control
Train-the-Trainer

Agenda – Day 1

- 8:00-8:30 – Understanding the purpose of the class
- 8:30-9:00 – What is your greatest classroom struggle?
- 9:00-10:30 – What tools do we have?
- 10:30-10:45- Break
- 10:45-12:00 – Registration information
- 12:00-1:00 – Lunch (Salon A-4)
- 1:00-3:00 – How adults learn
- 3:00-3:15 – Break
- 3:15- 4:30 - Barriers to learning
- 4:30 – 5:00 – Daily wrap-up and Q&A

Trainer Introductions

Toolkit

- www.GEintranet.net
- www.GEonelessworry.com
- www.GEenergy.com
- www.insideGE.com


Pedagogy vs. Andragogy

Workplace Training

- START survey
- ASTD industry review

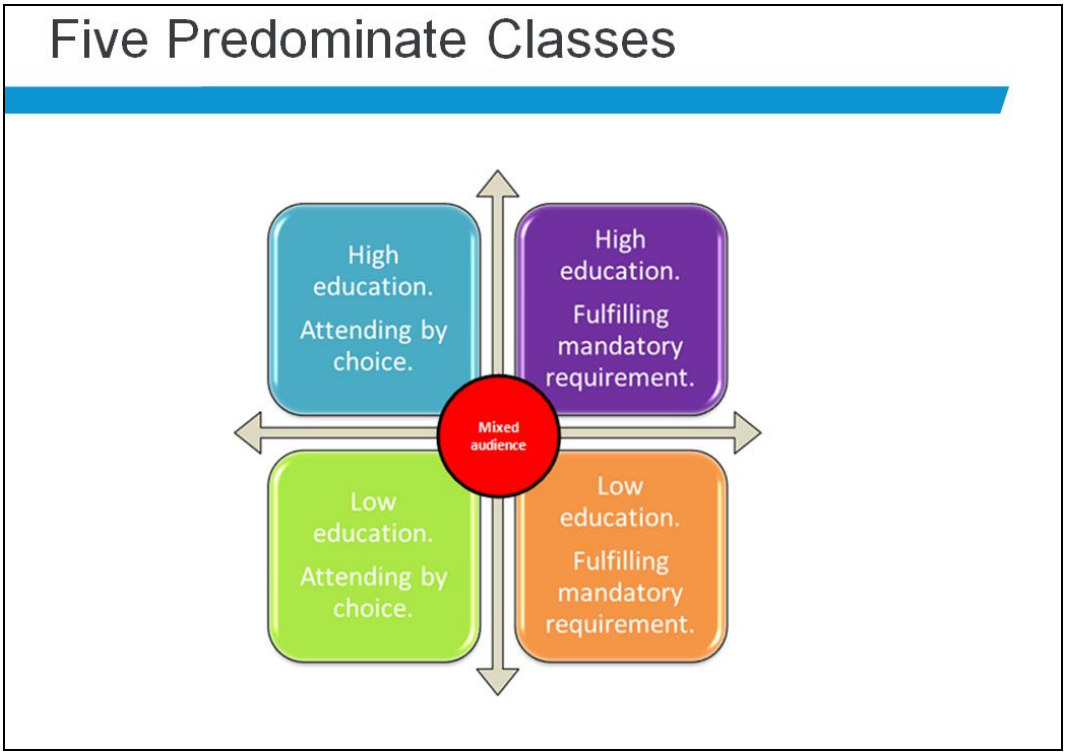
Questions and Answers

Agenda – Day 2

- 8:00-8:30 – Review and discussion on previous day
- 8:30-10:00 – Sample registration data
- 10:00-10:15 - Break
- 10:15-12:00 – Understanding the five types of classes
- 12:00-1:00 – Lunch (Salon A-4)
- 1:00-3:00 – Techniques for teaching adult learners
- 3:00-3:15 – Break
- 3:15- 4:30 – Small group work sessions
- 4:30 – 5:00 – Daily wrap-up and Q&A

Sample Registration

1. 	Sample Student 1: Average formal level of education = 2 year degree Fulfilling government regulatory mandate. Worries about being called on in class.
2. 	Sample Student 2: Average formal level of education = no high school diploma Volunteers for every training available. Values education and sees it as a path to stability and success.
3. 	Sample Student 3: Average formal level of education = Master's degree Manager signed up student for job skills enhancement. Cannot disconnect from work; remains on call at all times.
4. 	Sample Student 4: Average formal level of education = 4 year degree Needs CEU to fulfill Mining Society of Engineers' requirement Has only attended a few trainings this year, but has done so on a voluntary basis.
5. 	Sample Student 5: Average formal level of education = 4 year degree Fulfilling government regulatory mandate. Is not on call at work.


Five Predominate Classes
High education.
Attending by choice.
High education.
Fulfilling mandatory requirement.
Mixed audience
Low education.
Attending by choice.
Low education.
Fulfilling mandatory requirement.

Questions and Answers

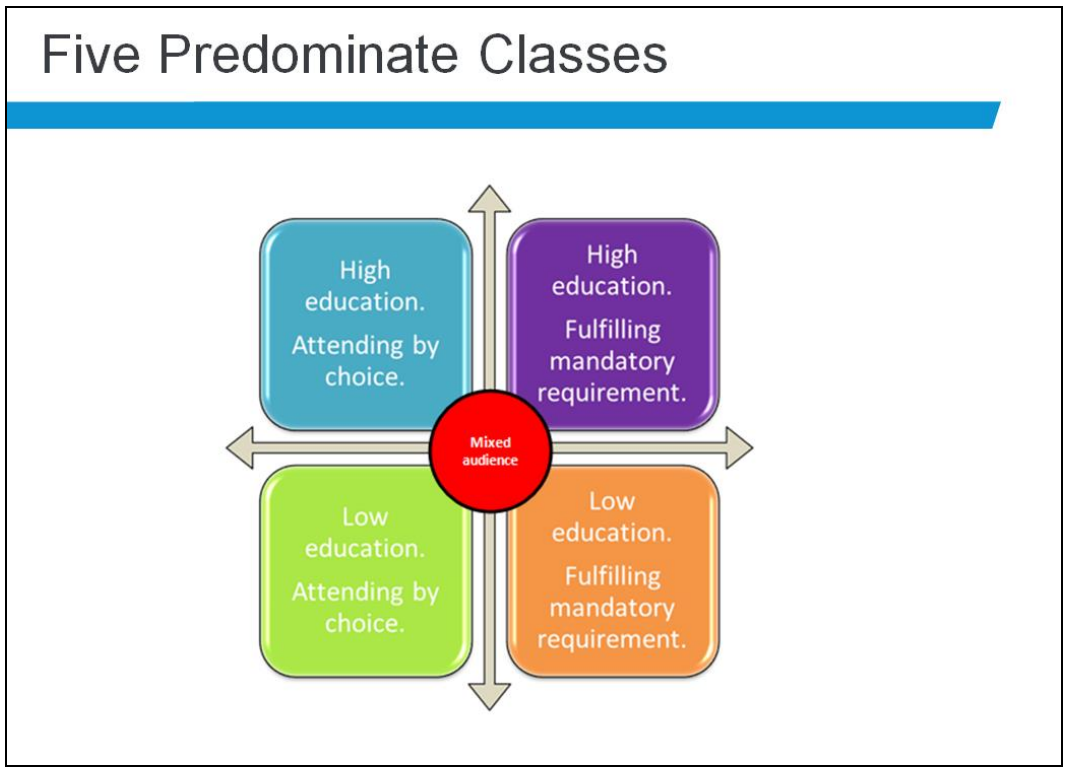
Review Day 2

Agenda – Day 3

- 8:00-8:30 – Review and discussion on previous day
- 8:30-10:00 – Preparing lesson plans for each type of class
- 10:00-10:15 - Break
- 10:15-12:00 – Prepare for the five class types
- 12:00-1:00 – Lunch (Salon A-4)
- 1:00-3:45 – Group presentations and simulations
- 3:45-4:00 – Break
- 4:00-5:00 – Final wrap-up and Q&A

Lesson Planning

- GE's learning channel
- Video on lesson planning
- Pair up and work on a lesson plan!


Five Predominate Classes
High education.
Attending by choice.
High education.
Fulfilling mandatory requirement.
Mixed audience
Low education.
Attending by choice.
Low education.
Fulfilling mandatory requirement.

Final Wrap Up

Worksheet - Based upon the registration selections, match the student with the area.

1. 	Sample Student 1: Average formal level of education = 2 year degree Fulfilling government regulatory mandate. Worries about being called on in class.	(Answer: Low education. Fulfilling mandatory requirement.)
2. 	Sample Student 2: Average formal level of education = no high school diploma Volunteers for every training available. Values education and sees it as a path to stability and success.	(Answer: Low education. Attending by choice.)
3. 	Sample Student 3: Average formal level of education = Master's degree Manager signed up student for job skills enhancement. Cannot disconnect from work; remains on call at all times.	(Answer: High education. Fulfilling mandatory requirement.)
4. 	Sample Student 4: Average formal level of education = 4 year degree Needs CEU to fulfill Mining Society of Engineers' requirement Has only attended a few trainings this year, but has done so on a voluntary basis.	(Answer: Mixed audience.)
5. 	Sample Student 5: Average formal level of education = 4 year degree Fulfilling government regulatory mandate. Is not on call at work.	(Answer: High education. Attending by choice.)

Evaluation for Train the Trainer Session

Date _____

My Mentor/Mentee is _____

1= Strongly Disagree; 2= Disagree; 3= Neither Agree Nor Disagree; 4= Agree; 5= Strongly Agree

1. I feel the training was worth my time _____
2. I felt I could contribute my ideas and thoughts to the session _____
3. This session gave me new tools for my trainings _____
4. The facilitation of this training was of high quality _____
5. I came away from the training with useful tools _____
6. This training was relevant to me _____
7. The small group sessions were worthwhile _____

Please provide your honest feedback to improve this, and future trainings

1. Things I would not change about the training:

2. Things I would change about the training:

3. Please share any other feedback or comments you might have.

Rubric for Pollution Control Training

Trainer_____ Date _____Observer_____

5= The trainer's performance demonstrates excellent skills, consistently shows understanding far exceeding basic competencies.

4= The trainer's performance demonstrates very good skills that consistently shows understanding that exceeds basic competencies.

3= The trainer's performance meets basic requirements and shows basic expectations.

2= The trainer's performance demonstrates some progress, but requires improvement.

1= The trainer's performance does not meet expectations. Immediate further coaching is required.

Standard	Review 1	Review 2	Review 3
Understanding: The trainer understands how to determine which of the 5 types of classes he/she is in.			
Learning and Development: The trainer understands the difference in classroom demographics.			
Anxiety: The trainer adapts the teaching style to accommodate the learners' anxieties.			
Focus: The trainer adapts the teaching style to accommodate for the learners' ability to focus on the course.			
Adaptation: The trainer uses techniques, as discussed in the train-the-trainer course, to mitigate the effects of classroom behaviors.			
Additional Comments:			

Appendix B: Training Questionnaire

Answer regarding feelings and actions towards trainings in general. Your honest, confidential survey answers will improve future sessions of the GE learning. Your support of this scholastic effort is truly appreciated. If at any time you feel any discomfort or psychological distress while taking this questionnaire, please stop the survey and skip forward to the registration process.

(Answers are electronic radial buttons utilizing SurveyCentral. Pilot survey will have physical numeration for respondents to circle. Scale of 1 to 5. 1= "*not at all typical of me*" through 5="*very much typical of me*")

1. I avoid attending training because I didn't do well in school.

   ○1 ○2 ○3 ○4 ○5

2. When I am in training, I feel anxious.

   ○1 ○2 ○3 ○4 ○5

3. I have negative memories of school.

   ○1 ○2 ○3 ○4 ○5

4. My previous classroom experiences make me feel less self-assured during training.

   ○1 ○2 ○3 ○4 ○5

5. I avoid telling my peers what my level of education is.

   ○1 ○2 ○3 ○4 ○5

6. I get nervous when the trainer asks me questions in a training class.

○1 ○2 ○3 ○4 ○5

7. My anxiety about training affects my sleep the night before the class.

○1 ○2 ○3 ○4 ○5

8. I am concerned with making mistakes in front of my coworkers.

○1 ○2 ○3 ○4 ○5

9. I am worried that taking training will negatively impact my home life.

○1 ○2 ○3 ○4 ○5

10. I volunteer to participate in classroom or online training activities, even if there is risk of failure.

○1 ○2 ○3 ○4 ○5

11. My workload impacts my ability to focus on training.

○1 ○2 ○3 ○4 ○5

12. My job requires me to be on-call, available to be contacted even in trainings.

○1 ○2 ○3 ○4 ○5

13. Family or relationship issues often arise that affect my ability to focus on training.

○1 ○2 ○3 ○4 ○5

14. Financial worries distract me from focusing on training.

○1 ○2 ○3 ○4 ○5

15. When in training, I am worried I am missing out on family time.

○1 ○2 ○3 ○4 ○5

16. New material comes slowly to me.

○1 ○2 ○3 ○4 ○5

17. I often check the time during training to see how much is left.

○1 ○2 ○3 ○4 ○5

18. I am often unable to arrive on time for training.

○1 ○2 ○3 ○4 ○5

19. I use technology to keep connected to my outside life when I'm in training.

○1 ○2 ○3 ○4 ○5

20. I think that taking training at work will not improve my life.

○1 ○2 ○3 ○4 ○5

21. What is the highest level of education you have completed?
    - -Less than high school
    - -High school/GED
    - -Some college no degree
    - -2-year college degree (associates)
    - -4-year college degrees (BS, BA, etc.)
    - -Master's Degree
    - -Doctorate Degree

22. Did you attend this training session by choice?
    1=No
    2=Yes

Appendix C: Consent Form

You are invited to take part in a research study of adult learners in GE's environmental control classes. In an effort to hopefully understand the relationship better between certain behaviors and adult learners' reactions to mandatory learning scenarios, you are being asked to participate in a study that will inform a train the trainer course. Any adult who has participated in GE's environmental protection learning series is invited to be in the study. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part.

This study is being conducted by a researcher named Steven H. Harlan, who is a doctoral student at Walden University. You may already know the researcher as the Education Leader for GE's Air Filtration division, but this study is separate from that role.

Background Information:
The purpose of this study is to explore relationships between an adult learner's behaviors such as anxiety towards training, ability to focus on training, and willingness to participate in training, and if that adult volunteered for the class and the adult's previous level of completed formal education. It is hoped this information can be used to improve GE's environmental control trainings.

Procedures:
If you agree to be in this study, you will be asked to:

- Answer 22 survey questions
- Take about 10 minutes to thoughtfully consider these 22 questions
- Accept that you will receive no monetary benefit for participating

Here are some sample questions:

My workload impacts my ability to focus on training.
I am concerned with making mistakes in front of my coworkers
I avoid attending training because I didn't do well in school.

Voluntary Nature of the Study:
This study is voluntary. Everyone will respect your decision of whether or not you choose to be in the study. No one at GE or Walden University will treat you differently if you decide not to be in the study. If you decide to join the study now, you can still change your mind later. You may stop at any time.

Risks and Benefits of Being in the Study:
Being in this type of study involves some risk of the minor discomforts that can be encountered in daily life, such as fatigue, stress, or worry over time management. Being in this study would not pose risk to your safety or wellbeing.

It is hoped that the data that you and others provide will improve the quality of GE's environmental protection training. It is highly unlikely that you will derive any direct benefit of involvement other than the possible feeling of pleasure in bettering scholarship.

Payment:
No remuneration is available to participants. GE expressly forbids any payment, thank you gifts, or reimbursements in exchange for data. While the researcher cannot reimburse you for your time, please be assured that your participation is accepted with the most heartfelt appreciation, and every effort will be made to better the greater society utilizing the information you provide.

Privacy:
Any information you provide will be kept anonymous. The researcher will not use your personal information for any purposes outside of this research project. Also, the researcher will not include your name or anything that could identify you in the study reports. Data will be kept secure by SurveyCentral, and data will be kept for a period of 10 years.

Contacts and Questions:
If you have questions, you may contact the researcher, Steven Harlan, via email: stevenhharlan@gmail.com; steven.harlan@ge.com or via phone at 816-313-4753 or 816-305-7437. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is 1-800-925-3368, extension 1210. Walden University's approval number for this study is 04-22-13-0178501_and it expires on 04/21/2014.

Please print or save this consent form for your records.

Statement of Consent:

I have read the above information and I feel I understand the study well enough to make a decision about my involvement. By clicking "Accept" I understand that I am agreeing to the terms described above.

Appendix D: Pilot Consent Form

You are invited to take part in the pilot of a research study of adult learners in GE's environmental control classes. In an effort to understand the relationship better between certain behaviors and adult learners' reactions to mandatory learning scenarios, you are being asked to participate in the pilot of a study that will inform a train the trainer course. As someone who is involved with GE's environmental protection learning series, you are invited to be involved with the pilot of this study. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part in this pilot.

This study is being conducted by a researcher named Steven H. Harlan, who is a doctoral student at Walden University. You may already know the researcher as the Education Leader for GE's Air Filtration division, but this study is separate from that role.

Background Information:
The purpose of this study is to explore relationships between an adult learner's behaviors such as anxiety towards training, ability to focus on training, and willingness to participate in training, and if that adult volunteered for the class and the adult's previous level of completed formal education. It is hoped this information can be used to improve GE's environmental control trainings.

Procedures:
If you agree to be in this pilot study, you will be asked to:

- Answer 22 survey questions
- Take about 10 minutes to thoughtfully consider these 22 questions
- Accept that you will receive no monetary benefit for participating

Here are some sample questions:

My workload impacts my ability to focus on training.
I am concerned with making mistakes in front of my coworkers
I avoid attending training because I didn't do well in school.

Voluntary Nature of the Pilot Study:
This pilot study is voluntary. Everyone will respect your decision of whether or not you choose to be in the study. No one at GE or Walden University will treat you differently if you decide not to be in the study. If you decide to join the study now, you can still change your mind later. You may stop at any time.

Risks and Benefits of Being in the Study:
Being in this type of pilot study involves some risk of the minor discomforts that can be encountered in daily life, such as fatigue, stress, or worry over time management. Being in this pilot study would not pose risk to your safety or wellbeing.

It is hoped that the feedback that you and others provide will improve the quality of this survey, which, in turn, will benefit GE's environmental protection training. It is highly unlikely that you will derive any direct benefit of involvement other than the possible feeling of pleasure in bettering scholarship.

Payment:
No remuneration is available to participants. GE expressly forbids any payment, thank you gifts, or reimbursements in exchange for data. While the researcher cannot reimburse you for your time, please be assured that your participation is accepted with the most heartfelt appreciation, and every effort will be made to better the greater society utilizing the information you provide.

Privacy:
Any information you provide will be kept anonymous. The researcher will not use your personal information for any purposes outside of this research project. Also, the researcher will not include your name or anything that could identify you in the study reports. Survey data will be kept secure by SurveyCentral, and data will be kept for a period of 10 years. Feedback provided to better the study will be kept confidential when anonymity is not possible.

Contacts and Questions:
If you have questions, you may contact the researcher, Steven Harlan, via email: stevenhharlan@gmail.com; steven.harlan@ge.com or via phone at 816-313-4753 or 816-305-7437. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is 1-800-925-3368, extension 1210. Walden University's approval number for this study is 04-22-13-0178501_and it expires on 04/21/2014.

The researcher will give you a copy of this form to keep.

Statement of Consent:

I have read the above information and I feel I understand the pilot study well enough to make a decision about my involvement. By signing below, I understand that I am agreeing to the terms described above.

Printed Name of Participant

Date of consent

Participant's Signature

Researcher's Signature

Appendix E: Tables

Test for Homogeneity for Anxiety

Levene Statistic	df1	df2	Sig
2.488	6	749	.375

Test of Homogeneity for Focus

Levene Statistic	df1	df2	Sig
.782	6	749	.584

Statistical Details

ANOVA - Level of Formal Education and Anxiety

	df	Eta^2	F	Sig
Q1. I avoid attending training because I didn't do well in school.	755	0.290	50.901	.000
Q2. When I am in training, I feel anxious.	755	0.200	31.295	.000
Q3. I have negative memories of school.	755	0.186	28.584	.000
Q4. My previous classroom experiences make me feel less self-assured during training.	755	0.256	42.915	.000
Q5. I avoid telling my peers what my level of education is.	755	0.240	39.398	.000
Q6. I get nervous when the trainer asks me questions in a class.	755	0.064	8.488	.000
Q7. My anxiety about training affects my sleep the night before the class.	755	0.076	10.232	.000
Q8. I am concerned with making mistakes in front of my coworkers.	755	0.016	2.066	.055
Q9. I am concerned that taking training will negatively impact my home life.	755	0.019	2.357	.029
Q10. I volunteer to participate in classroom or online training activities, even if there is risk of failure.	755	0.217	34.687	.000

ANOVA - Level of Formal Education and Ability to Focus

	df	Eta^2	F	Sig.
Q11. My workload impacts my ability to focus on training.	755	0.098	13.513	.000
Q12. My job requires me to be on-call available to be contacted even in training.	755	0.096	13.313	.000
Q13. Family or relationship issues often arise that affect my ability to focus on training.	755	0.024	3.096	.005
Q14. Financial worries distract me from focusing on training.	755	0.263	44.611	.000
Q15. When in training, I am worried I am missing out on family time.	755	0.042	5.456	.000
Q16. New material comes slowly to me.	755	0.268	45.768	.000
Q17. I often check the time during training to see how much is left.	755	0.053	7.007	.000
Q18. I am often unable to arrive on time for training.	755	0.013	1.631	.136
Q19. I use technology to keep connected to my outside life when I'm in training.	755	0.039	5.071	.000
Q20. I think that taking training at work will not improve my life.	755	0.231	37.470	.000

ANOVAs for Choice in Attendance

ANOVA - Choice in Attendance and Anxiety

	df	Eta^2	F	Sig
Q1. I avoid attending training because I didn't do well in school.	755	0.326	364.570	.000
Q2. When I am in training, I feel anxious.	755	0.153	136.124	.000
Q3. I have negative memories of school.	755	0.191	177.907	.000
Q4. My previous classroom experiences make me feel less self-assured during training.	755	0.175	159.999	.000
Q5. I avoid telling my peers what my level of education is.	755	0.111	94.484	.000
Q6. I get nervous when the trainer asks me questions in a class.	755	0.074	60.178	.000
Q7. My anxiety about training affects my sleep the night before the class.	755	0.014	10.806	.000
Q8. I am concerned with making mistakes in front of my coworkers.	755	0.036	28.373	.055
Q9. I am concerned that taking training will negatively impact my home life.	755	0.003	2.538	.029
Q10. I volunteer to participate in classroom or online training activities, even if there is risk of failure.	755	0.464	653.403	.000

ANOVA - Choice in Attendance and Ability to Focus

	df	Eta^2	F	Sig.
Q11. My workload impacts my ability to focus on training.	755	0.002	1.759	.000
Q12. My job requires me to be on-call available to be contacted even in training.	755	0.010	7.524	.000
Q13. Family or relationship issues often arise that affect my ability to focus on training.	755	0.020	15.584	.005
Q14. Financial worries distract me from focusing on training.	755	0.285	300.365	.000
Q15. When in training, I am worried I am missing out on family time.	755	0.001	0.490	.000
Q16. New material comes slowly to me.	755	0.081	66.656	.000
Q17. I often check the time during training to see how much is left.	755	0.107	90.680	.000
Q18. I am often unable to arrive on time for training.	755	0.000	0.307	.136
Q19. I use technology to keep connected to my outside life when I'm in training.	755	0.024	18.582	.000
Q20. I think that taking training at work will not improve my life.	755	0.502	759.304	.000

Appendix F: NIH Certificate

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Steven Harlan** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 06/28/2011

Certification Number: 709728