EFFECTS OF DESKTOP VIRTUAL REALITY ENVIRONMENT TRAINING ON STATE ANXIETY AND VOCATIONAL IDENTITY SCORES AMONG PERSONS WITH DISABILITIES DURING JOB PLACEMENT/JOB READINESS ACTIVITIES

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WE DID IT HONEY! WE DID IT!

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Title of Study: EFFECTS OF DESKTOP VIRTUAL REALITY ENVIRONMENT TRAINING ON STATE-ANXIETY AND VOCATIONAL IDENTITY SCORES AMONG PERSONS WITH DISABILITIES DURING JOB PLACEMENT/READINESS ACTIVITIES

Major Field: EDUCATION (Occupational Education)

Abstract: This study examined how desktop virtual reality environment training (DVRET) affected state anxiety and vocational identity of vocational rehabilitation services consumers during job placement/job readiness activities.

It utilized a quantitative research model with a quasi-experimental pretest-posttest design plus some qualitative descriptive techniques. A small purposive sample was used, comprising 8 individuals currently participating in the Oklahoma Department of Rehabilitation Services Project SEARCH job placement program.

Independent variables were the DVRET experimental treatment and the backgrounds and demographics of the subjects. Dependent variables were Modified Percent Gain Scores (MPGS) on the State Anxiety Inventory and the Vocational Identity (VI) sub-scale of the My Vocational Situation (MVS) Inventory.

Descriptive statistics, cross tabulations, independent sample t-tests, and correlation coefficients were used for statistical analysis. The DVRET presented significantly lower state anxiety and small but not significantly higher VI. Correlations indicated state anxiety and vocational identities were related. Post-treatment questionnaire comments showed the treatment group unanimously found pre-employment VR exploration was beneficial.

This study implies that desktop VR has promise in the vocational rehabilitation profession.

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CHAPTER I

INTRODUCTION

Emanuel was a highly acclaimed star athlete looking forward to living up to the much anticipated hype that college scouts, coaches, family, and friends placed on him. Two games into his freshman season Emanuel's eyesight began to blur for no apparent reason. After weeks of team doctors and optometrist examinations, one visit to a family practice doctor shattered Emanuel's world as he knew it. Doctors confirmed he was suffering from chronic renal failure. Emanuel's competitive athletic career came to an abrupt halt.

Emanuel is now prescribed to a dialysis machine three times a week. Due to his larger than normal muscular build, Emanuel has to endure six hours of dialysis, twice the average treatment time of an average individual. The extreme amount of time and energy spent on his dialysis treatments began to take a toll on Emanuel. Severe fatigue and weakness became the norm. Subsequently, Emanuel did not sustain any employment during his nine years of dialysis treatment.

Nine years after Emanuel's life-changing diagnosis, he received a donor kidney. Emanuel's energy immediately increased and therefore his willingness to re-enter the workforce and obtain gainful employment increased. The stark reality of not participating in the labor market for several years confronted him. Emanuel was very anxious and did not have a well-defined idea of what occupation to pursue, how to pursue it, or which specific job skills he would need to transition into successful employment.

The anxiousness and indecision Emanuel experienced in choosing an occupation and not knowing how to pursue employment may be due to high levels of state anxiety and low levels of vocational identity. Unfortunately, Emanuel is not alone. Of over 23 million Americans with disabilities between the ages of 16 and 64, 64% (15 million) are absent from the labor market (U.S. Census, three-year estimate 2005-2007). Brenes, Penninx, Judd, Rockwell, Sewell, & Wetherell (2008) concluded in their research an overwhelming number of individuals with disabilities have a significant amount of anxiety over their lifespan, specifically when facing major change in daily routine, such as returning to employment. This anxiety creates one of many potential barriers to successful re-entry into the workforce. Not feeling confident about themselves or about appropriate goals, interests, and talents leads to low levels of Vocational Identity.

Since the inception of the American Disability Act 1973 (ADA), individuals with disabilities have been fighting to gain the equal access and equal employment freedoms of their non-disabled counterparts. Participating in the workforce contributes to one's feeling of self-worth and happiness. The 2009 Rehabilitation Research and Training Center (RRTC), Disability Statistics and Demographic reported an employment rate of 36.2% among persons with disabilities. In contrast, their non-disabled counterparts had a 75% employment rate. However, more recent data indicate individuals with disabilities still face employment issues. Of over 19 million working-age adults with disabilities, 64.7% are not participating in the workforce by working full or part time compared to 25.6% of non-disabled working-age adults (Rehabilitation Research and Training Center on Disability Demographics and Statistics, 2010). Recent developments in training technology may offer assistance and opportunities not previously available. As

technology evolves, methods of training individuals with disabilities are being developed. However, research on innovative technology regarding job placement/job readiness training among individuals with disabilities has largely been overlooked. New highly realistic interactive technologies such as desktop virtual reality (VR) may promote workforce readiness and thus enhance the job placement success rate among individuals with disabilities. Therefore, potential technological training tools must be evaluated to determine alternate means of preparing individuals with disabilities to enter or re-enter the workforce. The ability of VR technology to provide realistic pre-employment familiarization and the possibility of resultant anxiety reduction suggested a working hypothesis for the present study.

Virtual Reality Environments

Virtual Reality (VR) has taken on many different definitions throughout its existence. VR is commonly defined as a way of simulating or replicating a 3D environment through computer-generated imagery and giving the user a powerful sense of "being there," taking control, and interacting personally with the environment and its contents (Ausburn & Ausburn, 2004, 2008b, 2010; Beier, 2004; Brown, 2001; Chen, Yang, Shen, & Jeng, 2007: Di Blas & Poggi, 2007; Inoue, 2007; Mikropoulos, & Natsis, 2011; Wilson, Forman, & Stanton, 1997).

The term *virtual reality environments (VREs)* refers to a diversity of computer-based experiences ranging from totally immersive experiences with headgear and body suits to realistic PC-based imagery worlds. Desktop Virtual Reality Environment Training (DVRET) is a *non-immersive* form of VR presented on a desktop or laptop computer screen. DVRET uses computer software such as QuickTime, Java, or Flash

technology to present high-resolution panoramic imagery on a desktop/laptop computer.

In the last decade, numerous industries have incorporated VR into some aspect of their training: military (Dunne & McDonald, 2010; Lányi, 2006; Vlahos, 2006), medical (Roy, Sticha, Kraus, & Olsen, 2006); entertainment (Dehrer, 2011); environmental (Taylor, & Disinger, 1997); architecture (Ladeveze, Sghaier, & Fourquet, 2009); interior design (Vosinakis, Koutsabasis, Stavrakis, Viorres, & Darzentas, 2008); ergonomics (Wilson, 1999); technical education (Ausburn & Ausburn, 2008a; Ausburn et al, 2007b); fire safety (Bliss & Tidwell, 1997); and law enforcement (Hormann, 1997; Kroutter, 2010). Within the rehabilitation industry, the majority of VR-focused research that has been conducted has related to assisting individuals with disabilities deal with cognitive and physical impairments, phobias, traumatic brain injury (TBI), and wellness and mobility treatments (Davidson, & Smith, 2003; Foreman, Fraser, Wilson, Duffy, & Parnell, 2005; German, Broida, & Broida, 2003; Hoffman, Palacios, Carlin, & Arbona, 2003; Kraft & Kraft, (2004); Maltby, Kirsch, Mayers, & Allen, 2002; Standen, Brown, Horan, & Proctor, 2002. The potential of VR to address *vocational and employment* readiness issues has been missing in the vocational rehabilitation literature. An interest in examining possible benefits that virtual reality environments may have for helping persons with disabilities address employment issues by dealing with anxiety and vocational identity provided for this researcher the impetus for this study.

Theoretical and Conceptual Framework

Theoretical Foundation: Dale's Cone of Experience

This research examined the extent to which virtual reality environment training affected State Anxiety (SA) levels and Vocational Identity (VI) levels among individuals with disabilities during job placement/job readiness activities. The underpinning theoretical support for this research was drawn from Edgar Dale's classic instructional design theory and model known as the Cone of Experience (Dale, 1946, 1969). Dale's Cone of Experience is a visual diagram designed to present Dale's categorization of a wide range of mediated learning experiences. Dale's Cone of Experience includes eleven overlapping levels of experiences to which individuals are exposed in various modes of media. Dale contended that concrete and realistic media were more likely to provide generally beneficial learning experiences, while abstract media were more likely to cause learner difficulties (Dale, 1969). The second to the last level of Dale's Cone is "Contrived Experiences" where virtual reality naturally fits do to its realistic presentation. For this study, the author focused on the contrived experiences level of Dale's Cone in which individuals with disabilities experienced "simulated experiences" that were highly realistic virtual reality environments of actual job locations during job placement/job readiness activities. Additional levels within Dale's Cone were not evaluated for this study.

Edgar Dale (1946) first introduced the Cone of Experience in his textbook on audiovisual methods in teaching. The Cone of Experience is a visual device meant to summarize Dale's classification system for various types of mediated learning experiences (Molenda, 2003). The original pictorial devise illustrating Dale's media concreteness/abstraction theory was divided into ten labels with more abstract at the top of the Cone and less abstract at the base. In descending order, the original ten media

types were: Verbal Symbols; Visual Symbols; Recording/Radio/Still Pictures; Motion Pictures; Exhibits; Study Trips; Demonstrations; Dramatic Participation; Contrived Experiences; and Direct, Purposeful Experiences. Dale made small modifications by 1969, replacing Dramatic Participation with Dramatized Experiences and adding Educational Television on the Cone. The 1969 version of Dale's Cone is shown in Figure 1.

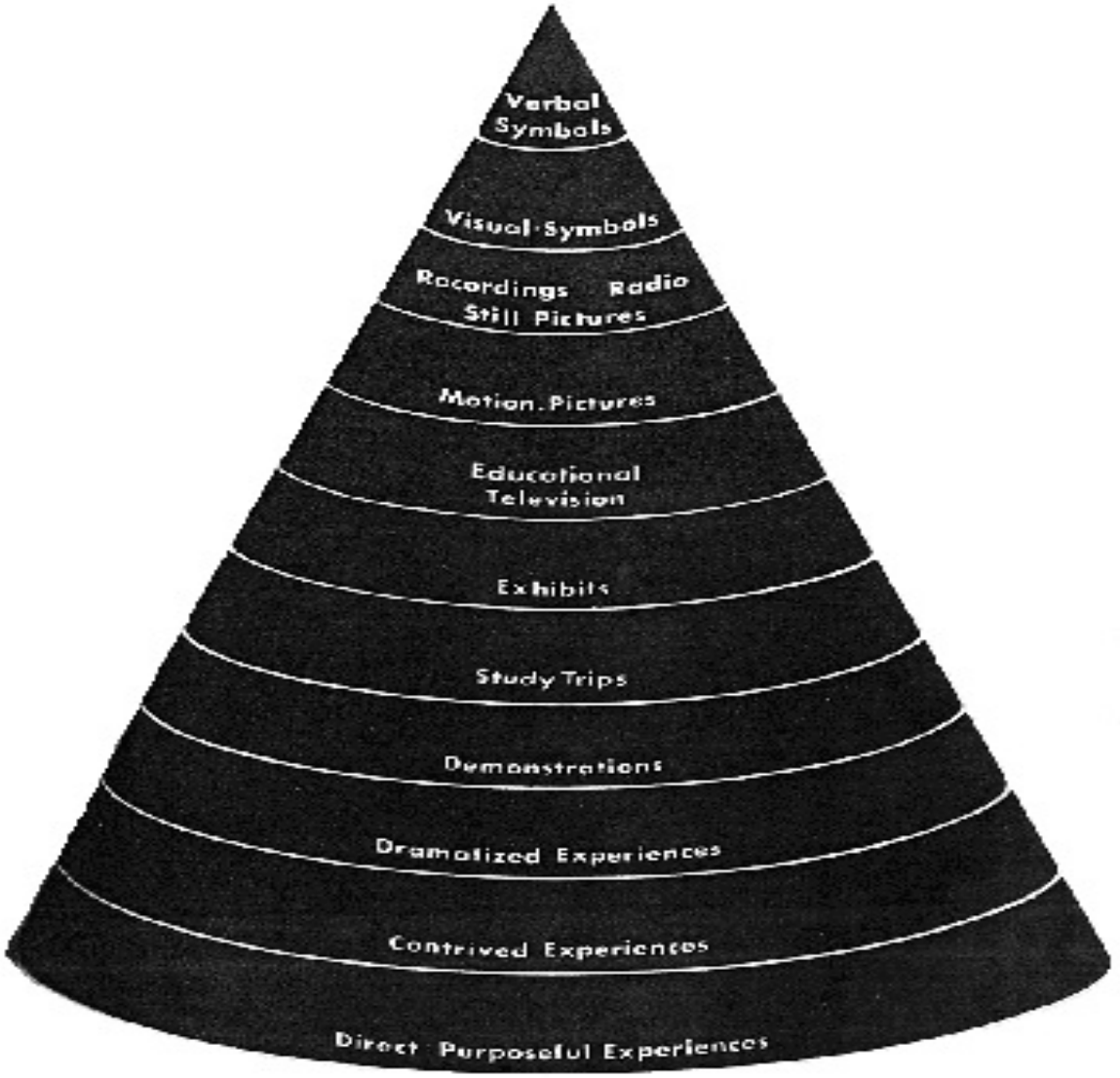


Figure 1. Diagram of Dale's Cone of Experience (2nd Version, 1969)

Dale never intended for the Cone of Experience to be a mechanism for elimination of some media approaches or for judging some instructional modes as generally superior to others. Dale (1946) explained when discussing the Cone, "You will make a dangerous mistake. . .if you regard these bands on the cone as rigid, inflexible divisions" (p. 42). Instead, Dale viewed the cone as a template for educators to reference in regards to gauging multimedia-learning experiences. The main concept behind the Cone is that, as learning experiences are more applied and concrete, the likelihood of the learner grasping lasting knowledge becomes greater. In Figure 2, an updated or modernized schematic of the cone and its eight various modes of media interactions is suggested by Ausburn and Ausburn (2009). To accommodate technological advancements and eliminate older less used instructional modes, Ausburn and Ausburn's updated Cone replaced Contrived Experiences and Dramatized Experiences with Simulated Experiences; replaced Motion Pictures and Educational Television with Motion Visual Media; eliminated Study Trips; and changed Still Pictures to Still Visual Media (See Table 1). In all versions of the Cone of Experience, the tip of the cone represents pure abstraction versus the base of the cone, which represents concrete "real life" or realistic experiences.

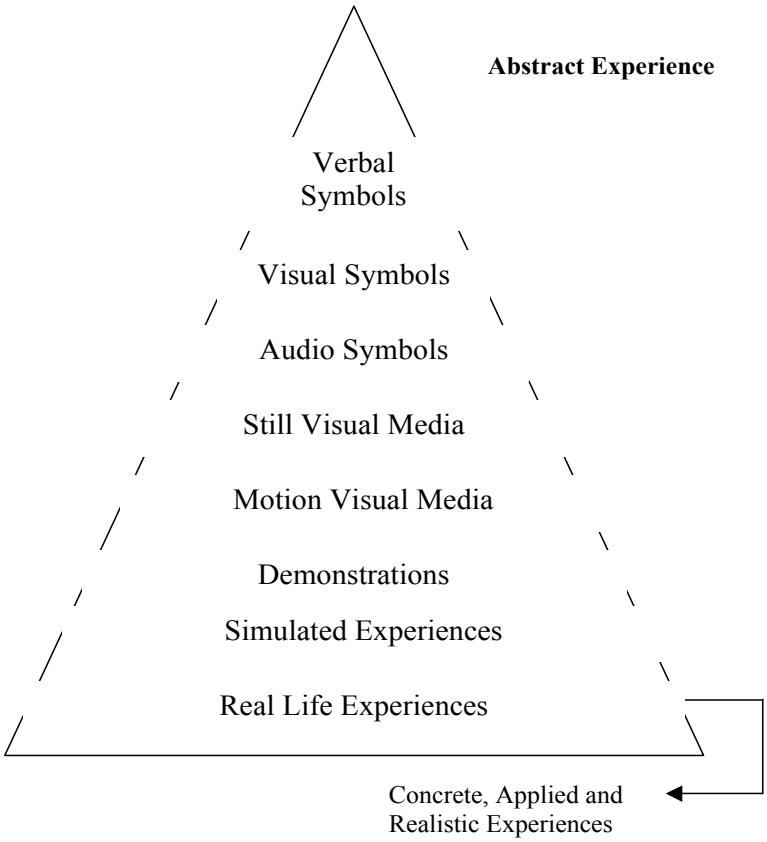


Figure 2. Updated Modern Day schematic of Dale's Cone of Experience (Ausburn & Ausburn, 2009)

The researcher developed Table 1 to summarize the comparison between Dale's older (1969) Cone of Experience and Ausburn and Ausburn's (2009) modern day schematic.

Table 1.
Comparison of Earlier versus Modern Day Forms of Dale's Cone of Experience.

Dale's Cone of Experience Earlier Form (Dale, 1969)	**Modern Day Schematic of Dale's Cone of Experience (Ausburn & Ausburn, 2009)**
Verbal Symbols	Verbal Symbols
Visual Symbols	Visual Symbols
Recordings, Radio	Audio Symbols

Table 1 (continued) *Comparison of Earlier versus Modern Day Forms of Dale's Cone of Experience*.

Dale's Cone of Experience Earlier Form (Dale, 1969)	**Modern Day Schematic of Dale's Cone of Experience (Ausburn & Ausburn, 2009)**
Still Pictures	Still Visual Media
Motion Pictures and Educational Television	Motion Visual Media
Demonstrations, Study Trips and Exhibits	Demonstrations
Contrived Experiences and Dramatized Experiences	Simulated Experiences
Direct Participation Experiences	Real Life Experiences

This study focused on the base of the Cone of Experience, particularly the Simulated Experiences level. The base of the cone (Real Life Experiences) represents concrete and applied real-world experiences in which a learner participates. This occurs in hands-on and personal involvement. One example of this would be students participating in practicum or internship experiences. Learners are purposefully involved in a learning process that demands active participation in the real world. Dale (1946) asserted that in real-world experiences a learner has "direct participation, with responsibility for the outcome" (p. 42).

In the next level of the Cone, the simulated experience mode of media interaction, learners can realistically experience actual situations that may be prohibitively unmanageable, costly, or dangerous to experience in actuality. In earlier versions of the cone, Dale termed this section *Contrived Experiences*. For example, to explain a petroleum refinery, he stated, ". . . a model of the same refinery is easy to grasp . . . within the model the layout of the installations and the processes of manufacture are far simpler to see and to understand" (1946, p. 44). In today's technological society, more realistic simulated experiences have become more commonplace and accepted. In 1969,

Dale considered this section of his Cone as the "editing of reality" section, stating ". . . it is necessary, when the real thing cannot be clearly perceived directly" (p.44). Technology had not yet advanced at that time to the point it is now. Now society enjoys technological advancement that enables students to learn about past, present, and even future events in a full-blown 3D interactive experience without moving from their classroom desk. The quality, realism, and interactivity of simulated experiences have been strongly enhanced by virtual reality technology. It is at this level of Dale's Cone – simulated experiences via virtual reality – that the present study focuses.

Arendale (1993) summarized the importance of the lower levels of Dale's Cone, stating:

> At the most basic and most effective level of instruction, students are introduced to new material through an actual hands-on experience or "doing the real thing." Students see, do, and talk about the concept . . . learning is most complete if these conditions can be met (p.19).

Today's new virtual reality technologies make simulated experiences far closer in concreteness and impact to those in physical reality. Dale's Cone of Experience advocates that the more accurate and realistic the experiences, the greater the concreteness of the learning experiences. Ausburn and Ausburn (2008a) recently explained that, "One of the primary characteristics of virtual reality is the fidelity of its presentation of the reality of a 3D environment and the relationship of items within the environment" (p. 63). Dale's Cone of Experience, specifically, the realistic and concrete virtual reality simulation mode of media presentation, had a critical position in this study. The researcher used desktop virtual reality training environments (DVRET) scenes of actual job/employment sites of participants during their job placement/job readiness

activities, hypothesizing that DVRET positioning within the *simulation* category near the base of Dale's Cone would be beneficial to users.

Conceptual Framework

The conceptual framework for this study provides a graphical explanation of how dependent variables State Anxiety and Vocational Identity may be altered through the independent treatment variable of DVRET. By employing realistic "as if you are there" 3D simulation, positive differences in State Anxiety and Vocational Identity were predicted as a working hypothesis. These positive influences may serve as a conduit for predicting successful employment results (e.g., gainful employment and retention) among individuals with disabilities. A graphical diagram of this conceptual framework is shown in Figure 3.

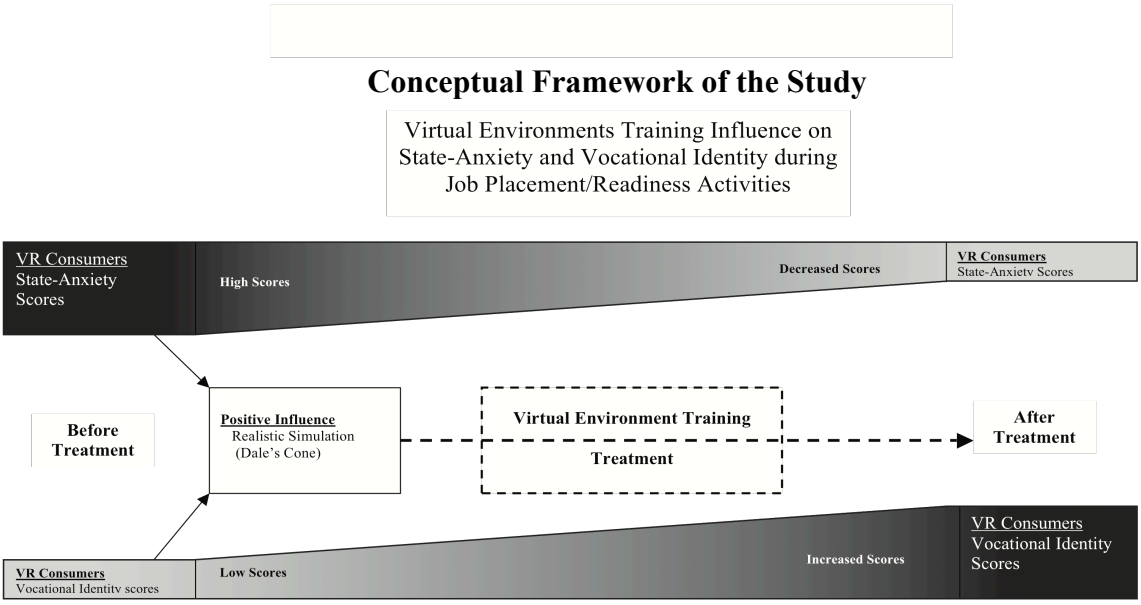


Figure 3: Conceptual Framework for this Study

Problem Statement

Disproportional rates of unemployment among individuals with disabilities in comparison with their non-disabled counterparts have been well documented (Schonbrun, Kampfe, & Sales, 2007; Gilbride, Coughlin, Mitus & Scott, 2007; Hergenrather, Rhodes, & McDaniel, 2003; Hernandez, Cometa, Velcoff, Rosen, Schober, & Luna, 2007; Hernandez & McDonald, 2010; Kundu, Geist, & Dutta, 2005; Standen, Brown, Horan, & Proctor, 2002; Smith, 2007; Smith & Strauser, 2008; United States Bureau of Labor Statistics, 2012; Waghorn, Chant, White, & Whiteford, 2005). However, current research does not address possible relationships of unemployment among individuals with disabilities in regard to two major barriers that may contribute to such high unemployment rates: (a) high anxiety levels and (b) low vocational identity during the onset of job placement/job readiness activities.

The current research literature also fails to address the possible beneficial effects of new highly realistic training technology such as desktop virtual reality environment training in mitigating the anxiety and vocational identity barriers. The problem of the study is therefore the current lack of empirical information regarding State Anxiety and Vocational Identity levels of individuals with disabilities and how desktop virtual reality environment training technology might assist then. By addressing this problem, this study may lead to significant progress in efforts within the rehabilitation industry to provide desktop virtual reality environment training during job placement/job readiness activities and, in turn, to increased successful closure rates (status 26) for individuals with disabilities.

Purpose of the Study

The purpose of this study is to determine through quasi-experimentation and qualitative questioning how desktop virtual reality environment training affected State Anxiety and Vocational Identity self-reported scores from a sample of State Rehabilitation Services consumers during job placement/job readiness activities.

Research Questions

The following research questions guided this study:

1. Is there a significant difference between Modified Percent Gain Scores (MPGS), based on pretest/posttest scores for state anxiety between participants who do or do not experience desktop virtual reality environment treatment?

    H_{01}: There is no difference between Modified Percent Gain Scores (MPGS), based on pretest/posttest scores for state anxiety between participants who do or do not experience desktop virtual reality environment treatment?

    H_{A1}: There is a significant difference between Modified % Gain Scores (MPGS), based on pretest/posttest scores for state anxiety between participants who do or do not experience desktop virtual reality environment treatment?

2. Is there a significant difference between Modified Percent Gain Scores (MPGS), based on pretest/posttest scores for vocational identity between participants who do or do not experience desktop virtual reality environment treatment?

H_{02}: There is no difference between MPGS based on pretest/posttest scores for vocational identity between participants who do or do not experience desktop virtual reality environment treatment?

H_{A2}: There is a significant difference between MPGS based on pretest/posttest scores for vocational identity between participants who do or do not experience desktop virtual reality environment treatment?

3. Is there a significant relationship between participants' State Anxiety and Vocational Identity scores during job placement activities?

   H_{03}: There is no significant relationship between the State Anxiety and Vocational Identity scores of participants during job placement activities.

   H_{A3}: There is a significant relationship between the State Anxiety and Vocational Identity scores of participants during job placement activities.

4. What perceptions do participants have about desktop virtual reality as a job placement/job readiness tool?

Data were gathered to answer the research questions from the sources and analyzed with the procedures shown in Table 2.

Table 2:
Data Sources and Analyses Tools for Research Questions

Question	Data Source	Procedure
1. Is there a significant difference between pre- and post-Modified Percent Gain Scores for State Anxiety between participants who do or do not experience desktop virtual reality environment treatment?	State Anxiety Scale	Calculation of pretest/posttest modified % gain score, and independent sample *t*-test of gain scores for treatment and control group.
2. Is there a significant difference between pre- and post-Modified	Vocational Identity Scale	Calculation of pretest/posttest modified %

Table 2 (continued) *Data Sources and Analysis Tools for Research Questions continued*

Question	Data Source	Procedure
Percent Gain Scores for Vocational Identity between participants who do or do not experience desktop virtual reality environment treatment?	Vocational Identity Scale	gain score, and independent sample *t*-test of gain scores for treatment and control group.
3. Is there a significant relationship between State Anxiety and Vocational Identity scores of participants during job placement activities?	State Anxiety Scale, Vocational Identity Scale	Correlation Coefficient
4. What perceptions do participants have about desktop virtual reality as a job placement/job readiness tool?	Open-ended questions in exit survey	Content Summary

Definitions of Key Terms

For the purpose of this study, terms are defined as follows:

Conceptual Definitions

Desktop Virtual Reality Environment Scene. A computerized, on-screen program that depicts a 360-degree, realistic, scenic presentation of a location. The consumer controls the scene and can "enter and walk through" as if actually there by using the computer keyboard and mouse.

Desktop Virtual Reality Environment Training (DVRET). An interactive tool that allows replicating and learning about a 3D environment through computer-generated imagery. The user can explore and study the on-screen environment at-will by using a graphic interface to pan, tilt, and zoom.

Individual with disability. A person having a physical or mental impairment that substantially limits one or more major life activity, a record of such an impairment, or been regarded as having such an impairment.

Project SEARCH Program. An competitive employment program with the primary objective of securing employment for people with disabilities. There are currently over 200 Project SEARCH sites across the United States, Canada, England, Scotland, and Australia.

Service Delivery Status. Active status area where consumer is eligible for job placement/job readiness services.

Status 20. Rehabilitation Services Administration vocational rehabilitation process code for consumers ready for employment.

Status 26. Successful closure after employment (rehabilitation) for more than 90 days.

Operational Definitions

Desktop Virtual Reality Environment Scene. 360-degree, realistic, scenic presentation on a computer of the actual jobsite location in which participating consumers will work and virtual replication of real-world job locations consumers choose. Each scene contained video of the researcher and a site supervisor explaining what to expect within the desktop virtual reality environment scene and general job duties. Participants could pan, tilt, zoom, and move between different areas of the scene using hotspot navigational tool.

Desktop Virtual Reality Environment Training. Used by consumers for self-exploration of a desktop virtual reality environment scene showing their jobsite environment prior to

actually being placed at jobsite. All scenes contained clickable hot spots for navigation, pan and zoom and embedded videos.

Individual with disability. An active consumer of Oklahoma State Rehabilitation Services.

Job placement/job readiness training activities. Activities involving preparation for entering or re-entering employment, including but not limited to the following: preparation of resume, completing employer applications, personal interviewing, evaluation of where the focus of the job seeking will occur, and any other considerations unique to the consumer's individual job-seeking needs.

Modified % Gain Score Method. A technique for combining pretest and posttest scores into a single score interpreted as the % of gain available on posttest that is actually gained on the posttest (ODCTE, 1992; Ausburn & Hedberg, 1981; Basarab & Root, 1992).

Project SEARCH Program. A competitive employment program sponsored by the Oklahoma Department of Rehabilitation Services and Chesapeake Energy Corporation with the primary objective being to secure employment of individuals with disabilities.

Rehabilitation Services "Consumer." An individual who has applied for and met the minimal eligibility requirements to qualify for state rehabilitative services (e.g., Want to enter or re-enter the work force; have a documented physical, visual, cognitive, or mental disability which results in problems in obtaining employment; need employment-related services to prepare for, get, or keep a job; and have a chance to benefit by going to work).

State Anxiety. The experience of anxiety as a temporary emotional state. It can be brought on by a particular situation or experience.

State Anxiety Modified Percent Gain Scores. Pre-/posttest scores of participants on State anxiety Inventory, calculated by modified % gain method.

Vocational Identity. When a person possesses a clear and stable understanding of his or her career goals, interests, personality, and talents.

Vocational Identity Modified Percent Gain Scores. Pre-/posttest scores of participants on Vocational Identity Scale, calculated by modified % gain method.

Limitations of the Study

The first limitation of the study was the small sample size ($n = 8$). A small purposive sample of state rehabilitation consumers receiving job placement/job readiness training at one service program at the time of the study was used.

The second limitation of this study was a single training program was used. For this study it was critical to identify a single service program with several built-in jobsite locations where consumers received training and work.

The curtailment of sample size and program scope was necessary in this study because of the time and cost of creating separate DVRET presentations for each individual participant. The issue is that the findings of this study cannot be reliably generalized beyond the current study with such a small sample of vocational rehabilitation consumers and a single training program. However, the current study can serve as an exploratory study for a larger investigation of desktop virtual reality environment training applications for vocational rehabilitation consumers during job placement/job readiness activities.

Significance of the Study

The study focused on the use of desktop virtual reality environment training as a means to mitigate elevated levels of state anxiety and decreased levels of vocational identity during job placement/job readiness activities. It was the hope of the researcher to ignite a line of inquiry regarding use of new innovative technologies, specifically DVRET, within the rehabilitation arena as a practical tool to increase successful employment among persons with disabilities. Given the well-documented, elevated, high-unemployment levels of persons with disabilities, the study opened doors to exploration of rapidly developing desktop virtual reality technology as a tool for addressing an employment issue with significant economic implications throughout the nation and in the larger global community.

CHAPTER II

REVIEW OF LITERATURE

Introduction

Innovative technologies such as desktop virtual reality environments have proven to have significant effects on training and instructional design over the last two decades (Ausburn & Ausburn, 2008a; Ausburn et al, 2007a; Bliss & Tidwell, 1997; Dehrer, 2011; Dunne & McDonald, 2010; Hormann, 1997; Kroutter, 2010; Ladeveze, Sghaier, & Fourquet, 2009; Lányi, 2006; Roy, Sticha, Kraus, & Olsen, 2006; Taylor, & Disinger, 1997; Vlahos, 2006; Vosinakis, Koutsabasis, Stavrakis, Viorres, & Darzentas, 2008; and Wilson, 1999). The researcher chose to investigate how desktop virtual reality environment training may affect or assist vocational rehabilitation clients in the area of job placement/job readiness. As far as could be determined, using desktop virtual reality environments within job placement/job readiness applications had not been previously investigated. The researcher completed an exhaustive review of past and current literature and believed that the present study appeared to be the first to utilize desktop virtual realty environments to help assist individuals with disabilities increase their success rate to enter or re-enter the workforce.

Employment and Disability Status in the United States

United States census reported in 2010 over 100 million individuals living in the United States. Of those, 49 million have significant disabilities that hinder or affect their potential of obtaining employment (U.S. Census, 2010). According to the Rehabilitation Research and Training Center on Disability Statistics (2010), the employment rate among working age (i.e., 18-64 years) individuals with disabilities is 33.4%. This is in sharp contrast to their non-disabled counterparts of the same age group, whose employment rate is 72.8%. A more current statistical report reveals that between September 2011 and September 2012 the Bureau of Labor Statistics reported individuals with disabilities had a 16.1% unemployment rate, which is nearly twice the rate of those who are not disabled at 8.5%.

Over the years, the gap in employment and income between disabled and non-disabled individuals has stubbornly persisted regardless of the economy and the availability of jobs (Daston, Riehle, & Ruthowski, 2012). Two decades after signing into law the Americans with Disabilities Act (ADA), Public Law 101-336, millions of dollars are being spent to address the issue of the large disparity between the employment rate among persons with disabilities and those that are not disabled. In fact, President Barack Obama signed executive order # EO13583 in August 2011 establishing a priority for increased employment of people with disabilities within the largest employer in the United States—the federal government.

The well-documented disparity in employment success between individuals with disabilities and those who do not have disabilities and the current priority of the U.S. federal government to close this disparity, indicate that the issue is an important one. The

existence and magnitude of the employment disparity suggest any approach that may help close the employment gap merits investigation.

Virtual Reality and Desktop Virtual Reality Environments

Virtual reality (VR) has been a topic of major dialogue in research since the late 1920s. Due to the high cost associated with its development, VR was initially within large government agencies such as the military and big industry that served as contractors to provide government services. Flight simulators were among the first attempts to generate real-life situations during wartime.

The Link Trainer, created by Ed Link, was also known as the "Blue Box" because of its distinctive bright blue fuselage and yellow wings and tail. It was the training apparatus of choice for the U.S. Air Force, Germany, the United Kingdom, Israel, Japan, Pakistan, and the USSR. Ten thousand Link Trainers were manufactured and upward of 500,000 pilots were trained using the "Blue Box" (Robertson Museum and Science Center, 2000). The Link Trainer and inventor Edwin Link are shown in Figure 4.

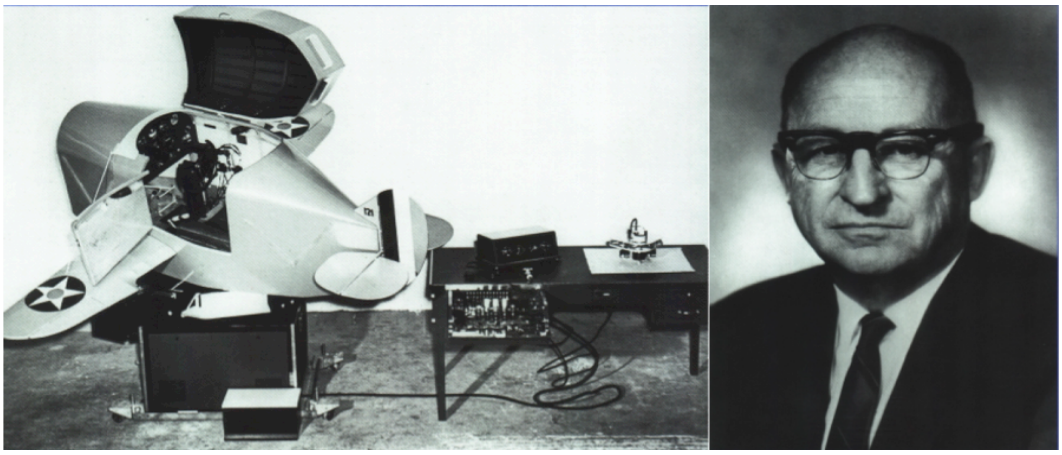


Figure 4: Still photograph of Link Trainer and Inventor Edwin A. Link
Source: http://files.asme.org

Created out of the need for a secure way to teach pilots how to fly by instruments, the Link Flight Trainer consisted of an airplane cockpit set atop a pneumatic platform, which was controlled by the pilot via a directional stick. The entire platform would shift in response to the pilot's control as the horizon line changed (Gladdis, 1997).

Nearly 25 years later in 1956, film producer Morton Heilig designed the first multisensory virtual experience. Resembling the latest models of arcade machines, the Sensorama combined projected film, audio, vibration, wind, and odors, all designed to make the user feel as if he or she was actually embedded in the projected environment rater than simply watching it (Blade & Padgett, 2002). The Sensorama is shown in Figure 5.

Figure 5: Still photo of the Sensorama Machine.
Source: http://multisensorysystems.com/

Stanney & Zyda (2002) noted that the Sensorama provided ". . . a multisensory experience of riding a motorcycle by combining three-dimensional (3-D) movies seen through a binocular-like viewer, stereo sound, wind, and enticing aromas" (p. 2). The 3-D movie images allowed the user to experience a realistic sensation through five modes, including wind blowing face and hair and smells of riding a motor bike through a county side in Brooklyn, NY; the vibrations of a helicopter ride over Century City; a bicycle ride; a dune buggy ride; and a dance by a belly dancer (Stanney & Zyda, 2007).

Since the creation of the "Blue Box" trainer and the Sensorama, innovation and advancements in virtual reality technology have made the technology increasingly more realistic. Transformations in the terms describing this *as if it's real* technology took place between the 1970s and 1980s. Krueger created the expression *artificial realty* which was widely adopted throughout the 1970s. Additional terms such as *augmented reality, immersive reality and telepresence* were used also. As computer software became more sophisticated in the 1980s, Lanier coined the term *virtual reality* (Siddens, 1999), the general term that remains in use today for technologies that attempt to create realistic renderings of 3-D environments.

Virtual reality has been defined in a multiplicity of ways. Davies (2004) defined virtual reality as a "technique of using computers to model real (or imaginary) environments in a fashion that is both natural and intuitive" (p. 3). A much more expansive definition of VR was provided by Ausburn and Ausburn (2004) who asserted that:

> VR can range from simple environments presented on a desktop computer to fully immersive multi-sensory environments experienced through complex headgear and body suits. In all its manifestations, VR is basically a way of simulating or replicating an environment and giving the

> user a sense of "being there," taking control, and personally interacting with the environment with his/her own body (p. 34).

Moshell and Hughes (2002) offered a technical statement that virtual environments denote a real-time graphical simulation with which the user interacts via some form of analog control, within a spatial frame of reference and with user control of the viewpoint's motion and view direction" (p. 893). According to Loftin, Chen, and Rosenblum (2005), virtual reality environments are a set of ". . . integrated technologies that provide a multimodal display of and interaction with information in real time, enabling a user. . . to occupy, navigate, and manipulate a computer-generated environment" (p. 479). The term *virtual realty* remains board regarding technological systems, which can range from highly complex technically to more recent systems, fully immersive virtual environments use head-mounted displays (HMDs), auditory input, voice activation, data gloves, and even body suits wired with biosensors for advanced sensory input and biofeedback to realistic PC-based imagery (Ausburn & Ausburn, 2004; Beier, 2004). Examples of the HMD and tactile hardware in an immersive VR system are shown in Figure 6.

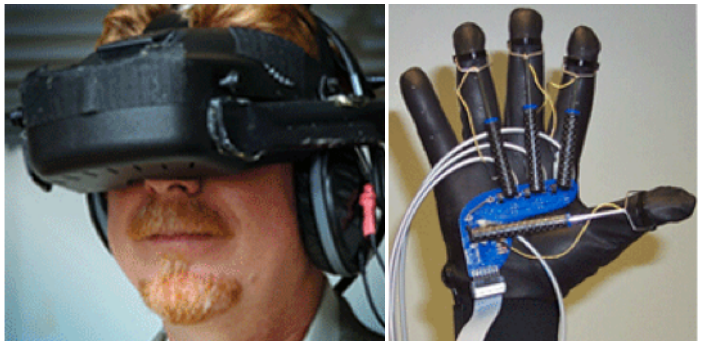


Figure 6: Head-mounted display and data gloves
Source: http://weburbanist.com

The most recent form of VR is called *non-immersive or desktop VR*. While researching gender issues in VR learning, Ausburn, Martens, Washington, Steele, and Washburn (2009), provided a complete description of non-immersive desktop VR, stating:

> Desktop VR uses QuickTime, Java, or Flash technology to present high-resolution panoramic imagery on a standard desktop computer. Desktop VR movies are created by taking a series of digital still photographic images and then using special VR software to stitch and blend the images into a single panoramic scene that the user can enter and explore individually and interactively. The user employs a mouse to move and explore within an on-screen virtual environment as if actually moving within a place in the real world. Movements can include rotating the panorama image to simulate physical movements of the body and head, and zooming in and out to simulate movements towards and away from objects or parts of the scene (p. 54).

What characterizes these desktop VR movies and distinguishes them from traditional video is that the *user* chooses where, when, and how to move, explore, and examine rather than being controlled by decisions made during production by a video producer (Ausburn & Ausburn, 2004). Figure 7 shows an actual still from a VR scene created by this researcher of one Vocational Rehabilitation Services office space.

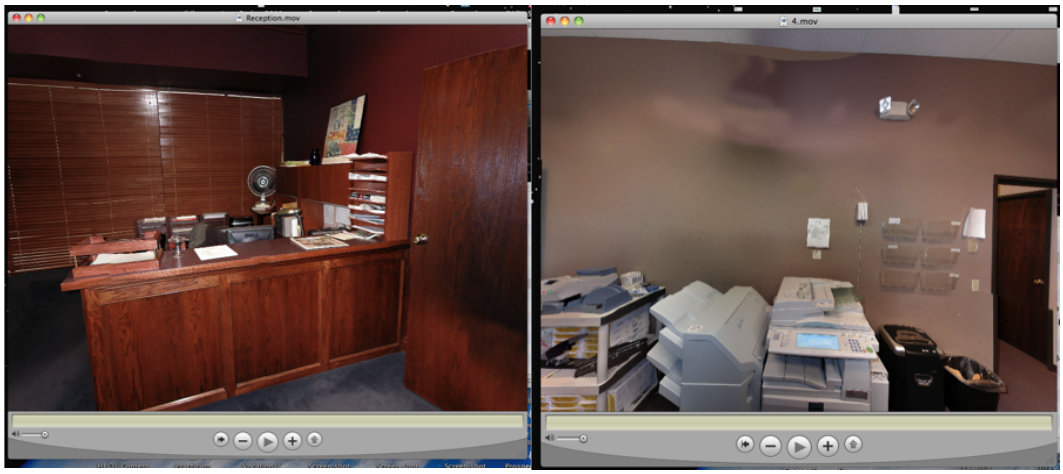


Figure 7: Still image of Vocational Rehabilitation Services office

What is important about the recent major technical advances in desktop VR for rehabilitation practitioners is that these technologies now bring the advantages of VR experiences within the fiscal and technical capabilities of many public rehabilitation agencies and job placement/job readiness programs alike. By using new VR software and digital photographic equipment, desktop VR environments can be created relatively easily, thus opening the technological door to examining the effects of VR on job placement/job readiness preparation of individuals with disabilities.

Simulation and Virtual Reality in Rehabilitation

Using desktop virtual reality environment training in a job placement/job readiness setting with persons with disabilities does not appear to have been previously reported in the research literature. Furthermore, this appears to be the first study that has explored the treatment technique of DVRET to enhance the likelihood of augmenting job placement/job readiness success by decreasing anxiety levels and increasing vocational identity levels of individuals with disabilities.

Virtual or simulated technology is not entirely new to the rehabilitation profession. Numerous areas within the rehabilitation profession have used and are currently using VR technology to support individuals with disabilities as they overcome or adapt to their situations. Wilson, Foreman, & Tiauka (2007) demonstrated that spatial information acquired by physically disabled children through exploration of a VR will transfer to a real-world equivalent environment. Lampton et al. (1994) described in their study improvement of several perceptual-motor tasks with practice in a simulated environment. Similarly, Regian, Shebilske, and Monk (1992), found evidence of

successful simulation-based development of skill acquisition on spatial procedural task, such as learning a sequence of knob or button activations on a simulated console.

Virtual reality environment has also been used effectively in the treatment of phobias. Kraft and Kraft (2004), utilized virtual realty environments to decrease anxiety in patients with driving phobia. Wald and Taylor (2000) attributed this to the fact that "VR is an effective treatment which makes it possible for patients to experience a real-time, computer-generated, three-dimensional environment that simulates real life" (p. 250). For example, clinical arachnophobes have a persistent fear of spiders, which was addressed by Hoffman, Palacios, Carlin, and Arbona (2003). They concluded that VR treatment significantly reduced the fear of spiders in eight clinically phobic undergraduate students. Furthermore, Davison and Smith (2003) argued that specific phobias are largely about the lack of control over natural intrusions into individualized experiences and that conditioning through VR could restore control. Echoing this notion, Mahoney (1997), asserted:

> VR seems to provide a mechanism (a technology) and a medium (cyberspace) for re-asserting that control through behavior modification. . . VR seems to be the perfect controlled environment . . . in VR, you have total control of complex stimulus presentation . . . This is a psychologist's dream (p. 57).

In addition, Emmelkemp and colleagues (Emmelkemp, et al. 2002) compared the efficacy of VR exposure and *in vivo or real-life* exposure. Thirty-three patients (16 in the *in vivo* treatment and 17 in the VR treatment) who suffered from acrophobia (fear of heights) were tested. The VR exposure was found to be as effective as exposure *in vivo* on anxiety and avoidance. VR treatment was evaluated in fear of flying on an airplane (Maltby, Kirsch, Mayers, & George, 2002; North, & North, 1997; Rothbaum, Hodges,

Smith, Lee, & Price, 2000). Commonly, the results found that VR treatment had a major affect on decreasing an individual's phobic tendencies.

Innovative use of virtual realty environment technology has also been applied to treatment of debilitating Post-traumatic Stress Disorders (PTSD). Hodges, et al. (2001), expressed their feelings about VR for treating patients with PTSD, stating "virtual environments afford opportunities not only to capitalize on patients' capacities, but also to augment them with visual and auditory and even haptic computer-generated experiences" (p. 26). Psychologists have seen VR become a common modality for treatment of traumatic stress in recent years. In the aftermath of September 11, 2001, Difede, & Hoffman (2002), studied survivors with PTSD using VR. They argued that VR environment technologies offer an external setting in which stress patients can encounter their trauma and master its effects. They went on to state:

> Because of the multiplicity of sensory cues that virtual reality affords, patients may become more involved in their treatment . . . In addition, this approach may facilitate processing of the traumatic experience. Because patients encounter the virtual environment at their own pace, a firm distinction is created between remembering and reliving (p. 1084).

The use of VR environments has consistently shown significant improvements in reducing anxiety (Anderson, Zimand, Hodges, and Rothbaum, 2005; Anthony, 2011; Harris, Kemmerling, & North, 2002; Meyerbroker & Emmelkemp, 2010). Meyerbroker & Emmelkemp (2010) asserted that:

> . . . VR indeed is effective in comparison with the state-of-the-art CBT treatment and controlled for the effect of time. Results of the VR on behavioral measures at post-treatment are impressive, suggesting that the results of VR indeed generalize to the real world (p. 939).

In the area of physical rehabilitation, stroke patients are using VR technologies with encouraging results being reported (Cameirao, Badia, Duarte, & Verschure, 2011; Crosbie, Lennon, Basford, & McDonough, 2007; Laver, George, Ratcliffe, & Crotty, 2011). Post-stroke paralysis of the arm remains an important clinical problem with fewer than 50% of post-stroke individuals recovering some degree of movement or function (Crosbie, et al. 2012). Holden, Dyar, Schwamm, and Bizzi (2005) contended that "Virtual reality may hold some solutions to these problems . . . it has been shown to be an interactive and enjoyable medium that, with sufficient use, may improve upper limb motor function in adults with stroke" (p. 215). Comparably, Traumatic Brian Injury (TBI) patients have benefited for VR technology (Cox, et al. 2010; Larson, et al. 2011; Mumford & Wilson, 2009; (Thornton et al. 2005). Larson and colleagues argued that virtual reality environments are both well tolerated and engaging and that they could be beneficial for in-patients with severe TBI. Furthermore, a study by Lloyd, Riley, and Powell (2009) showed that a virtual environment could be successfully used as a remediation intervention with brain-injured participants. They concluded that participants who sustained an errorless learning paradigm on a virtual path-finding task were significantly more accurate than they were after other approaches to learning.

As demonstrated in the literature cited above, the use of virtual reality technologies in areas of mental, emotional, and physical rehabilitation continues to grow. It is the aim of this study to examine how VR environment training may affect anxiety and vocational identity levels among persons with disabilities during job placement/job readiness activities. The extensive literature review has not shown any indication of VR being utilized to assist persons with disabilities *vocationally*. Within the board sense of

the word *rehabilitation*, aspects *vocational rehabilitation* - specifically job placement - arguably are among the most important. At the foundation of the importance of vocational rehabilitation is employment. People use employment as a personal measuring tool. Often, people's careers and career choices are seen as defining who they are. Speaking of transition from high school to work for individuals with disabilities, Daston, Riehle, & Rutkowski (2012) made a compelling statement of the importance of meaningful work:

> . . . It only takes a moment of reflection to know that, on a deeper level, you truly need your work. More than that, you probably need it more than it needs you… A fulfilling career is more than a way to pay the rent and keep food on the table. Our work defines us, gives our lives structure and meaning, and establishes our place in the world. Indeed, it's the first question we ask a new acquaintance, "What do you do?" The answer puts us in a context. It gives us a social framework (p.1).

Individuals with disabilities are no different. Applying innovative technologies such as desktop virtual reality environments training (DVRET) during job placement/job readiness activities appears to be logical and important if it can be demonstrated to increase the likelihood of persons with disabilities entering or re-entering the workplace. This possibility provided impetus for this study and related it directly to previous uses of simulated and VR in various aspects of rehabilitation.

The conceptual and theoretical foundation of this study linked the potential of innovative desktop virtual reality technologies with Edger Dale's Cone classic theory of instructional design known as the Cone of Experience. This linkage provided a theoretically sound working hypothesis and a means to investigate how and why VR treatment may be an important approach to attaining successful job placement for

individuals with disabilities by decreasing anxiety and increasing vocational identity levels.

Dale's Cone of Experience

The first step to introducing VR training in job-placement/job readiness research was to identify a sound theoretical base. The underpinning theoretical support for this research was drawn from Edgar Dale's classic instructional design theory and model known as the Cone of Experience (Dale, 1946, 1969). Based on the concrete/abstract concept in Piagetian developmental psychology, Dale theorized that the more concrete an experience is, the more likely the participant will gain meaningful experience and learning (Ausburn & Ausburn, 2008a).

Background

Edgar Dale's classic instructional design theory and model known as the Cone of Experience has iconic stature in the history of instructional design. The cone is a pictorial diagram designed to present Dale's categorization of a wide range of mediated learning experiences (Dale, 1946). The original cone-shaped pictorial devise illustrating Dale's media concreteness/abstraction theory was divided into ten labels. They were, in descending order from the tip of the cone and thus descending order of abstraction: Verbal Symbols; Visual Symbols; Radio/Recording/Still Pictures; Motion Pictures/Television; Exhibits; Field Trips; Demonstrations; Dramatized Experiences; Contrived Experiences; and Direct, Purposeful Experiences. The media formats at the top or tip of the cone were viewed as more abstract and less concrete; those at the bottom or base of the cone were closer to reality or real-world, hands-on experience. Dale made

small modifications to the Cone of Experience by 1969, replacing Dramatic Participation with Dramatized Experience and adding Educational Television to Motion Pictures.

Theory

The theory underlying Dale's Cone of Experience helped facilitate the development of utilizing audio-visual methods in teaching within the instructional technology field. It was one of the earliest developments and applications of theory in the emerging science of instructional design (L. Ausburn, personal communication, November 23, 2012). The cone-shaped diagram was used to create the symbolic depiction of learning experiences from the most abstract level of experience (located at the top of cone) to the most concrete level of experience (located at the bottom of cone). The cone depicted a sequence of varied experiences from the very basic (reality) to extremely enhanced (mediated) learning experiences with the objective of engaging learners with a concept or topic, facilitating their understanding, and developing greater knowledge.

Verbal Symbols or spoken words presentation is at the pinnacle or tip of the Cone of Experience, indicating its extreme level of abstraction. Spoken words are, in fact, an abstraction of an abstraction, i.e. printed words (L. Ausburn, personal communication, November 23, 2012). There is no physical application with spoken words and abstraction has reached its highest level with spoken language being the conduit for information presented. Dale (1969) emphasized that ". . . a verbal symbol may be a word for a concept (horse), an idea (beauty), a scientific principle (the law of gravity), a philosophic aphorism (honesty is the best policy), or any other representation of experience that has been classified in some verbal symbolism (p. 53). Though there is no direct experiential

learning involved, verbal symbols (language) can serve as an important aspect to all the parts of the cone. "Verbal symbols therefore, are used together with every other material on the cone" (Dale, 1969, p. 53).

The *Visual Symbols* mode of media presentation is located near the peak of the cone, and is thus abstract rather than realistic. Learning using visual symbols alone is a highly abstract process, for there is no true realistic representation. Items such as printed words, graphs, diagrams, maps, and charts convey the information that is to be learned in a representational fashion. One positive aspect of utilizing visual symbols is the demagnification of language. For example, visual symbols may use a variation of lines lengths (i.e. line graph) to describe arithmetic performances of eighth graders, or well-known transit symbols can relay information to travelers rather than large amounts of verbiage.

Audio Symbols can also be categorized as "one sense" media applications (Dale, 1969, p.52). Dale argued that audio devices emphasize specific aspects of auditory experiences. He grouped Recording and Radio in the Audio Symbol section due to their "one sense" classification and auditory commonalities and contended that Recordings and Radio experiences are less direct audio-visual experiences and can serve as mass communication devices, heard individually or by large groups (Dale, 1969).

Still Visual Media and *Still Symbols* are united in Dale's Cone due to their presentation of non-moving (motionless) examples of an item or event, (e.g., photographs or other reconstructions of realty). *Still Visual Media* are less direct or less realistic, than motion visual media, whereas, there is no audio, motion, or three-dimensional aspects

applied. Dale (1969) asserted that still media are a "one sense" media application, because learners can only process information through eyesight.

Motion Visual Media has taken on a new emphasis in present day. Pertaining to education, media outlets such as YouTube via the world-wide-web (Internet) have opened visual media to the extreme. These motion visual media outlets have distinct values that differentiate them from other media formats. Dale (1969) asserted that with motion visual media, information can be compressed both in time and in space. Though learners are still mainly spectators, with motion visual media the full experience can be presented more efficiently by editing out unwanted or unnecessary parts. Motion Visual Media presentations can be edited by the presenter, to show what he or she considers the most critical parts of a learning experience. Motion Picture and Educational Television came together on Dale's Cone in part because some distance remains between them and directly experiencing a particular event with multiple senses, e.g. touching, tasting, handling, feeling (Dale, 1969. p. 50).

The *Demonstration* mode was defined by Dale (1969), as ". . . a visualized explanation of an object, fact, idea, or process" (p. 48). In demonstrations, visualized explanations were experienced by the learner through chalkboards and felt boards or other manipulatables. In modern day, demonstrations are presented largely through multimedia devices such as Smartboards, PowerPoint, Prezi, and other computerized interfaces.

Dale (1969) linked *Study Trips* with *Demonstration* because generally the learner—even though actually in the presence of planned learning experience—remained in a spectator's position. Dale gave the example of a group of big-city children taking a

trip to a farm and receiving a new and richer meaning of the concept of "wool" after watching a sheep's wool coat being taken off. *Exhibits* were also merged with *Demonstrations* by Dale. He asserted that ". . . exhibits could be a bit eclectic in nature, taking on several forms of presentation (e.g., a series of photographs within a chart or poster, active demonstrations, or a film), subsequently, blurring the lines of type of media presentation (p. 50). Dale offered an efficient way to conceptualize exhibits and group them with study trips and demonstrations: Each one is essentially something one sees as a spectator.

In *Dramatized and Contrived* experiences, what Ausburn and Ausburn (2009) labeled the Simulated Experiences level in their update of the Cone of Experience, learners can physically interact with a particular learning environment, as it would be presented in real life. The rationale for simulated or modeled experiences is that a model of a learning environment that is the same as the actual real environment may be easier to grasp. For example, talking about a refinery model, Dale (1946) contended that ". . . with the model the layout of the installations and processes of manufacture are far simpler to see and to understand" (p. 44). The same might arguably be said for an animated or filmed version of the refinery in action.

Contemporary Acceptance and Relevance

A simple Google Scholar Internet search revealed indication of the widespread discussion and acceptance of Dale's Cone of Experience and the media abstractness/concreteness theory that underpins it. Numerous scholarly peer- reviewed articles surfaced that applied Dale's theory of audio-visual methods in teaching within a multiplicity of disciplines such as curriculum development (Dupain & Maguire, 2006);

learning effect of pictures (Magne & Parknas, 1963); student achievement (Cheek, Arrington, Carter, & Randell, 2000); experiential learning (Roberts, 2006); counseling (Subramony, 2003); learning technology (Tipton, 1998); agricultural education (Roberts, 2006); distance learning (Bhueler, 2000); library science (Rao, 1999); instructional design (Ausburn & Ausburn, 2007b); and cognitive and affective learning (Wager, 1975).

Ausburn and Ausburn (2008a) maintained that Dale's Cone was rooted in Piagetian psychology's proposition of concrete versus abstract reasoning. They summarized that the Cone could be summarized by several major propositions. Dale's Cone proposed that (a) various types of learning experiences and media vary in their level of concreteness, (b) concrete forms of experience and media are truer and more complete representations of realty, and (c) more concrete media representations can facilitate learning, particularly when reality is complex and unfamiliar to learners (Dale, 1954).

Concreteness and representational accuracy is critical to virtual reality as a technology. In fact, the degree to which a scene or environment is accurately reproduced—referred to as fidelity in virtual reality vocabulary—is a central attribute of VR, and one which distinguishes if from other forms of media (Ausburn & Ausburn, 2008b). Seth and Smith (2002) contended that one of the primary characteristics of VR is the fidelity of its presentation of the reality of a 3D environment and the spatial relationships of items within it. It is the fidelity of VR that creates its concreteness as a medium and thus establishes the relevance of Dale's Cone and theory of media abstractness/concreteness as a theoretical support for the efficacy of VR in the present study.

Dale's Cone has also been tied directly to counseling in the literature, giving it another direct link to the present study. Subramony (2003) asserted that ". . . Dale's Cone of Experience helped focus on how to integrate tactile and doing activities into counseling to make things happen and to encourage retention of new interpersonal skills" (p. 26). Tipton (1998) concluded that the Cone aided understanding of the role media and its relationship to learning. Tipton went on to support Dale's Cone for adolescent learners, maintaining that young leaders need the concrete experiences at the bottom of the Cone to understand the abstract ones at the top and that presentation of only visual and verbal symbols would give students no concrete referent to understand their meaning. It seems that the same logic used by Tipton could transfer to all learners when subject or experience is new and without prior reference.

The researcher in this study used Dale's Cone as a theory base, applying the base of the Cone as a concrete mode of technological media to hypothesize the potential benefits of experiencing simulated or realistic experiences by users. Life skill learned in a virtual environment is highly concrete and has been shown to transfer to the real world (Wilson, Forman, & Stanton, 1997). Real-world application of actual jobsite locations is the purpose of the desktop VR environment training used in this study. Subsequently, the levels of State Anxiety and Vocational Identity of individuals with disabilities may be positively affected by the concreteness or reality of the VR familiarization treatment. Such a working hypothesis is supported by the literature reported here.

Anxiety and Vocational Identity

In his book *Meaning and Measurement of Neuroticism and Anxiety,* Cattell (1961) analyzed the concepts of *neuroticism and anxiety*. Cattell used a factor analytic method to determine that anxiety can be conceptualized as two distinct dimensions: realistic situational anxiety and characterological anxiety. In 1966, Spielberger's work regarding anxiety found that anxiety is separated into two distinct categories: state anxiety, a transitory emotion; and trait anxiety, a general predisposition of responding. Anxiety has been defined as a diffuse reaction to nonspecific stimuli that is out of proportion to the actual danger level of the fear-producing stimuli in terms of subjective distress, avoidance, and/or duration (Albano, Causey, & Carter, 2001).

Research has shown that individuals with disabilities are at a greater risk of experiencing anxiety symptoms or anxiety disorders (Davis, Saeed, & Antonacci, 2008; Hambrick, et al. 2003; Iwasaki & Mactavish, 2005; Norberg, Diefenbach, & Tolin, 2008; Richards, Maughan, & Hardy, 2001; Strauser, Lustig, & Uruk, 2006). Furthermore, anxiety has been found to be the most common category of disorders in the *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revision (*DSM-IV-TR);* (Kessler, et al. 2005; Mineka & Zinbarg, 2006). Preparing to enter or re-enter the labor market for persons with disabilities may cause anxiety levels to increase even more. Kelly (2002) found that high levels of state anxiety predicted the need for more time to complete a task than was actually needed. By alleviating high levels of anxiety, transitioning to the workplace may be smoother, more successful, and less stressful. The researcher in this study used desktop VR environment training as a treatment to attempt

to mitigate high anxiety levels among persons with disabilities during job placement/job readiness activities.

Only a scant amount of research has been done specifically investigating the use of VR in order to reduce anxiety levels during job placement/job readiness activities among persons with disabilities. However, a considerable amount of scholarly research has investigated the prevalence of anxiety among individuals with disabilities, including areas of *quality of life* (Endicott, Harrison, & Blumenthal, 1993; Hambrick et al. 2003; Mendlowicz & Stein, 2000; Nortberg, Diefenbach, & Tolin, 2008); *Autism* (Hagopian & Jennett, 2008; Kim, et al. 2000; Lindsay, & Michie, 1988); *Fibromyalgia* (Arnold, 2008; Arnold, Leon, Whalen, & Barrett, 2010; Carleton, Richter, & Gordon, 2012); *Depression* (Boulenger, & Lavallee, 1993; Coryell, Endicott, & Winokur, 1992; Fava et al. 2000); and *intellectual disabilities* (Mindham, & Espie, 2003; Pruijssers, Meijel, & Achterberg, 2011; Ramirez & Lukenbill, 2008; Reid, Smiley, & Cooper, 2011) to name a select few. Reid, Smiley and Cooper (2011) sited Sullivan et al. (1999) asserting:

> …when the level of anxiety exceeds the reality of the threat or outlasts the duration of the threat, the response becomes pathological…it triggers a spiral of autonomic and psychological over activity that produce frightening symptoms, subsequently exacerbating the initial experience of anxiety, worry, and apprehension. (p.172)

The U. S. Census reports recently reported that 49 million individuals residing in the United States have a significant disability that prevents or deletes affects on their potential of obtaining employment (U.S. Census, 2010). The vast majority of these individuals are diagnosed in the mental illness disability category.

The prevalence of coexisting mental disorders and medical conditions has been well documented. Studies have found anxiety as well as depression to be the most

common mental disorders associated with chronic medical conditions (Griffin, Friend, Kaell, Bennett, and Wadhwa, 1999; Lowe et al. 2003). Cook et al. (2007) examined the effect of co-occurring disorders on employment outcomes among people with severe mental illness and found that 77% of the general working-age population is employed in a given year, while less the 17% of those with mental illness are working. This finding of ties between co-occurring anxiety and mental illness and their joint relationship to poor employment is directly relevant to the present study.

Another study conducted by Waghorn, Chant, Paul and Whiteford (2005) focused on labor force participation, employment, and work performance among people with ICD- anxiety disorders in comparison to people without disability. Waghorn, Chant, White, and Whiteford (2005) found people with anxiety disorders were 28% less likely (47% - 19%) to participate in the labor force when compared to their non-disabled counterparts. This finding also relates directly to the present study.

State-Trait Anxiety and the STAI Instrument

Spielberger developed the State-Trait Anxiety Inventory (STAI) to primarily make a conceptual distinction between chronic or trait anxiety, and temporary in-the-moment or state anxiety. The State-Trait Anxiety Inventory (STAI) is a self-reported assessment of anxiety designed to measure the two separate categories of anxiety: state and trait anxiety (Spielberger, et al. 1983). According to the STAI, *state anxiety* is the experience of anxiety as a temporary emotional state. It can be brought on by a particular situation or experience. In contrast, *trait anxiety* is the disposition to experience more permanent or enduring anxiety as a temperament characteristic, or as a general propensity to be anxious.

The STAI is a double-sided, 40-item (20 on each side) assessment instrument. The range of possible total raw scores is 20-80. Although there has not been a widely accepted clinical statistical number for what is considered anxiety-prone, generally the higher the score the more likely the individual is worried or anxious. The STAI has been extensively validated and is a widely used measure of anxiety (Chaplin, 1984; Davis, Anderson, Linkowski, Berger, & Feinstein, 1985; Spielberger, et al. 1983; Spielberger, Gorsuch, Lushene, Vagg, and Jacobs, 1983). Additional details about the STAI instrument and its psychometric properties and scoring are presented in Chapter 3 (Methodology) of this study.

A substantial amount of research has emphasized the influence of anxiety among individuals with disabilities, which is of direct relevance to the present study. Charlesworth and Dempsey (1982) investigated trait anxiety reductions among individuals with substance abuse issues. They asserted that trait anxiety on the STAI decreased significantly compared to the control group when stress management techniques were used. Muschalla et al. (2010) studied mental health anxiety levels of patients regarding job anxiety and state-trait anxiety using the STAI inventory as part of their study. By conducting a factor analysis they found a significant correlation between job anxiety scale and the STAI inventory. Intellectual disabilities (ID) have also been found to be concomitant with anxiety. Reid, Smiley, and Cooper (2011) investigated the prevalence of anxiety within the ID population. Using a backward stepwise binary logistic regression, they found a statistically significant ($p \leq .05$) independent association with anxiety after accounting for potentially confounding effects of each of the variables.

While anxiety has frequently been related to individuals with disabilities using the STAI, anxiety studies using the instrument are not confined to the disability arena. For example, Modrolio & Guillen (2009) studied age, gender, and performance outcomes of competitive windsurfers using the state-trait anxiety inventory. In their study a sample of 79 professional and amateur windsurfers competing in events at regional and world championships were investigated. Trait anxiety levels were moderate for the sample as a whole. The respective means were 19.77 (*SD* = 5.50) and 18.21 (*SD* = 4.84) for cognitive and somatic anxiety. In contrast to the more traditional clinical studies, this sports-based study demonstrates the range of applications of the STAI in the research literature.

The aforementioned studies present a strong case that the STAI instrument is a widely accepted inventory to use among individuals with disabilities. STAI is an easy-to-use, two-sided instrument that is generally completed in five minutes. It can be scored by hand using a ready-made scoring template usually taking less than five minutes.

My Vocational Situation Instrument

My Vocational Situation (MVS) is a brief, self-administered and hand-scored instrument that was designed as a diagnostic tool to be used in career planning by vocational rehabilitation counselors, job placement specialists, career counselors, and special education teachers when assisting individuals with and without disabilities. The MVS may be administered individually or in a group setting and can be completed and scored in less than 10 minutes. Eighteen *true* or *false* items make the Vocational Identity (VI) subscale. VI is attained when a person possesses a clear and stable understanding of his or her career goals, interests, personality, and talents. Two additional parts exist

within the MVS: Occupational Information (OI) and the Barriers (B) sections. The VI is the only part within the MVS that is actually considered a scale. The researcher in this study used only the VI portion of the MVS as a dependent variable. Prior researchers have supported the notion of using VI separately. Savickas (1991) pointed out that many counselors use VI separately because the two other parts (OI and B) of the MVS are problem checklists rather than psychometric inventories (p. 151). Based on this analysis, the researcher in this study concluded the VI subscale was an applicable instrument by itself to utilize with persons with disabilities.

Vocational Identity

Almost nothing is yet known empirically about how the vocational identity (VI) of individuals with disabilities is affected by desktop virtual reality environments. As far as this researcher can determine, this study is among the first to examine this use of VR. However, the use of VI as a variable in studies related to career decisions has been frequent and well documented. Numerous researchers have used VI as a variable when investigating career choice and career efficacy, career decision-making, vocational indecision, career search, and career development. VI has also applied to numerous studies investigating decision-making (Enright, 1996; Farley et al. 1988; Luzzo, Hitching, Restish, & Shoemaker, 1999; Ochs & Roessler, 2001).

While investigating self-estimated interest types of secondary students, Hirschi and Lage (2008) found significant correlations between self-estimation and vocational identity. For example, they discovered meaningful relations to congruence and differentiation confirming the basic validity of the self-estimation of the secondary students. Furthermore, the accuracy of self-estimation of the secondary students mainly

connected to knowledge in career decision making, being clear about their own career interests, skills, and values.

An examination of college students enrolled in a career and life-planning course found similar positive results in respect to vocational identity. In this study Johnson, Nichols, Buboltz, and Riedesel, (2002) hypothesized that students who completed the career and life-planning course would exhibit higher levels of career development at posttest on the vocational identity inventory. A series of independent sample *t*-tests supported this hypothesis; the college students who completed the course had a significantly greater change from pretest to posttest on the vocational identity that did the control group.

Another study investigating vocational identity and career choice congruence of gifted and talented high school students (Leung, 1998) found vocational identity was significantly congruent to college major choice, but not congruent on career choice. Further, an ANOVA procedure was conducted with college major decision status and gender as independent variables and vocational identity score as a dependent variable. Both the gender and college major decision status results were significant, supporting the hypothesis that vocational identity scores were related to decision status and gender.

An exhaustive literature review of VI provided a substantial support for the prevalence and suitability of the MVS—and more specifically the VI subscale—in a wide range of disciplines spanning from vocational decision making by spinal cord injury patients (Crisp, 1992); career thoughts and disability type (Yanchak, Lease, & Strauser, 2005); career choices of urban high school students (Ladany, Melincoff, Constantine, & Love, 2007); special educational students (Roessler & Foshee, 1996); psychological well-

being (Strauser, Lustig, & Ciftci, 2008); disability status and trauma symptomatology (Strauser, Lustig, Cogdal, & Ciftici, 2006; Strauser, Lustig, & Ciftici, (2006); and career development of rehabilitation clients (Farley, Schriner, & Roessler, 1988).

Persons with disabilities typically have a more complex career development (Ochs & Roessler, 2000) than their non-disabled peers and are more susceptible to vocational identity and career decision-making problems. Innovative technologies such as desktop virtual reality may serve as a tool to increase the tendency for higher vocational identity among individuals with disabilities. As far as this researcher can determine, this study is one of the first to approach this working hypothesis empirically.

Conclusion

Given the facts that anxiety among persons with disabilities is high and finding a job is frequently a tension-producing situation, individuals with disabilities may benefit from treatments that will lessen anxiety levels, such as desktop virtual reality environment training. By applying the proven theory of Dale's Cone of Experience coupled the State-Trait Anxiety and the My Vocational Situation inventories, both reliable and validated instruments, individuals who find themselves in a similar situation to the one presented in Chapter 1 for Emanuel may be better assisted by vocational rehabilitation counselors and job placement specialist alike when VR is applied to job placement/job readiness activities. The fundamental notion of assisting individuals with disabilities in vocational and employment readiness through desktop virtual reality environment training was the chief focus of this study.

CHAPTER III

METHODOLOGY

General Research Design

This study utilized a quantitative research model based on a quasi-experimental pretest-posttest research design. In addition, the study included a qualitative technique (open-ended questionnaire) to describe participants' backgrounds and their perceptions of the treatments they received. The researcher used a small purposive sample (n = 8) comprised of individuals who were vocational rehabilitation services consumers at the time of the study within the Oklahoma Department of Rehabilitation Services sponsored job placement/job readiness program.

Non-Equivalent Control Group Design

The specific quasi-experimental design in this study is referred to by research design experts Campbell and Stanley (1966) as the *nonequivalent control group design*. They supported this design, asserting it is "one of the most widespread experimental designs in educational research . . ."and . . . well worth using in many instances. . ." (p. 47).

According to Campbell and Stanley (1966), the nonequivalent control group design:

> . . . involves an experimental group and a control group both given a pretest and a posttest, but in which the control group and the experimental group do not have pre-experimental sampling equivalence.

> Rather, the groups constitute naturally assembled collectives . . . The assignment . . . of virtual reality environments to one group or the other is assumed to be random and under the experimenter's control (p. 47).

Campbell and Stanley point out that while equality of the experimental and control groups is not guaranteed, ". . . the addition of even an unmatched or nonequivalent control group reduces greatly the equivocality of interpretation over what is obtained in . . . the One-Group Pretest-Posttest design" (p. 47).

Each Rehabilitation Services Consumer (RSC) who participated in this study was assigned a number (numbers corresponded to the order in which subjects agreed to participate). RSCs were randomly divided into two groups by a list randomizer. All eight assigned participant numbers were entered into the list randomizer and the resulting randomized list was divided with first four numbers being assigned to Group 1 (Control Group; $n = 4$) and the second four numbers being assigned to Group 2 (Treatment Group/Desktop Virtual Reality Environment Training; $n = 4$). The list randomizer equitably assigned the RSCs to Group 1 (Control Group) and Group 2 (Treatment Group/Desktop Virtual Reality Environment Training), helping to control potential bias between the groups. This ensured each RSC had equal opportunity to be selected for either the control group (non-treatment group) or the treatment group which received the virtual environment training. This procedure met Campbell and Stanley's (1966) criterion for random assignment to groups in the nonequivalent control group research design.

Variables

The independent variables in this study consisted of (a) the experimental treatment, i.e. the desktop virtual reality environment training scenes of specific job

locations, and (b) the background and demographic descriptors of the subjects. The dependent variables consisted of scores on two instruments: the State Anxiety Inventory for Adults Modified Percent Gain Scores and the Vocational Identity Inventory Modified Percent Gain Scores. Modified percent-gain scores on both instruments were calculated from the pretest and posttest scores, as explained below. State anxiety pretest scores were obtained at the beginning of the job placement/job readiness process before any general program activities in relation to job placement/job readiness were decided. Similarly, pretest scores for Vocational Identity were obtained for each participating client before any job placement/job readiness activities. Post scores for both instruments were obtained after a few weeks of the participants' jobsite training. This process met Campbell and Stanley's (1966) pretest/posttest criterion for the nonequivalent control group research design. The pretest and posttest scores were used to calculate the Modified Percent Gain Scores for each participant using a procedure described by Ausburn & Hedberg (1981), Ballou & Sanders (2004), and ODCTE (1992). These Modified Percent Gain Scores were used as the dependent variable measures in the study.

Population and Sample

A population is the group of interest to the researcher, the group to whom the researcher would like to generalize the results of the study (Fraenkel & Wallen, 2006, p. 93). In addition, a population is a group that "has at least one characteristic that differentiates it from other groups" (Gay, 1987, p. 102). The population in this study was individuals with disabilities who were consumers of the Oklahoma Department of Rehabilitation Services (ODRS) at the time of the study. More specifically, the

population consisted of consumers of ODRS that were actively engaged in job placement/job readiness activities, that is *status 20* of the Rehabilitation Services Administration [RSA] consumer progress code or in *Service Delivery Status*.

The population of interest in this study represented a sizeable group. ODRS served 18,137 persons with disabilities in 2011, of which 2,812 were successfully employed (ODRS Annual Report, 2011). Consumers seeking services from ODRS and eligible receive a multiplicity of services and resources, including eligibility determination, evaluation and assessment, service planning, service delivery, placement, and follow-up.

A sample is made up of the individuals, items, or events selected from a larger group referred to as a population (Gay, Mills, & Airasian, 2006, p. 99). While there are several ways of selecting a sample using random, stratified, clustering, and systematic techniques, "certain techniques are more appropriate for certain situations" (Gay & Airasian, 2006, p. 123). The sampling technique selected for this study had to accommodate the normal operations of the ODRS consumers' program matriculation. The sample size also had to be kept small due to the highly exploratory nature of the study and the time and technical rigor of having to produce a custom desktop virtual reality environment for each individual participant in the treatment group ($n = 4$). To meet these requirements, a small sample of eight ($n = 8$) individuals was selected from consumers engaged at the time of study in job placement/job readiness activities at one central office or program within the general vocational rehabilitation services division in Oklahoma.

The demographic characteristics of the study are presented in Table 3. The sample had more males than females—6 males (75%) and 2 females (25%). The age of the participants ranged from 18 to 22 with a mean of 19.5 (*SD* = 1.414). Half (50%) of the participants were 18 years of age. With regard to race/ethnic diversity, the largest was Caucasian representing 62.5%, followed by African Americans representing 25%, and others at 12.5%. All participants (100%) had obtained a high school diploma or GED. The majority (75%) reported a primary disability as intellectual disability (learning disability), followed by physical disability (12.5%) and developmental (12.5%). All participants (100%) reported the onset of their disability occurred between birth and the age of 18 years of age. The greater part of the sample was unemployed (87.5%) at the time of the study. Only one individual (12.5%) were employed, reporting working part time for the last 6-9 months.

Table 3
Demographic Characteristics of Participants

Variable		*N*	*M*	*SD*	%
Age			19.5	1.414	
	18	4			50%
	19	2			25%
	20	1			12.5%
	22	1			12.5%
Gender					
	Male	6			75%
	Female	2			25%
Ethnicity					
	African American	2			25%
	Caucasian	5			62.5%
	Other	1			12.5%
Primary Disability					
	Physical	1			12.5%
	Intellectual	6			75%
	Developmental	1			12.5%
Age of Onset					
	Birth – 18	8			100%

Table 3 (continued) *Demographic Characteristics of Participants*

Variable	*N*	%
Level of Education		
12th Grade/GED	8	100%
Employment Status		
Unemployed	7	87.5%
Full/Part Time	1	12.5%

Total *N* = 8

Most of the time, consumers enter ODRS services and move through several stages, e.g., Referral, Application, Eligibility Determination, Evaluation and Assessment, Counseling, and Individual Plan for Employment [IPE]) before entering job placement/job readiness or *status 20*. The sample was selected purposively to represent a variety of clients from these stages and from different backgrounds.

Although ODRS clients participate in a state-funded and operated program, participation is voluntary. The consumers have *informed choice* rights at each segment of program projects and activities for which they are involved or receive services. Informed choice within the context of vocational rehabilitation services processes operates in consistency with principles of respect for individual dignity, personal responsibility, self-determination, and pursuit of meaningful careers. Title I, Part A Sec. 100 (a)(3)(C) of the Rehabilitation Act 1973 (amended) states that "individuals with disabilities must be active participants in their own rehabilitation programs, including making meaningful and informed choices about the selection of their vocational goals and objective and the vocational rehabilitation services they receive" (p. 30). This legal requirement affected the sampling procedure used in this study. The researcher secured authorization from ODRS to work with individuals who were active cases. Rehabilitation specialists (also

called vocational rehabilitation counselors) with consumers in status 20 allowed the researcher to ask individual consumers if they would be interested in participating in this research study. The individuals that agreed were informed they would be required to complete three written survey instruments (Demographic Survey, State Anxiety Inventory, and Vocational Identity Scale), and one open-ended questionnaire, along with possibly an interactive computer-based training (The Virtual Environment Training Scene). To ensure consumers that agreed to participate in the study received consistent information, the researcher utilized a pre-written protocol sheet (See Appendix A) to read to consumers before they decided to sign the informed consent form (See Appendix B). Through this process, eight volunteers were obtained and identically briefed and prepared for the research. The volunteers were asked to complete the consent form, demographic data sheet, and two pretest inventories onsite immediately. If they expressed interest, but did not have time to complete the written instruments on-the-spot, the researcher contacted them personally and set up dates and times suitable for them to complete the demographic survey and the S-Anxiety and Vocational Identity inventory instruments for pretest scores.

Instrumentation

Instrumentation Overview

Instruments used in research should be selected that will provide pertinent data about the topic under investigation and meet the purpose of the researcher (Gay & Airasian, 2006, p. 145). To obtain the quantitative measures of the two dependent variables for each participant in this study, the researcher utilized two well-known and

established inventories: the *State-Trait Anxiety Inventory*, (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) (See Appendix C) and *My Vocational Situation Inventories or MVS* (Holland, Daiger, & Power, 1980a) (See Appendix D). Both inventories were given to all research subjects (n = 8) at the beginning of the study and again at the conclusion of the study, thus serving as the pretest and posttest measurements of the dependent variables. In addition, a 10-question demographic survey was given to collect information about each participant at the onset of study participation (See Appendix E). Demographic data collection included: gender, ethnicity, age, disability type, level of education, and employment status. These data served as independent variables in this study.

During an exit interview with individual members of the treatment group (subjects that received virtual environment scene treatment), participants (n = 4) were asked to complete a seven-item, open-ended questionnaire to identify their perceptions and thoughts about the VR scenes (See Appendix F). The exit questionnaire was added to provide additional qualitative support and depth to the quantitative findings of this study. By adding a qualitative element to this quantitative study, the research benefitted from strengths inherent in both quantitative and qualitative techniques.

State-Trait Anxiety Inventory for Adults-Form Y

The State-Trait Anxiety Inventory (STAI) was developed by Charles Spielberger primarily to make a conceptual distinction between chronic or trait anxiety, and temporary in-the-moment or state anxiety (Spielberger, et al. 1983). The STAI is a self-reported assessment of anxiety designed to measure two separate categories of anxiety: state and trait anxiety. State anxiety is the experience of anxiety as a *temporary*

emotional state. It can be brought on by a particular situation or experience. In contrast, trait anxiety is the disposition to experience more permanent or enduring anxiety as a temperament characteristic, or as a general propensity to be anxious. The State Anxiety (S-Anxiety) subscale or STAI Form Y-1 and the Trait-Anxiety (T-Anxiety) subscale or STAI Form Y-2 are printed on opposite sides of a single-page test form to allow assessment of either or both types of anxiety (Spielberger, et al. 1983).

STAI Form Y-2

The Trait-Anxiety (T-Anxiety) subscale (STAI Form Y-2) measures persistent generalized anxiety. It consists of 20 items with a weighted score of 1 to 4. Items are scored on a 4-point Likert-type scale: (1) Almost Never, (2) Sometimes, (3) Often, and (4) Almost Always. Responses indicate how subjects usually feel, describing the frequency of their anxiety feelings. For 11 of the T-Anxiety items, a rating of 4 denotes the presence of a high level of anxiety (e.g., "I wish I could be as happy as others seem to be," "I feel like a failure," "I feel nervous and restless," "I worry too much over something that really doesn't matter," "Some unimportant thought runs through my mind and bothers me," "I feel that difficulties are piling up so that I cannot overcome them," "I take disappointments so keenly that I can't put them out of my mind," "I lack self-confidence," "I feel inadequate," "I get in a state of tension or turmoil as I think over my recent concerns and interests," and "I have disturbing thoughts"). For the remaining 9 items on the T-Anxiety subscale, a rating of 4 denotes the absence of anxiety (e.g., "I feel satisfied with myself;" "I feel rested;" "I feel pleasant;" I make decisions easily;" "I am calm, cool, and collected;" "I feel secure;" "I am a steady person;" "I am content;" and

"I am happy"). Statements are presented in the "substantively counterbalanced order" (Dreger, 1987; Johnson, 2008; Spielberger, et al. 1983).

Because it did not fit the intent of this study, Form Y-2 for trait anxiety was not used in this study. The rationale for this choice is described below.

STAI Form Y-1

General Description, Administration, and Scoring: The State Anxiety (S-Anxiety) subscale (STAI Form Y-1) measures transitory anxiety. It consists of 20 items with a weighted score of 1 to 4. Items are scored on a 4-point Likert-type scale: (1) Not At All, (2) Somewhat, (3) Moderately So, and (4) Very Much So. Responses on the S-Anxiety subscale show temporary, in-the-moment feelings of the subjects describing if they are feeling a heightened amount of anxiety at the present time. For 10 of the S-Anxiety items, a rating of 4 denotes the presence of a high level of anxiety (e.g., "I feel nervous," "I feel frightened," "I feel tense," "I feel indecisive," "I feel strained," "I am worried," "I feel upset," "I am presently worrying over possible misfortunes," "I feel confused," and "I am jittery"). For the remaining 10 items on the S-Anxiety subscale, a rating of 4 denotes the absence of anxiety (e.g., "I feel secure," "I feel at ease," "I feel satisfied," "I am relaxed," "I feel calm," I feel comfortable," "I feel self-confident," "I feel content," "I feel steady," and "I feel pleasant") (Dreger, 1987; Johnson, 2008; Spielberger, et al. 1983). For data analysis, these items are reverse-scored, meaning that a subject's rating of 1 will be scored as a 4, etc. This reverse scoring maintains a high number as an indicator of a high level of anxiety.

The State Anxiety (S-Anxiety) subscale (STAI Form Y-1) was designed to be self-reporting and may be administered either individually or in groups. The inventory

has no time limits, (Spielberger, et al. 1983). Respondents with higher levels of education can usually complete the S-Anxiety subscale in six minutes. Less educated or individuals with emotionally defined impairments may require ten minutes to complete S-Anxiety subscale STAI Form Y-1.

The S-Anxiety subscale has 20 items. The scoring weights for the anxiety-present items are the same as the "blackened" numbers on the test form. The scoring weights for the anxiety-absent items are reversed, i.e., responses marked 1, 2, 3, or 4 are scored 4, 3, 2 or 1, respectively (See Appendix G). The anxiety-absent items for which the scoring weights are reversed on the S-Anxiety are items: 1, 2, 5, 8, 10, 11, 15, 16, 19, and 20 (Spielberger, et al. 1983). A raw score range of a minimum of 20 (20 items x 1 point) to a maximum of 80 (20 items x 4 points) may be yielded on the S-Anxiety subscale. The S-Anxiety subscale is scored by hand, using a scoring key, and can usually be completed in a few minutes (Spielberger, et al. 1983). The research literature suggests that while there is no clinical cut-off score, higher scores commonly indicate higher levels of state anxiety.

For the present study, the researcher chose not to use the Trait-Anxiety (T-Anxiety) subscale (STAI Form Y-2), because the study did not relate to the predisposition or propensities of persons with disabilities for permanent anxiety. For the purpose of this study the researcher was concerned only with the State Anxiety of individuals with disabilities as a temporary emotional state during job placement/job readiness activities in preparation for employment. Thus only STAI From Y-1 was used in this study.

Reliability and Validity. The state anxiety scores among persons with disabilities during job placement activities was a chief concern of the researcher as a dependent variable. Therefore, S-Anxiety subscale (STAI Form Y-1) was used in this investigation. Daivs, Anderson, Linkowski, Berger, and Feinstein (1985) addressed the validity of the state anxiety construct as a variable affecting vocational preparation of people with disabilities. They reported that the greatest vocational barrier for individuals with disabilities as well as physical impairments is often social discomfort or shame resulting from physical appearance and that these feelings escalate anxiety levels during job placement/job readiness activities.

When applying a research instrument it is important to indicate to what extent the testing instrument is valid and reliable. Reliability is "the degree to which a test consistently measures whatever it is measuring" (Gay & Airasian, 2006, p. 169). Two basic forms of reliability are test-retest reliability and internal consistency reliability. Test-retest reliability refers to the consistency of scores on the same test over time (p. 171). Internal consistency reliability refers to the consistency of items one test at a time (p. 173). Furthermore, Barnes, Harp, and Jung, (2002) asserted:

> Many researchers erroneously believe that reliability is a property of a particular instrument. By referring to the reliability of a test or saying an instrument is reliable, what is generally implied is that once an instrument has been found to be reliable or unreliable, the status it is given is immutable; that reliability does not change. . .this assumption is not correct. . .an instrument in a single study can produce scores that are reliable and then a different study with different participants can produce scores that are unreliable. . .reliability is not a property of the test; rather, it is a property of the scores on a test for a particular sample of examinees. (p. 603)

For the specific purpose and sample of the current study, the S-Anxiety subscale (STAI Form Y-1) instructions were modified to ensure clear comprehension by the participants in their job readiness situation and thus strengthen the reliability of the instruments. Spielberger, et al. (1983) supported such action and asserted "Instructions for the S-Anxiety scale may be modified to evaluate the intensity of S-Anxiety for any situation or time interval of interest to an experimenter or clinician" (p.10). The statement below contains the actual verbiage of the STAI Form Y-1. Text in italics indicates this researcher's modifications of the STAI Form Y-1 directions in the pretest phase to place the instrument in the research context and increase its reliability:

> A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel or *felt at the beginning of job placement/job readiness activities.* There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your *feeling at the beginning of job placement/job readiness activities.* (STAI Form Y-1, researcher-modified instructions)

The S-Anxiety scale was used again for the posttest phase of the study. The only difference between the pretest and posttest administrations of the instrument was within the instructions where the word "beginning" was changed to the word "end" as appropriate for the conclusion of their job placement/job readiness activities.

The research literature provides considerable data regarding the general reliability of the STAI state anxiety scale. Spielberger, Gorsuch, Lushene, Vagg, and Jacobs (1983) reported original findings about the state anxiety scale for normative samples of 1,838

employees (1,387 males; 451 females) of the Federal Aviation Administration (FAA); 855 postsecondary students enrolled in an introductory psychology course; 424 secondary school tenth graders; and two samples of military recruits, 1,701 male Air Force recruits and 263 Navy recruits (192 males; 71 females). This study yielded means, standard deviations, and alpha coefficients of internal consistency reliability that were similar to each other. Chaplin (1984) reported test-retest reliability coefficients for the S-Anxiety subscale ranging from .16 to .62 for intervals from 1 hour to 104 days among a sample of male and female high school and college students. While these coefficients were low, relatively low stability coefficients were expected for the S-Anxiety subscale to reflect fluctuations inherent in different situations. High internal consistency alpha coefficients have been reported for the S-Anxiety subscale, ranging from .86 to .95 (Chaplin, 1984).

In a study exploring the validity of the relationship between state-trait anxiety and dysfunctional career thoughts among individuals with disabilities, Johnson (2008) found a high internal consistency alpha coefficient of .93 in the state anxiety subscale. In an investigation of reliability generalization of the state-trait anxiety inventory, Barnes, Harp, and Jung, (2002) reviewed 816 articles that previously studied state-trait anxiety on some level. The inclusion criteria for the investigation consisted of articles needed to indicate use of the original STAI and the 1983 STAT Form Y. Otherwise, a foreign language translation of one of these two forms was administered to participants. Based on this extensive review, the authors reported test-retest reliability coefficients for the state anxiety subscale among the studies investigated at .70 and internal consistency alpha coefficients among the studies up to .91.

A substantial amount of research has investigated the influence of anxiety among

individuals with disabilities (Brenes, et al. 2008; Davis, Saeed, & Antonacci, 2008; Hambrick, Turk, Heimberg, Schneier, & Liebowitz, 2003; Jahoda, et al. 2008; Reid, Smiley, & Cooper, 2011; Waghorn, et al. 2005). A reasonable amount of the available research specifically addresses this topic utilizing the State-Trait Anxiety Inventory (Charlesworth & Dempsey, 1982; Johnson, 2008; Karatas & Duyan, 2004; Muschalla, Linden, & Olbrich, 2010; Tsivgoulis, et al. 2007). This research suggested that high anxiety levels among individuals with disabilities may have an effect on employment restrictions (i.e. reduced job seeking or inhibition of job retention). An extensive review of literature revealed STAI yielded reliable results when applied to individuals with disabilities and a valid relationship with their behavior. Support in previous scholarly literature persuaded this researcher to utilize the STAI S-Anxiety subscale (STAI Form Y-1) in this study.

My Vocational Situation (MVS)

My Vocational Situation (MVS) is a relatively simple paper and pencil, hand-scored, self-reported, diagnostic inventory used to assess three distinct aspect-measurement scales of career decision making: (1) Vocational Identity scale (VI), (2) Occupational Information (OI), and (3) Barriers (B). MVS may be administered individually or in a group setting. The responses are marked on the front and back of one page and can usually be completed in ten minutes or less and scored without templates in approximately ten seconds (Strauser, et al. 2006).

The three parts of the MVS are answered and scored in similar fashion. The VI consists of 18 true or false items. The VI score is the total number of *false* responses

within the 18 Vocational Identity items. The OI score is the total number of *No* responses to the four statements within the Occupational Information item questions. OI requires that users indicate whether they need career information with yes or no responses to items such as: how to find a job in my chosen career, what kinds of people enter different occupations, more information about employment opportunities, and how to get the necessary training in my chosen career. The B score is the total number of *No* responses to the four statements within the Barriers item questions. B requires that users indicate whether they have difficulties with career obtainment with yes or no responses on items such as: I am uncertain about my ability to finish the necessary education or training, I do not have the money to follow the career I want most, I lack the special talents to follow my first choice, and an influential person in my life does not approve of my vocational choice (Holland, Daiger, & Power, 1980a).

Vocational Identity Scale (VI)

General Description. Vocational Identity Scale (VI) is a major component of My Vocational Situation (MVS) (Holland, Daiger, & Power, 1980a). VI is the only part of the three-part MVS inventory that is considered a scale. The VI subscale functions through questions such as: I need reassurance that I have made the right choice of occupation; I am uncertain about the occupations I could perform well; if I had to make an occupational choice right now, I am afraid I would make a bad choice; no single occupation appeals strongly to me; and making up my mind about a career has been a long and difficult problem for me (Holland, Daiger, & Power, 1980b).

Reliability and Validity. In original findings of Holland, et al. (1980b), they reported internal consistency reliability coefficients (i.e. coefficient alpha or Cronbach's

alpha) for the VI ranging from .86 to .89. A combined reliability sample of 824 individuals in high schools, colleges, and businesses was used ranging in age from 16-69 with an average age of 25.4 for males and 23.0 for females. The sample included persons within factory industry, hard sciences, office/clerical workers, and others. The educational level of the sample ranged from freshman in secondary education through those with a postsecondary Ph.D. in engineering or the social sciences. Strauser, Lustig, and Ciftci, (2008) also found VI to have a high internal consistency reliability coefficient of .86. Furthermore, Strauser, Lustig, Cogdal, and Uruk (2006) and Stauser, Lustig, and Uruk (2006) found a .87 internal consistency coefficient among 131 and 222 trauma symptoms subjects respectively. Solberg, Good, Fischer, Brown, and Nord (1995) found a strong correlation between VI and other career self-efficacy measures ($r = .54$), and between VI and career decision making ($r = .61$), thus establishing concurrent validity for VI in relationship to these other related measures. The VI has not received support from all researchers (Brown & Lent, 2000; Lewis & Savickas, 1995; Skorikov & Vondracek, 1998). However, Stauser et al. (2006) found the MVS to be an efficacious instrument and reported VI internal consistency coefficients ranging from .86 to .89.

In the current study, the researcher used only the VI portion of the MVS. This choice was justified in the research literature. As Savickas (1991) pointed out, "Many counselors use VI separately because the two other parts of the MVS are problem checklists rather than psychometric inventories" (p. 151). VI measures to what extent individuals possess a clear and stable picture of their goals, interests, personality, and talents. Researchers' intentions for utilizing the VI is generally to screen several sample

segments of career seekers who have documented disabilities and who may need concentrated career counseling because of an inadequate level of vocational identity.

The majority of individuals with disabilities experience disproportionately high levels of complex career development processing issues, even more so than their non-disabled counter parts. This can foster vulnerability to vocational identity and career decision-making problems (Enright, 1996; Luzzo, Hitchings, Retish, & Shoemaker, 1999; Ochs & Roessler, 2001; Yanchak, Lease, & Strauser, 2005).

The MVS has been well documented in scholarly research over time regarding the usefulness of its results to vocational rehabilitation counselors, job placement specialists and career counselors when assisting individuals with and without disabilities. In addition, prior research has shown MVS is appropriate to assess vocational identity in a variant of populations with special needs, including special education students (Roessler & Foshee, 1996); people with trauma symptoms (Strauser, Lustig, Cogdal, & Uruk, 2006); the gifted and talented (Leung, 1998); secondary and postsecondary students (Solberg, Good, Fischer, Brown, & Nord, 1995); people with psychoneurotic, psychotic, or emotional disabilities (Farley, Schriner, & Rossler, 1988); people with cognitive and physical disabilities (Yanchak, Lease, & Strauser, 2005); and people with spinal cord injuries (Crisp, 1992).

Based on the findings, this researcher believed VI was an appropriate instrument to use in this study with individual with disabilities. Many researchers use vocational identity as a variable whenever they are studying career development, career decision making, vocational indecisions, career indecisions, career search, career choice and career efficacy. This supported the construct validity of the vocational identity concept

as a variable in this study. Research history and reported reliability and validity supported the choice of the VI section of the MVS as the appropriate measurement instrument for this study.

Desktop Virtual Environment Training Presentation Treatments

Vocational rehabilitation counselors and job placement professionals need to employ effective teaching tools during job placement/job readiness service activities in order to maximize their effectiveness. Recent research literature (e.g. Ausburn & Ausburn, 2004; Ausburn & Ausburn, 2008a; Ausburn & Ausburn, 2008b; Ausburn, Ausburn, Cooper, Kroutter, & Sammons, 2007a; Bliss & Tidwell, 1997; Davies, 2004; Di Blas, & Poggi, C. 2007; Koutter, 2010; Riva, 2003; Slater & Usoh, 1993; Williams, 2005; Winn, Hoffaman, Hollander, Osberg, and Char, 1997) has shown repeatedly that using desktop virtual reality (VR) applications can be instructionally effective in a variety of instructional context and settings.

The desktop virtual reality environment training scenes (DVRET) used in this research were developed by the researcher. They were presented on desktop and/or laptop computers. The production of the DVRETs was completed with a 10.2 megapixel Sony A230 digital SLR camera with a Sony18-55mm lens. In addition, a Manfrotto tripod with quick release 3-way pan/tilt panoramic head was used to stabilize the camera at a vertical angle and control degrees of rotation of the camera during on-location production photography. The photographs were stitched and blended into completed VR panoramas and clickable "hot spots" were added with VR Worx software.

The DVRETs showed the actual job/workplace environments where subjects were trained or employed. In a summery of VR environments, Ausburn, Martens,

Washington, Steele, and Washburn, (2010) explained that ". . .VR is a way of simulating or replicating a 3D environment through computer-generated imagery and giving the user a powerful sense of being there, taking control, and actively interacting with the environment and its content" (p. 54). This is exactly what the DVRETs accomplished for the subjects of the study as part of their job readiness activities. Thus, it replicated their job environment and allowed them to experience it before actually going onsite.

Procedures

Research procedures reflect all the activities involved in collecting data related to the problem. Procedures should make it clear exactly how participants were assigned to groups, treatments, or the conditions under which participants were observed or interviewed (Gay, Mills, & Airasian, 2006). This study began with securing IRB approval, a copy of which is presented in Appendix H. Permission to solicit and conduct the study using current consumers was also obtained from the Oklahoma Department of Rehabilitation Services (See Appendix I). Additional permission was obtained from the Chesapeake Energy Corporation. The Chesapeake corporate campus in Oklahoma City was the job placement/job readiness program location (See Appendix J).

After securing informed consent forms from all participants (n = 8), they were administered the demographic questionnaire and both the State Anxiety Inventory and Vocational Identity sub scale to obtain pretest scores for the dependent variables. Participants were assigned a number, which corresponded with the order in which they agreed to participate in the study. Participants were randomly assigned to a control group (n = 4) or a treatment group (n = 4) by a number randomizer. All participants

matriculated through the normal job placement/job readiness activities, but only the treatment group participants were exposed to a virtual environment training scene of their actual job/training location. All virtual realty scenes were produced with the permission Chesapeake Energy Corporation. The VR scenes showed different parts of the company where research subjects would eventually be placed for job training and/or work.

Each treatment group participant was trained on how to use and navigate a non-research-related virtual environment scene (i.e., an office space of ODRS) before they were introduced virtually to their actual training location. After treatment, participants demonstrated they could correctly use the navigational commands in the on-screen VR scene, and they were asked to "visit" (virtually) their assigned individual treatment-related virtual environment scene. Each participant's virtual environment was unique and showed the actual location in which he/she would be trained or would work. The virtual environment/training scenes were produced by the researcher and distributed to participants via multimedia devices (DVD/Flash drive) or through the internal hard drive of the computer of choice. Treatment group participants could then view, navigate, and manipulate their positions within their own specific job/training 3D environment. Each participant was encouraged to view and interact with his or her job-specific virtual environment scene individually, at his or her own will and pace.

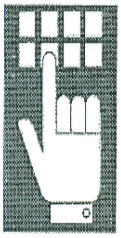
The desktop virtual reality environment scene treatments included two short video clips featuring: (1) the researcher instructing the participants to feel free to view and explore their personal DVRET scene as many times as they wanted and in whatever manner they wished during a two-week period; and (2) the onsite supervisor/mentor welcoming participants, introducing themselves and briefly and explaining what their job

duties would be. Participants were encouraged to learn as much about their jobsite as they could. As the small video clip ended, the DVRET scene began and the users could then start exploring their virtual environment at-will.

After two weeks of job placement/job readiness activities, all study participants re-took both the State anxiety and self-reported Vocational Identity Inventories to provide posttest scores for the dependent variables. A post-satisfaction survey (See Appendix K) was given to all study participants asking Likert-type scale questions to obtain supplemental information about how they perceived their job placement/job readiness activities experience. An exit questionnaire (Appendix F) specific to the treatment group was given to compile perceptions, feelings, and thoughts regarding the usage of the DVRET scenes.

Data Analysis

Fraenkel and Wallen (2006) stated that data analysis is the process of simplifying data in order to make it comprehensible. Quantitative data in this study were analyzed using SPSS 18.0 statistical software. Modified % gain (MPG) scores were calculated from the State Anxiety Identity and Vocational Identity Sub-Scale pretest and posttest scores using procedures recommended by the ODCTE (1992) in the Oklahoma testing program. The ODCTE explanation and calculation of MPG scores are shown in Figure 8.



Hand Calculating Modified Percent Gain Scores

1. Count up the student's **raw score**, or actual number of points scored on the pretest and the posttest.

2. Convert both the pretest raw score and the posttest raw score to **percent scores**. To change raw scores to percent scores, use this formula:

$$\frac{\text{Raw Score}}{\text{Number of Points on the Test}} \times 100 = \text{Percent Score}$$

EXAMPLE

A student earns 6 points out of a total of 75 possible on the pretest. He/she earns 68 points out of the 75 on the posttest

The student's pretest percent score is **(6 ÷ 75) X 100, or 8%**
The student's posttest percent score is **(68 ÷ 75) X 100, or 91%**

3. Subtract the **pretest percent** from 100%. This gives the **percent available** to the student for improvement on the posttest.

EXAMPLE

The student in the example above made a pretest percent of 8%. His/her percent available is

100%
-8% (pretest percent)
92% (percent available)

4. Subtract the **pretest percent** from the **posttest percent**. This is the **percent gained** by the student on the posttest.

EXAMPLE

The student made a pretest percent of 8% and a posttest percent of 91%. His/her percent gained is

91% (posttest percent)
- 8% (pretest percent)
83% (percent gained)

5. Divide the **percent gained** by the **percent available**. This gives the **MODIFIED PERCENT GAIN SCORE.** It shows what portion of the available increase the student actually gained.

EXAMPLE

The student had a percent gained of 83% and a percent available of 92%. His/her modified percent gain score is **(83÷ 92)) X 100, or 90% .**

This student made a modified percent gain score of 90% . This means that the student earned 90% of the improvement that was possible for the student on the posttest, based on his/her pretest score.

Figure 8: Description of Modified Percent Gain Scores
Source: Oklahoma Department of Vocational and Technical Education,

MPGS are interpreted as the percentage an individual *did* gain on a posttest score based on what he or she *could* gain based on the pretest score.

MPG scores of State Anxiety and Vocational Identity Inventories outcomes were compared with independent sample *t*-tests for participants who did and did not experience desktop virtual reality environment scenes. A $p = .05$ level was considered significant for this study. A correlation coefficient was used to examine relationship between State Anxiety and Vocational Identity. A background profile was developed for each participant to describe his or her demographics and background. An open-ended questionnaire was given to the treatment group participants to gain some qualitative data, particularly regarding their perceptions and experience with the virtual reality environment scenes.

CHAPTER IV

FINDINGS

Overview of the Study

To address the four research questions that guided this study, several statistical analyses were conducted for the two dependent measures: (1) state anxiety, measured with the State-Anxiety Inventory for Adults – Form Y, and (2) vocational identity, measured with the Vocational Identity sub-scale of the My Vocational Situation inventory. Descriptive statistics, cross tabulations, calculation of pretest/posttest modified percent gain scores, independent sample *t*-tests of the gain scores for treatment and control group, and correlation coefficients were used for statistical analysis of the dependent measures.

Additionally, to add depth and detail to quantitative data results among the four (n = 4) treatment group participants, a simple qualitative technique was used via a seven item open-ended questionnaire. The self-reported comments were summarized to gain perceptions that study participants had regarding desktop virtual reality environment training while exploring their actual employment site as a job placement/job readiness tool.

A purposive sample of eight individuals with disabilities who were active clients of the Oklahoma Department of Rehabilitation Services served as the participants in this study. All eight participants were in *service status* (status 20), which indicates they were active in job placement/job readiness activities, specifically a specialized program titled

Project SEARCH. Project SEARCH is a competitive employment program with the primary goal to secure gainful employment for persons with disabilities. There are over 200 Project SEARCH program site throughout the United States, Canada, England, Scotland and Australia. The State of Oklahoma has four Project SEARCH sites currently in operation. The eight participants were randomly assigned to either the treatment group (n = 4) that used the virtual reality environment training, or the control group (n = 4) that only received traditional job placement/job readiness activities used by the Project SEARCH program.

Each member of the treatment group was provided with and trained how to use a desktop VR scene of the actual jobsite in which he or she would be working. The four (4) jobsites were all in different departments of the Chesapeake Energy Corporation. The jobsites where determined by Chesapeake Energy human resources and the Project SEARCH management teams. The participants could explore their VR environments as much as they wished at the pace and timing they chose. The assessments of the dependents variables for both treatment and control groups were administered before and after the job placement/job readiness activities to which they were assigned. Qualitative comments were collected through a self-reported open-ended questionnaire at the conclusion of the study.

The Participants

Demographical information for the sample (n = 8) are presented in Table 3, in Chapter III. These data show diversity among study subjects. A more detailed look at each participant of this study was prepared in a profile, highlighting each participant's

background and personal characteristics. The eight profiles of the study participants are presented below.

Participant 1: Participant 1 was a white female 19 years old with a learning disability who was participating in her first employment-training program. She had graduated from high school the previous year and was excited about the possibilities of getting a good job. Regarding her previous employment, Participant 1 stated, " I had a job as a car hop in the summer of my senior year, but it only lasted for about half a year." Participant 1's job assignment within her employment-training program was in the Restaurant Division as a cashier/front house support person. The skills needed for this position included:

- Good communication
- Counting money
- Cleaning
- Stocking
- Utilizing checklist for inventory
- Inventory collection
- Recycling
- Managing and calculation of money

General tasks of the job are:

- Managing money
- Operating casher register
- Wiping down tables, chairs, drink dispensers, countertops, salt and pepper shakers (before and after lunch)

- Collecting dry goods inventory
- Breaking down boxes and plastic bags and placing in designated recycle bins.

Participant 1 was randomly selected for the treatment group. The researcher developed a desktop virtual reality environment scene for her of the restaurant area, including the work areas specific to her work duties. Participant 1 had two weeks to interact with her individualized jobsite virtual reality environment scene as often as she liked. Sample still photographs from the desktop VR scene of the restaurant jobsite for Participant 1 are shown in Figure 9.

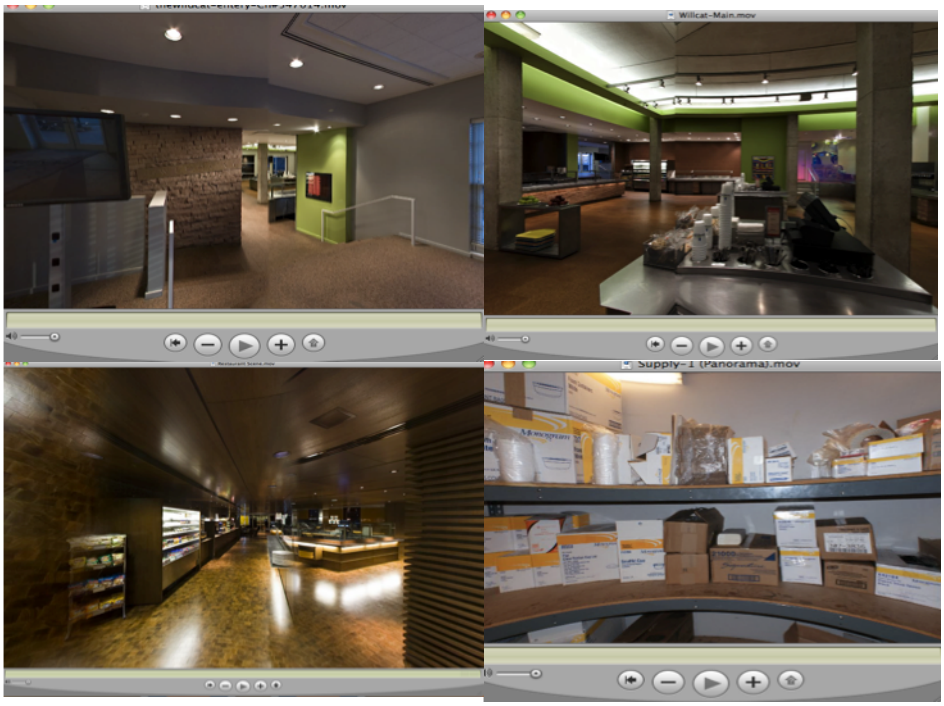


Figure 9. Still photographs of Desktop Virtual Reality Environment Scene for Restaurant Jobsite

Participant 2: Participant 2 was a white female 19 years old with a learning disability. She stated about her work experience "I have done a lot of volunteering before, but I've never been, you know, like really been paid for working." A recent graduate from high school, Participant 2 was looking forward to gaining the tools and confidence to help her secure gainful employment. Participant 2's job assignment was in the Imaging Division as an imaging technician. Following were the skills required for this position:

- Interacting with computers,
- Prepping
- Scanning
- Retrieving information
- Processing and documenting information
- Communicating with supervisors , peers, and subordinates
- Analyzing objects, actions, or events
- Monitoring process
- Organizing, planning and prioritizing work
- Evaluating information to determine compliance with standards

General tasks Participant 2 would be expected to perform were:

- Prepare paperwork to be scanned into computer program by separating division order with and without attachments
- Read source documents such as canceled checks, sales reports, or bills
- Divide division orders and enter data into specific data fields or onto tapes or disks for subsequent entry

- Utilize keyboard and scanners
- Scan paperwork electronically by desktop computer into computer program
- Compare data with source documents
- Re-enter data in verification format to detect errors
- Load machines with required input or output media such as paper, cards, disks or tapes

Participant 2 was randomly selected to be in the treatment group of this study. The researcher developed a desktop virtual reality environment of the Imaging division jobsite, including any work areas specific to the participant's work duties. Sample still photographs from the desktop VR scene of the Imaging jobsite for Participant 2 are shown in Figure 10.

Figure 10. Still photographs of Desktop Virtual Reality Environment Scene for Imaging Division Jobsite

Participant 3: Participant 3 was a white male 18 years old with a learning disability. Working a job was not new to him. Participant 3 has worked at a local amusement park as a games attendant. Participant 3 stated about getting a new job, "I hope this program will help me get a very good job." His personal goals and career wish were to work in a computer industry. Participant 3's job assignment was in the Security Operations Division as an operations assistant. The skills for the operations assistant include:

- Documenting and evaluating information to determine compliance with standards
- Communication with supervisors, peers or subordinates
- Identifying objects, actions, and events
- Monitoring processes materials and surrounding
- Processing information
- Updating and using relevant knowledge
- Retrieving information
- Making decisions and solving problems
- Establishing and maintaining interpersonal relationships

Job tasks for an operations assistant consisted of the following:

- Monitoring company activities by camera and video to ensure adherence to company policies and procedures
- Observing operation of irregular activities and report all violations and suspicious behaviors to supervisors verbally or in writing via email

- Creating repair tickets for nonworking cameras on and off company campus

Participant 3 was randomly selected to be in the control group of this study.

Participant 4: Participant 4 was a black male 20 years old with an intellectual disability status, specifically learning disability, and a high school graduate. Although he has never had a job, he had worked around his home with his father. Participant 4 did not state a specific career industry but did state he would like it close to home. Participant 4's job assignment was in the Restaurant Division as a front house support person. The skills needed for this position include:

- Good cleaning
- Stocking
- Utilizing checklist for inventory
- Inventory collection
- Recycling

General tasks of the front house support person job were as follows:

- Wiping down tables, chairs, drink dispensers, countertops, salt and pepper shakers, (before, during, and after lunch period)
- Maintaining appearance and cleaning standards of company during lunch period
- Collecting dry good inventory
- Breaking down boxes and plastic bags in location designated for recycle bins

Participant 4 was randomly selected to be in the control group of this study.

Participant 5: Participant 5 was an unemployed male 18 years old with an intellectual disability that racially identified him as *Other*. Participant 5 graduated from a large urban high school a year earlier. Although he had never been employed, he felt he was ready for the workforce. He stated about getting a job, "That's why I wanted to be in this program, I need a job to get money . . . I really want a truck so I can get around to work and stuff." The job assignment for Participant 5 was in the Records Division as a records technician. The skills for the records technician include:

- Locating information
- Documenting information in computer software
- Utilizing Microsoft Outlook and Lync for communication
- Filing and storing hard copy information

Job tasks for an operations assistant consisted of the following:

- Store any incomplete or illegible oil well logs in separate storage
- Report any issues/errors to supervisors utilizing Microsoft Outlook and Lync systems
- Utilize Microsoft and Excel to enter oil well information form logs into department database
- Research missing information in database utilizing PI Dwight software
- Attach barcode to the backside of the oil log once all information is documented
- Store completed logs back in original box
- File and store hard copy information of logs in vault

Participant 5 was randomly selected to be in the control group of this study.

Participant 6: Participant 6 was a white male 18 years old with an intellectual disability status, specifically learning disability, and a high school graduate. Although he was participating in the job placement/job readiness program, he was actually working at a local retail store as a sales associate. Regarding his job desires, Participant 6 said, "I hope I can find a job here (the large energy corporation program sponsor where the program was housed) . . . but if not I would like to work in construction, that way I can make enough money to live on." Participant 6's job assignment was in the Land Development Division as a Land Assistant. Skills required for this position were as follows:

- Documenting information using company-specific software
- Communicating with supervisors, peers or subordinates
- Utilizing Microsoft Outlook software
- Copying, sorting, scanning
- Organizing and processing incoming mail

The Land Assistant job tasks included:

- Operating office machines such as photocopiers and scanners, fax and personal computer
- Maintaining and updating inventory, mailing and database systems
- Opening, sorting, and routing incoming mail
- Recording and proofreading data for returned checks
- Reading source documents such as returned checks, cancelled checks or receipts, and enter data in specific fields using company-specific software

- Locating and correcting data entry errors and reporting them to supervisor

Participant 6 was randomly selected to be in the control group.

Participant 7: Participant 7 was a black male 18 years old with a physical disability status, specifically cerebral palsy. Participant 7 had major difficulties that limited his motor functioning on the left side of his body (leg, arm, and hand). Although he had never had a job, he had volunteered at his church, a local non-profit organization his grandmother had sent him to. Regarding his job preferences, he stated, "I think I would be good at cleaning up, I know how to clean stuff up good." Participant 7 did not state a specific career industry but did state he would like it to be close to home. The job assignment for Participant 7 was in the Fitness Center as a fitness center attendant. The skills needed for the fitness center attendant position were the following:

- Cleaning
- Stocking
- Collecting and storing fitness inventory
- Utilizing assigned task list to complete daily task
- Communicating with patrons, staff, and supervisors

Job tasks included:

- Maintaining appearance and cleaning standards of fitness center
- Utilizing the "ionator" to sanitize and wipe down exercise equipment (i.e. cardio equipment, exercise mats, and fitness balls)
- Cleaning and maintaining golf simulator and rock-climbing areas daily
- Cleaning and maintaining pool storage daily

- Stocking and maintaining supplies (i.e. cups and paper towels in designated areas)
- Issuing locker, racquet ball, and tanning booth keys
- Greeting fitness center guests

Participant 7 was randomly selected to be in the treatment group of this study. The researcher developed a desktop virtual reality environment of the Fitness Center jobsite, including any work areas specific to the participant's work duties. Sample still photographs from the desktop VR scene of the Fitness Center jobsite are shown in Figure 11.

Figure 11. Still photographs of Desktop Virtual Reality Environment Scene of Fitness Center Jobsite

Participant 8: Participant 8 was a white male 22 years old with a developmental disability, specifically Autism. He had previous work experience in a neighborhood grocery store. While working a job was not new to him, Participant 8 felt a job placement/job readiness program could help him. He stated ". . . they help people with disabilities get jobs, I think it will help me find work somewhere around Oklahoma." The job assignment for Participant 8 was in the Asset Management Division as an asset management assistant. The job skills required for this position included:

- Stocking, labeling, and packing
- Preparing items for shipping and delivering
- Locating and documenting information
- Communicating with supervisors, peers, and subordinates
- Utilizing Microsoft Outlook
- Assembling and disassembling

The asset management assistant position tasks included:

- Loading carts with equipment to be delivered to adjacent buildings per order request
- Inserting Sim cards into modems
- Preparing camera cases (i.e. remove plastic and cut off all tags, remove all accessories from box, and examine items for damage)
- Preparing laptop cases by storing accessories (i.e. mouse, mouse pads, power card, adaptors, and car charger)
- Placing all finished cases in appropriate bin to be shipped

- Emptying returned laptop cases and determining what equipment to keep and discarding any nonworking items
- Counting inventory to determine what to order when supplies run low
- Documenting what supplies to order
- Stocking items in warehouse to ensure they are correctly numbered and located in appropriate bin
- Scanning barcodes on returned equipment and entering return data on the inventory software
- Preparing daily report of activities utilizing Microsoft Outlook and email to supervisor at end of each day

Participant 8 was randomly selected to be in the treatment group of this study. The researcher developed a desktop virtual reality environment of the Asset Management Division jobsite, including any work areas specific to the participants work duties. Sample still photographs from the desktop VR scene of the asset management jobsite are shown in Figure 12.

Figure 12. Still photos of Desktop Virtual Reality Environment Scene of Asset Management Jobsite

Research Questions Results and Findings

Before data were obtained and analyzed each of the eight study participants agreed to be in the study and signed consent forms. A copy of the consent form was given to the participants for their records, and the researcher kept a copy under locked security to ensure data confidentiality was preserved and maintained.

Quantitative data were entered into the SPSS statistical analysis computer program for analysis. Research questions 1, 2, and 3 where addressed quantitatively from the pretest/posttest scores on the State Anxiety Inventory and Vocational Identity Sub-Scale and the calculation of MPGS from the pretest/posttest scores. Research question 4 was addressed qualitatively from analysis of comments of the treatment group

participants. The findings for each research question are discussed and presented below, organized by question.

Research Question 1: Is there a significant difference between Modified Percent Gain Scores (MPGS) based on pretest/posttest scores for state anxiety between participants who do and do not experience desktop virtual reality environment treatment?

Before the research questions relating to Modified Percent Gains Scores (MPGS) (Questions 1 – 3) could be answered, it was necessary to convert pretest/posttest scores on the two dependent variables of state anxiety and vocational identity to MPGS. Using pretest and posttest scores on the State Anxiety Inventory and Vocational Identity sub-scale, modified MPGS were calculated for the participants on the two dependent measures using procedures described in Chapter 3. These MPGS were used as the dependent measure scores to answer research questions 1, 2, and 3.

Table 4 shows the descriptive data results of pretest/posttest and MPGS of the State Anxiety Inventory for both control and treatment groups.

Table 4.
Pretest/Posttest results of State Anxiety Inventory Scores and Calculated Modified Percent Gain Scores (MPGS) N = 8

	Pretest/Posttest State Anxiety Inventory Scores / MPGS						
	Pretest			Posttest			
Subject # / Group (Treatment or Control)	Raw Score	Raw Score %	% Available from Gain on Posttest	Raw Score	Raw Score %	% Actually Gained on Posttest	MPGS
1 / TG	61	76.25	23.75	22	27.5	48.75	48.72%

Table 4 (continued) *Pretest/Posttest results of State Anxiety Inventory Scores and Calculated Modified Percent Gain Scores (MPGS) N* = 8

	Pretest/Posttest State Anxiety Inventory Scores / MPGS						
	Pretest			Posttest			
Subject # Group (Treatment or Control)	Raw Score	Raw Score %	% Available From Gain on Posttest	Raw Score	Raw Score %	% Actually Gained on Posttest	MPGS
2 / TG	53	66.25	33.75	33	41.25	25	74.07%
3 / CG	28	35	65	22	27.5	7.5	11.54%
4 / CG	33	41.25	58.75	28	35	6.25	10.64%
5 / CG	40	50	50	28	35	15	30%
6 / CG	42	52.5	47.5	22	27.5	25	52.63%
7 / TG	48	60	40	28	35	25	62.50%
8 / TG	57	71.25	28.75	40	50	21.25	73.91%

The data presented in Table 4 show descriptively a clear and substantial difference between the VR treatment group and the control group. The mean MPGS for the treatment group were 65.00, while it was only 26.50 for the control group (see Table 5 below). Review of the individual MPGS also supports the general overall favorability of the VR treatment. The standard deviations for the two groups also indicated that the treatment group had a smaller range of scores around their higher mean (see Table 5 below). These findings indicate that the treatment group had considerably less state anxiety after viewing the jobsite VR than the control group who did not see VR jobsites.

While the small sample size made inferential, statistical analysis inconclusive, this analysis was conducted on an exploratory basis. The inferential analysis addressing research question 1 was conducted with an independent sample *t*-test to assess the

statistical significance of any differences found between MPGS based on pretest and posttest scores for state anxiety among participants who did and did not experience desktop virtual reality environment treatment.

The researcher was concerned with the *t*-test assumption of equality of the variances of the treatment and control groups. Therefore, a Levene's Test for Homogeneity of Variances was performed to determine whether equal variance between groups could be assumed or not assumed. The level of significance for the *t*-test was set at $p = .05$. Table 5 shows the statistical data for the Levene's test and the *t*-test on State Anxiety Inventory MPGS.

As shown in Table 5, the *F*-ratio on the Levene's test revealed no significant difference in variance ($p = .317$) between the participants who did and did not experience desktop virtual reality environment regarding State Anxiety MPGS. Therefore, the *t*-test data with equal variance assumed was used. As shown in Table 5, the *t*-test with equal variance assumed showed that the treatment group that received the desktop virtual reality environment training had a higher mean MPGS (i.e., better results on posttest) than the control group that did not experience the desktop virtual reality environment training, at a statistical significance level of less than .05 ($t = 3.348$; $p = .015$). Therefore, for research question 1, the null hypothesis of no difference between the treatment and control groups was rejected and the alternate hypothesis was accepted.

Table 5.
Treatment and Control Groups t-Test analysis State Anxiety Inventory MPGS (*N* = 8)

State Anxiety Inventory	*N*	*M*	*SD*	*f*	Sig	*t*	*df*	Sig. (2-tailed)
Treatment Group (DVRET Experience)	4	65.00	11.860	1.190	.317	3.348	6	.015
Control Group (No treatment)	4	26.50	19.706					

Research Question 2: Is there a significant difference between Modified Percent Gain Scores (MPGS), based on pretest/posttest scores for vocational identity between participants' who do and do not experience desktop virtual reality environment treatment?

MPGS were calculated from the pretest/posttest scores on the Vocational Identity Scale. Table 6 shows the descriptive data results of pretest/posttest and calculated MPGS of the Vocational Identity Scale for both control and treatment groups.

Table 6.
Pretest/Posttest results of Vocational Identity Scale and Calculated Modified Percent Gain Scores (MPGS) N = 8

	Pretest/Posttest Vocational Identity Scale Scores / MPGS						
	Pretest			Posttest			
Subject # / Group (Treatment or Control)	Raw Score	Raw Score%	% Available from Gain on Posttest	Raw Score	Raw Score %	% Actually Gained on Posttest	MPGS
1 / TG	5	27.77	72.22	11	61.11	33.34	46.16%
2 / TG	5	27.77	72.22	15	83.33	55.56	44.32%
3 / CG	3	16.66	83.33	9	50	33.34	40%
4 / CG	9	50	50	14	77.77	27.77	55.54%
5 / CG	6	33.33	66.66	13	72.22	38.89	58.34%

Table 6 (continued) *Pretest/Posttest results of Vocational Identity Scale and Calculated Modified Percent Gain Scores (MPGS) N* = 8

	Pretest/Posttest Vocational Identity Scale Scores / MPGS						
	Pretest			Posttest			
Subject # / Group (Treatment or Control)	Raw Score	Raw Score%	% Available from Gain on Posttest	Raw Score	Raw Score %	% Actually Gained on Posttest	MPGS
6 / CG	7	38.88	61.11	12	66.66	27.78	45.45%
7 / TG	5	27.77	72.22	16	88.88	61.11	84.61%
8 / TG	3	16.66	88.33	11	61.11	44.45	53.34%

The data presented in Table 6 show descriptively a modest difference between the VR treatment group and the control group. The mean MPGS for the treatment group was 57.11, while for the control group it was a somewhat smaller 49.83 (see Table 7 below). The mean for the treatment group was also skewed upward by a single very large gain score in this small sample (M = 84.61), thus exaggerating the between-group difference. The standard deviations for the two groups also indicated that the treatment group had a wider range of scores around their only modestly higher mean (see Table 7 below). These findings indicate that the treatment group had a modestly greater but more variable vocational identity after viewing the jobsite VR than the control group that did not see VR jobsites.

Inferential analysis of the statistical difference in performance between the treatment and control groups was again performed on an exploratory basis for the vocational identity variable. The inferential analysis addressing research question 2 was conducted with an independent sample *t*-test to assess the statistical significance of any differences found between MPGS based on pretest and posttest scores for vocational

identity among participants who did and did not experiences desktop virtual reality environment treatment.

A Levene's Test for Homogeneity of Variances was performed to determine whether equal variance between groups could be assumed or not assumed. The level of significance for the *t*-test was set at $p = .05$. Table 7 shows the statistical data for the Levene's test and the *t*-test on Vocational Identity MPGS.

As shown in Table 7, the *F*-ratio on the Levene's test revealed no significant difference in variance ($p = .243$) between the participants who did and did not experience desktop virtual reality environment regarding State Anxiety MPGS. Therefore, the *t*-test data with equal variance assumed was used. As shown in Table 7, the *t*-test with equal variance assumed showed that the treatment group that received the desktop virtual reality environment training had modestly higher mean MPGS (i.e., better results on posttest) than the control group that did not experience the desktop virtual reality environment training. However, this difference did not reach a statistical significance level of less than .05 ($t = .706$; $p = .507$). Therefore, for research question 2, the null hypothesis of no difference between the treatment and control groups was retained.

Table 7.
Treatment and Control Groups t-Test analysis Vocational Identity MPGS ($N = 8$)

Vocational Identity	*N*	*M*	*SD*	*F*	Sig	*t*	*df*	Sig. (2-tailed)
Treatment Group (DVRET Experience)	4	57.11	18.743	1.674	.243	.706	6	.507
Control Group (No treatment)	4	49.83	8.580					

Research Question 3: Is there a significant relationship between state anxiety and vocational identity MPGS scores of participants during job placement activities?

Analysis addressing research question 3 was conducted inferentially on an exploratory basis with a two-tailed Person's *r* correlation for the dependent variables of State Anxiety Inventory and Vocational Identity Scale. MPGS scores on both variables were used in the correlation analysis. The correlation value for the dependent variables in research question 3 was not statistically significant at the .05 alpha level ($r = .199$; $p = .636$; $df = 6$ or $N - 2$). Further, at a practical level, the coefficient of determination or r^2 was only .039, indicating that only approximately 4% of the variance of state anxiety and vocational identity is common. This leaves nearly all the variance in the two variables (96%) not related to each other. Thus, for research question 3, the null hypothesis was retained, indicating no significant relationship was found between state anxiety and vocational identify.

Research Questions 4: What perceptions do participants have regarding desktop virtual reality as a job placement/job readiness tool?

To address research question 4, responses of treatment group participants ($n = 4$) on an exit questionnaire were analyzed regarding their perceptions about their individualized jobsite desktop virtual reality environments scenes. All data were self-reported and only minimal data were obtained. Overwhelmingly, treatment group participants indicated the DVRET was a very helpful tool to assist them in understanding and gaining familiarity of their new jobsite. The open-ended questionnaire reviled a

small amount of specific comments served to typify the perceptions of the treatment group participants.

Participate 7 (male with cerebral palsy) stated ". . . it was like I was there before. . . when I looked at the video of my supervisor he told me what I would be doing."

Participant 8 (male with Autism) echoed participant 7's perception. He described his thoughts as ". . . I enjoyed playing with the VR, I have never did this before, it was fun. . .I felt good when I started the first day, and I knew more about what I was suppose to do". Participant 8 added, "The video helped me know what I was going to be working and what things look like. . . It was easy for me this time when I went over there and when I started."

Participant 2 (female with a learning disability) stated simply that the DVRET helped her "Know what to expect" and the video of the supervisor ". . . made me feel comfortable."

The comments of participant 1 (female, learning disability) may have summarized the perceptions of the treatment participants, stating "Wow, this was great. I wish I would have a video of all the places I wanted to work… using this I could do good at any job.

Participant 8 went on to say, "The virtual video helped me feel relaxed about the job I was going to, it was good we had this."

All treatment group participants reported that they did use their personal VR jobsite environment to prepare for going to work. Each treatment group participant reported they chose to watch their DVRET—an average of 7 days and 105 minutes of viewing time—before the first day on their new job.

These findings indicated that the participants in this study chose voluntarily to make considerable use of their personal DVRET and found it to be helpful preparation for going to work, regardless of gender or type of disability.

Summary of Findings

The participants in this study were all consumers of the Oklahoma Department of Rehabilitation Services (ODRS) in *service status* (Status 20) and actively involved in a job placement/job readiness program sponsored by ODRS. The sample separated into 75% male and 25% female. The participants had a variety of disabilities; 75% of the participants had intellectual disabilities (learning disabilities) while 12.5% had physical disabilities and another 12.5% reported developmental disabilities. All participants had obtained high school diplomas and the majority of the participants (87.5%) were unemployed.

This study examined how desktop virtual reality environments training may affect State Anxiety and vocational identity self-reported scores of a small sample ($N = 8$) of State Rehabilitation Services consumers during job placement/job readiness activities.

Research questions 1 and 2 addressed differences between MPGS for state anxiety and vocational identity between VR treatment and control participant groups. Descriptive data and independent sample *t*-tests indicated that there was a substantial and statistically significant difference between the treatment and control groups on state anxiety pretest/posttest MPGS, in favor of the VR treatment group. There was only a modest and statistically non-significant difference in vocational identify, in favor of the VR treatment group. Thus the null hypothesis was rejected for research question 1 but

was retained for research question 2. Jobsite preparation via VR environment training effectively lowered state anxiety for the study participants but had little effect on vocational identity.

Research question 3 revealed through Pearson correlation analysis that there was neither statistical nor practical relationship between state anxiety and vocational identity. The null hypothesis was retained for this research question. These two variables appeared to be largely unrelated, and are perhaps independent of each other.

Research question 4 explored the perceptions of treatment group participants (n = 4) regarding their personalized DVRET jobsite scene. Question 4 was addressed during exit interviews with a seven-item questionnaire. The comments from the four participants that experienced the desktop virtual reality environment treatment provided insight into their perceptions regarding aspects of job readiness the DVRET provided them. A strongly perceived consensus from treatment group participants indicated they believed that VR technology and a personalized DVRET was beneficial in helping them prepare for their work experience.

CHAPTER V

CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS

Introduction and Context of the Study

The Bureau of Labor Statistics reported persons with disabilities have nearly double the unemployment rate (i.e., 16.1% compared to 8.5%) of the non-disabled (Bureau of Labor Statistics, 2012). Persons with disabilities have been advocating for fair and equal rights regarding access to employment since before the birth of the American Disabilities Act of 1973. Although strong advocacy for equal access to employment for persons with disabilities has been a core initiative among agencies and organizations that champion issues disproportionally affecting them, the gap has not subsided (Daston, Riehle, & Ruthowski, 2012). The federal government is the largest employer in the United States and in 2011, to further support improving employment opportunities for individuals with disabilities, President Barack Obama signed an executive order establishing a priority on heightening the employment rate of persons with disabilities. Subsequently, the fact remains that while efforts may prove helpful, individuals with disabilities can still benefit from new innovative technologies to assist them with participation in the workforce. One new technology that may prove useful is desktop virtual reality.

A body of research has supported virtual reality treatments as a positive tool in instructional design (Ausburn & Ausburn, 2008; Dehere, 2011; Dunne & McDonald, 2010; Kroutter, 2010). Desktop VR has been

demonstrated in the research literature to be beneficial for a variety of purposes in a variety of contexts and applications. However, a review of previous literature revealed that no research could be located that had addressed desktop virtual reality environment training as a tool to mediate state anxiety and vocational identity in efforts to increase overall vocational and employment success rates of persons with disabilities.

The research reported here addressed the lack of available data on the effects of the promising and versatile technology of desktop VR in the context of job-readiness training for persons with disabilities. Specifically, this research examined the extent to which desktop virtual environment training affected state anxiety levels (S-Anxiety) and vocational identity (VI) levels among persons with disabilities during job placement/job readiness activities.

Summary of the Study

Theoretical and Conceptual Framework

The underpinning theoretical support for this research was drawn from Edgar Dale's classic instructional design theory and model know as the Cone of Experience (Dale, 1946, 1969). The working and tested hypotheses of this study were formulated through a framework anchored in the basic proposition of Dale's Cone that *more concrete* learning experiences can aid learners. This supported the idea that two dependent variables that are important in job readiness and successful employment, i.e., state anxiety and vocational identity, could be altered through desktop virtual reality environment training that *realistically simulated on-job locations*. Thus, presence or absence of researcher-developed, individualized desktop VR simulations of assigned

worksites for participants served as this study's independent variable. The conceptual framework for the study is shown below in Figure 13, as it was presented in Chapter 1.

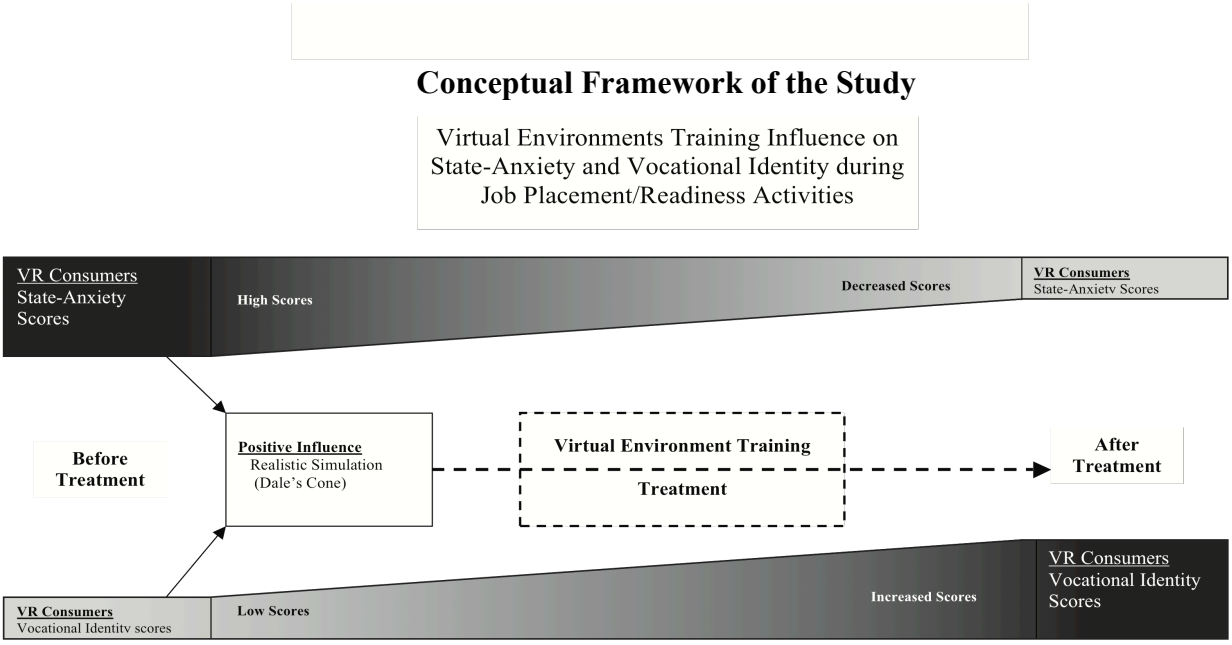


Figure 13: Conceptual Framework for this Study

Research and Design, Sampling, and Instrumentation

The study used a mixed-methods design that incorporated both quantitative and qualitative elements. The quantitative research model was based on exploratory, small-scale, quasi-experimental, pretest-posttest research design. Subjects were randomly assigned to either a treatment or control group. The specific quasi-experimental design in this study was referred to as the *nonequivalent control group design* by Campbell and Stanley (1966). In addition, the study included the qualitative elements of "profiles" to describe backgrounds of participants and to describe the perceptions of the treatment

group regarding the benefits of the desktop virtual reality environment worksite scenes they received.

The researcher used a small purposive sample ($N = 8$) comprised of individuals who were vocational rehabilitation services consumers at the time of the study within the Oklahoma Department of Rehabilitation Services (ODRS)-sponsored job placement/job readiness program. The participants represented both genders, and all had some type of disability. They were randomly assigned to either treatment group ($n = 4$) or control group ($n = 4$).

Instrumentation

The constructs of state anxiety and vocational identity were measured using the State-Trait Anxiety Inventory (STAI) (Spielberger, et al. 1983) and the Vocational Identity Subscale of the My Vocational Situation (MVS) (Holland, Daiger, & Power, 1980a). Both instruments carry established validity and reliability. For pretest/posttest statistical analysis of data from both instruments, Modified Percent Gain Scores (MPGS) were calculated and used.

Research Purpose, Questions, and Hypotheses

The purpose of this study was to determine through quasi-experimentation and qualitative questioning how desktop virtual environments training affected state anxiety and vocational identity self-reported scores of a small sample of rehabilitation services consumers during job placement/job readiness activities. Following are research questions and statistical hypotheses of the study:

Research Question 1 and Associated Hypotheses

Is there a significant difference between Modified Percent Gain Scores (MPGS), based on pretest/posttest scores for state anxiety between participants who do or do not experience desktop virtual environment treatment?

H_{01}: There is no significant difference between MPGS, based on pretest/posttest scores for state anxiety between participants who do or do not experience desktop virtual environment treatment.

H_{A1}: There is a significant difference between MPGS, based on pretest/posttest scores for state anxiety between participants who do or do not experience desktop virtual environment treatment.

Research Question 2 and Associated Hypotheses

Is there a significant difference between MPGS, based on pretest/posttest scores for vocational identity between participants who do or do not experience desktop virtual environment treatment?

H_{02}: There is no significant difference between MPGS, based on pretest/posttest scores for vocational identity between participants who do or do not experience desktop virtual environment treatment.

H_{A2}: There is a significant difference between MPGS, based on pretest/posttest scores for vocational identity between participants who do or do not experience desktop virtual environment treatment.

Research Question 3 and Associated Hypotheses

Is there a significant relationship between state anxiety and vocational identity scores of participants during job placement activities?

H_{03}: There is no significant relationship between state anxiety and vocational identity scores of participants during job placement activities.

H_{A3}: There is a significant relationship between state anxiety and vocational identity scores of participants during job placement activities.

Research Question 4

What perceptions do participants have about desktop virtual reality as a job placement/job readiness tool?

Summary of Findings

In this study, research questions 1, 2, and 3 and the associated hypotheses were tested quantitatively. One null hypothesis was rejected, and therefore, the alternate hypothesis was accepted. Two null hypotheses were retained. Research question 4 was addressed qualitatively through exit comments of the treatment group.

Finding 1 (Research Question 1)

Descriptive data and an independent sample *t*-test indicated that there was a large and statistically significant difference between the pretest and posttest MPGS of the treatment and control groups. The VR treatment presented better posttest performance in the form of lower state anxiety scores. Therefore, the null hypothesis was rejected and the alternate was accepted for this research question.

Finding 2 (Research Question 2)

Descriptive data and an independent sample *t*-test indicated only a small difference that was neither statistically significant nor practically important between the pretest and posttest MPGS of the treatment and control groups. The VR treatment

presented similar posttest performance in the form of higher vocational identity scores. Therefore, the null hypothesis was retained for this research question.

Finding 3 (Research Question 3)

Correlational analysis presented no evidence that state anxiety and vocational identity were related. Therefore, the null hypothesis was retained for this research question.

Finding 4 (Research Question 4)

Qualitative analysis of the post-treatment comments of the experimental group regarding their individualized jobsite desktop VR environment indicated that they unanimously found pre-employment VR exploration was beneficial. Self-reported usage of their individualized VR indicated that they voluntarily studied their workplace environment for several days and for considerable time each day.

Conclusions

The conclusions are relevant (a) to practice in job-readiness training for people with disabilities, (b) for understanding the variables that may affect the quality and outcomes of job-readiness training, (c) for the efficacy of desktop VR as a tool for vocational counseling, and (d) for the continued relevance of the classical instructional design theory known as Dale's Cone of Experience.

Conclusion 1: *Desktop virtual reality environment training (DVTE) may reduce state anxiety in people with disabilities.*

The research results indicated the MPGS regarding state anxiety were affected substantially and positively (anxiety levels decreased) when DVRET training was

experienced by participants. Maintaining a low level of anxiety during job placement/job readiness activities can be a determining factor between successful closure (status 26) and being turned away by an employer. Ayers, Kereetaweep, Chen, and Edwards (1998) indicated people that have high levels of anxiety (anxiousness) are less likely to be hired in both simulated and real situations. Until the present study, little was known about how DVRET might affect levels of state anxiety in people with disabilities. It can be concluded from this study that desktop VR technology may be quite effective in addressing pre-employment anxiety.

The MPGS mean scores for the treatment group (n = 4; M = 65.00; SD 11.860) on the state anxiety inventory were substantially higher than the control group (n = 4; M = 26.50; SD 19.706). The difference was statistically significant at the p = .01 level. These data support a conclusion that experiencing DVRETs of individuals' actual jobsites allowed them to gain an increased level of familiarity and to diminish their feelings of anxiety about going into strange places. The magnitude of the MPGS gap between the treatment group and control group also suggested a heightened level of comfort developed among them.

Conclusion 2: *Desktop virtual reality environment training (DVTE) may have little effect on raising vocational identity in people with disabilities.*

The MPGS mean scores for the treatment group (n = 4; M = 57.11; SD 18.743) on the vocational identity scale were not significantly different from the control group (n = 4; M = 49.83; SD 8.580). Although the direction of the MPGS for vocational identity was positive, it was not enough to yield statistical significance or practical importance. These data support a conclusion that experiencing DVRET of an individual's actual

jobsite may not necessarily confer a more clear and stable understanding of career goals, interest, or skills that make up vocational identity. The researcher can reasonably hypothesize that vocational identity may by complex and may have multiple intrinsic elements that need more time to develop with the participant than could be explored in this study.

Conclusion 3: *The variables of state anxiety and vocational identity may be independent of each other.*

A relationship between state anxiety and vocational identity MPGS did not present itself during this study. No research literature surfaced during literature review for this study that examined the relationship between state anxiety and vocational identity among persons with disabilities. Analysis addressing this variable relationship was conducted inferentially on an exploratory basis with a two-tailed Person's *r* correlation. The correlation value between state anxiety and vocational identity of participants was not statistically significant ($r = .199$; $p = .626$; $df = 6$) and identified only a very small amount (4%) of common variance. This suggests that job-related state anxiety and vocational identity may be independent of one another. The researcher hypothesizes that vocational identity is a complex construct and that individuals with disabilities may benefit from more individualized program curriculum regarding their knowledge about careers and their career interests and that this may be a more effective approach than VR environment training to raising vocational identity.

Conclusion 4: *Perceptions of DVRET are positive for individuals with disabilities, and this technology may be a beneficial tool for vocational rehabilitation*.

Overwhelmingly, participants within the treatment group in this study suggested the DVRET was a very helpful tool to assist them in understanding and gaining familiarity of their newly assigned jobsite. This finding supports a conclusion that desktop VR has potential as a tool for professionals in vocational rehabilitation to assist their clients prepare for workplace environments and employment. This is an important contribution to the research on VR technology because its efficacy has not been previously explored in this context. Therefore, this study makes a valuable contribution to the research base for desktop VR technology.

Conclusion 5: *Dale's Cone of Experience continues to be a relevant theoretical foundation for instructional design and can support new technologies such as VR.*

This study relied on Dale's Cone for theoretical support of its conceptual framework and its contention that more concrete forms of media can benefit learners. The photo-real desktop VR treatment used in the study is arguably the most concrete technology currently available for general instructional use. The findings of its efficacy in reducing job-related state anxiety and its favorable assessment by the individuals who experienced it support a conclusion that Dale's Cone and its concept of media concreteness can move effectively into new technologies and new contexts. Some researchers avoid "old theories," but this study suggests that the classics can still be effectively applied regardless of changing technology and a widening variety of learning contexts and purposes.

Conclusion 6: *The conceptual framework proposed for this study was only partially supported.*

The proposed conceptual framework led to working hypotheses that (a) pre-employment experience with desktop VR work environment modeling would lead to lowered state anxiety in people with disabilities, (b) it would also lead to raised vocational identity, and (c) state anxiety and vocational identity would be related. However, findings of the study support only hypothesis (a). This leads to a conclusion that the conceptual model proposed by this researcher is not entirely accurate and should be refined through further study.

Implications of the Study

The overarching practical implication of the findings of this study is that desktop virtual reality technology has real promise in the vocational rehabilitation field and may be critical for practicing vocational rehabilitation counselors, job placement specialists, and rehabilitation practitioners alike. The study implies that VR has the potential to be beneficial for the servicing agency or organization also. Return on investment (ROI) plays a very important part in public and private vocational rehabilitation. Among the most expensive aspect of any given business is training cost. DVRET may be a cost-efficient alternative or supplemental tool to service curriculum for persons with disabilities participating in job placement/job readiness programs. Ishii and Yaeda (2010) suggested that creative job placement should be added to the current training curriculum for VR counselors. It is the researchers view that desktop virtual reality environment training (DVRET) fits into that notion. The practical application of DVRET within the service component of vocational rehabilitation services may lead into a new phenomenon that assists vocational rehabilitation consumers in increasing employment success rates.

Recommendations and Final Thoughts

Additional research is needed to examine how DVRET affects state anxiety and vocational identity of persons with disabilities during job placement/job readiness activities. As mentioned before, this is the first-known study prescribing DVRET treatment as a conduit to decrease state anxiety and increase vocational identity. It would be beneficial for the present study to be replicated within another state vocational rehabilitation agency. This would continue the inquiry into the employment disparity among individuals with disabilities and their non-disabled counterparts. State Rehabilitation Services agencies across the country are all experiencing budget short falls and spending accountability. Potential consumers are placed on long waiting lists because priority groups are closed due to the aforementioned budget downturns.

Although past investigations (Ausburn, Martens, Washington, Steele, & Washburn, 2009; Kroutter, 2010) have shown that age and gender alone have no insurmountable negative effects in VR environments, it appears to be a seamless partnership to incorporate DVRET into the transition programs. Usually transition consumers are between the ages of 16 and 24. This age group may have a smoother introduction in the DVRET itself. In this researcher's professional experience, State Rehabilitation Services agencies most likely already have some or all of the software and hardware needed to begin using DVRET as a training tool. New innovative technologies that are relatively inexpensive and cost effective such as desktop virtual reality can make a substantial difference in service delivery to consumers like young Emanuel who was introduced in Chapter 1. With the availability of DVRET, Emanuel's chances of participating in the workforce may increase significantly. Results of this study suggest

that Emanuel's employment state anxiety could substantially decrease after DVRET experience and his vocational identity might even increase slightly.

This study opens the door and sets the stage for a full research agenda on the use of desktop virtual reality technology to improve the employability and employment rates for people with disabilities. On both economic and humanitarian principles, if the emerging VR technology can contribute to the successful employment for people who are often overlooked by society, then that technology deserves extensive and urgent investigation in the vocational rehabilitation field. This study offers a first step in that investigation.

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APPENDICES

APPENDIX A

Research Title:
Effects of Desktop Virtual Reality Environment on State Anxiety and Vocational Identity Scores Among Persons with Disabilities During Job Placement/Job Readiness Activities

Protocol Script

Hello _____(consumers name here)_____, there is a research study that is currently looking for Department of Rehabilitation Services consumers to participate in. The research study is aimed to address finding ways to help individuals with disabilities successfully get jobs. My Name is Andre Washington, I'm a doctorial student at Oklahoma State University and is the lead investigator. I am a former employee of Oklahoma Department of Rehabilitation Services and I have a great interest in assisting individual with disabilities find and secure jobs that they want to do. If you agree to participate in this study, you will be ask to complete four (4) questionnaires and one (1) survey during the time span of the research which may last for four to six weeks. In addition, you may be ask to do some interactive computer based training of the job you want to do. Don't worry, you do not have to have a lot of experience with computers, you just need to know how to use a computer keyboard and mouse.

I will show you and demonstrate any additional things you need to know. It will take you about 10 minutes to complete each questionnaire and survey. Again, the total time span for this project could last six weeks. You participation is completely voluntary and if you agree to participate and need to or want to stop for any reason you may do so at any time. Does this seem like something you would be interested in? Would you agree to participate in this research study?

Effects of Desktop Virtual Reality Environment Training State Anxiety And Vocational Identity Scores Among Persons With Disabilities During Job Placement/Job Readiness Activities.

Participant Consent Form

This research project is being done by Andre Washington of Oklahoma State University to look into how using a computer program affects the way a person feels and how a person understands a job they want to do. The computer program will look just like the workspace people will be training or working in.

PARTICIPANTS RIGHTS
I understand that my participation is voluntary, and that there is no penalty for refusal to participate, and that I am free to withdraw my consent and participation in this project at any time, without penalty. There are no known risks in participating in this research beyond those encountered in daily life. This research is being done to add more information to the existing research that has already been done.

If you agree to participate, you are agreeing to do the following:

- To complete a ten-question personal information questionnaire.
- To complete three (3) questionnaires that asks questions about your anxiety in regards to finding a job, level of preparedness of finding a job and satisfaction level during job placement/readiness activities.
- To complete an open-end questionnaire after the research is completed during a interview with the researcher.
- You know how to use a computer with a mouse
- Each questionnaire will take about 10 minutes of your time.

CONFIDENTIALITY
The records of this study will be kept private. Any written results will discuss group findings and will not include information that will identify you. Research records will be stored securely and only researchers and individuals responsible for research oversight will have access to the records. It is possible that the consent process and data collection will be observed by research oversight staff responsible for safeguarding the rights and wellbeing of people who participate in research. No specific reference to your name or personal identity will be made at any time. Completed questionnaires will be kept under locked security by lead researcher for up to two years for analysis and preparation of professional literature. After two years, all questionnaires will be destroyed.

CONTACTS
If you have questions or concerns, you may contact the lead researcher, André Washington, by phone at (405) 530-7525 or by email at alwashington@lunet.edu

If you have questions about the research, you may contact Lynna Ausburn, Dissertation Chair, Oklahoma State University, 257 Willard Hall Stillwater, Oklahoma 74048, (405-744-8322), or via email at lynna.ausburn@okstate.edu. If you have any questions about your rights as a research volunteer, you may contact Shelia Kennison, IRB Chair, 219 Cordell North, Stillwater, Oklahoma 74048 (405-744-3377), or via email at irb@okstate.edu.

CONSENT DOCUMENTATION:
I have been fully informed about the procedures listed here. I am aware of what I will be asked to do and of the benefits of my participation. I also understand the following statements:

I affirm that I am 18 years of age or older.

I have read and fully understand this consent form. I sign it freely and voluntarily. A copy of this form will be given to me. I hereby give permission for my participation in this study.

_____ _____

Signature of Participant Date

I certify that I have personally explained this document before requesting that the participant sign it.

_____ _____

Signature of Researcher Date

SELF-EVALUATION QUESTIONNAIRE
STAI Form Y-1

Please provide the following information:

Name_____Date_____S_____

Age_____ Gender (*Circle*) **M F** T_____

DIRECTIONS:

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel *right* now, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	1	2	3	4
2. I feel secure	1	2	3	4
3. I am tense	1	2	3	4
4. I feel strained	1	2	3	4
5. I feel at ease	1	2	3	4
6. I feel upset	1	2	3	4
7. I am presently worrying over possible misfortunes	1	2	3	4
8. I feel satisfied	1	2	3	4
9. I feel frightened	1	2	3	4
10. I feel comfortable	1	2	3	4
11. I feel self-confident	1	2	3	4
12. I feel nervous	1	2	3	4
13. I am jittery	1	2	3	4
14. I feel indecisive	1	2	3	4
15. I am relaxed	1	2	3	4
16. I feel content	1	2	3	4
17. I am worried	1	2	3	4
18. I feel confused	1	2	3	4
19. I feel steady	1	2	3	4
20. I feel pleasant	1	2	3	4

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APPENDIX D

my vocational situation

Name _____ Date _____ M__ F__ Age ____

Education completed _____ Other_____

List all the occupations you are considering right now.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Try to answer all the following statements as mostly TRUE or mostly FALSE. Circle the answer that *best represents your present opinion.*

In thinking about your present job or in planning for an occupation or career:

1. I need reassurance that I have made the right choice of occupation. T F
2. I am concerned that my present interests may change over the years. T F
3. I am uncertain about the occupations I could perform well. T F
4. I don't know what my major strengths and weaknesses are. T F
5. The jobs I *can do* may not pay enough to live the kind of life I want. T F
6. If I had to make an occupational choice right now, I am afraid I would make a bad choice. T F
7. I need to find out what kind of career I should follow. T F
8. Making up my mind about a career has been a long and difficult problem for me. T F
9. I am confused about the whole problem of deciding on a career. T F
10. I am not sure that my present occupational choice or job is right for me. T F
11. I don't know enough about what workers do in various occupations. T F
12. No single occupation appeals strongly to me. T F
13. I am uncertain about which occupation I would enjoy. T F
14. I would like to increase the number of occupations I could consider. T F
15. My estimates of my abilities and talents vary a lot from year to year. T F
16. I am not sure of myself in many areas of life. T F
17. I have known what occupation I want to follow for less than one year. T F
18. I can't understand how some people can be so set about what they want to do. T F

(over)

Research Title:
Effects of Desktop Virtual Reality Environment Training on State Anxiety And Vocational Identity Scores Among Persons With Disabilities During Job Placement/Job Readiness Activities

PI: Mr. Andre Washington, Oklahoma State University

Demographic Questionnaire

Office Use Only
Participant Code # _____

Date participant started receiving services from Department of Rehabilitation Services _____

DRS Case Status _____

1. Gender *(please circle which apply):* Male Female

2. Age: _____

3. Race/Ethnicity: _____

4. Employment Status *(please circle which apply):* Currently working Unemployed

5. Primary Disability Category/Type of Disability *(please check one):*

_____Visual Impairment/Blindness _____Mental Illness _____Physical Disability
_____Deaf or Hard of Hearing _____Learning Disability

6. Description of Disability: _____

7. What age where you when your disability came about *(please circle only one group):*

Birth -18 19-30 31-55 56 or older

8. What is your current level of education *(please circle only one):*

(a) 5th grade to 11th grade (b) 12th Grade/GED (c) Some College

(d)Associate Degree (e) Bachelors Degree (f) Master Degree (g) Doctorate Degree

9. Last time employed full or part-time? *(please circle only one)*

Within the last 30 days Within 3 months Within 12 months More than 1 year

10. Length of time employed at last job? *(please circle one)*

Less than 30 days 1 – 3 months 4-6 months 7-9 months 10-12 months More than 1 year

Research Title:
Effects of Desktop Virtual Environment on State-Anxiety and Vocational Identity Scores Among Persons with Disabilities During Job Placement/Readiness Activities

PI: Andre L. Washington, Oklahoma State University

Post Treatment Questionnaire for Treatment Group

1. How many times did you watch or view the DVD with the virtual environment scene on it?
2. How much time (in hours) would you say you played with the virtual reality environment?
3. Where did you watch or view your virtual reality environment scene (e.g. DRS office/training office, Library, etc…)
4. What was your experience in learning how to navigate (move around) within the virtual reality environment scene?
5. What would you say was the most attractive aspect of the virtual environment scene?
6. What would you say was the least attractive aspect of the virtual environment scene?
7. Did the virtual environment scene help prepare you for employment?
   If yes, how would you say this virtual environment help you prepare for employment?

State-Trait Anxiety Inventory for Adults Scoring Key (Form Y-1, Y-2)

Developed by Charles D. Spielberger in collaboration with R.L. Gorsuch, R. Lushene, P.R. Vagg, and G.A. Jacobs

To use this stencil, fold this sheet in half and line up with the appropriate test side, either Form Y-1 or Form Y-2. Simply total the scoring **weights** shown on the stencil for each response category. For example, for question # 1, if the respondent marked 3, then the **weight** would be **2**. Refer to the manual for appropriate normative data.

Form Y-1	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1.	4	3	2	1
2.	4	3	2	1
3.	1	2	3	4
4.	1	2	3	4
5.	4	3	2	1
6.	1	2	3	4
7.	1	2	3	4
8.	4	3	2	1
9.	1	2	3	4
10.	4	3	2	1
11.	4	3	2	1
12.	1	2	3	4
13.	1	2	3	4
14.	1	2	3	4
15.	4	3	2	1
16.	4	3	2	1
17.	1	2	3	4
18.	1	2	3	4
19.	4	3	2	1
20.	4	3	2	1

Form Y-2	ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS
21.	4	3	2	1
22.	1	2	3	4
23.	4	3	2	1
24.	1	2	3	4
25.	1	2	3	4
26.	4	3	2	1
27.	4	3	2	1
28.	1	2	3	4
29.	1	2	3	4
30.	4	3	2	1
31.	1	2	3	4
32.	1	2	3	4
33.	4	3	2	1
34.	4	3	2	1
35.	1	2	3	4
36.	4	3	2	1
37.	1	2	3	4
38.	1	2	3	4
39.	4	3	2	1
40.	1	2	3	4

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Oklahoma State University Institutional Review Board

Date:	Friday, March 09, 2012
IRB Application No	ED1246
Proposal Title:	Effects of Desktop Virtual Environment Training on State Anxiety and Vocational Identity Scores Among Persons with Disabilities During Job Placement/Readiness Activities
Reviewed and Processed as:	Expedited

Status Recommended by Reviewer(s): Approved Protocol Expires: 3/8/2013

Principal Investigator(s):

Andre L. Washington
222 NE 14th St.
Okla. City, OK 73104

Lynna Ausburn
257 Willard
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,

Shelia H. Kennison

Shelia Kennison, Chair
Institutional Review Board

Oklahoma Department of Rehabilitation Services
www.okdrs.gov

Director
Michael O'Brien
Commissioners
Ray Kirk
Steve Shelton
Lynda Collins

November 26, 2012

Tenure and Promotion Committee
Langston University
Langston, Oklahoma

RE: Andre L. Washington, M.S., CRC
Instructor/ Clinical Experience Coordinator
Langston University Dept. of Rehabilitation and Disability Studies

To Whom It May Concern:

I have known Mr. Washington since 1999. I was one of his original instructors at Langston and he also worked in my agency as a Carl Albert Intern. He has worked closely with my agency over the years supervising interns as part of their experience at Langston and their clinical experience with the Oklahoma Department of Rehabilitation Services.

It is my understanding Mr. Washington will defend his dissertation in the very near future and that he has asked to be considered for promotion to the rank of Assistant Professor. He has been a dedicated instructor for Langston and a true rehabilitation professional. I have known him as student, employee, and university instructor. I strongly support his promotion to Assistant Professor. I believe he will represent Langston University in a positive manner and that he will make a difference for students. Please do not hesitate to contact me if you have any questions. I can be reached at 405-951-3400 or mobrien@okdrs.gov.

Respectfully,

Michael O'Brien, Ed.D., CRC, CVE
Executive Director
Oklahoma Department of Rehabilitation Services

Lorrie L. Jacobs
Vice President - Compensation and Benefits

September 18, 2012

To: Oklahoma State University Institutional Review Board
Subject: Approval to complete study at Chesapeake

I have reviewed the dissertation proposal from Andre L. Washington, who is a doctoral student at Oklahoma State University. Chesapeake Energy Corporation agrees that he can complete the study on our campus. Two stipulations exist, clients must have full choice to enter or not enter into the project, and their confidentiality must be protected.

Should you have any questions, please feel free to contact me at 405-935-9421.

Sincerely,

Lorrie L. Jacobs

Chesapeake Energy Corporation
P.O. Box 18128 • Oklahoma City, OK 73154-0128 • 6100 N. Western Avenue • Oklahoma City, OK 73118
405.879.9421 • fax 405.767.4180 • lorrie.jacobs@chk.com

APPENDIX K

Research Title:

Effects of Desktop Virtual Reality Environment Training on State Anxiety and Vocational Identity Scores Among Persons With Disabilities During Job Placement/Job Readiness Activities

PI: Mr. Andre Washington, Oklahoma State University

Satisfaction Survey

Please circle the number response below that most accurately describes your experience with Oklahoma DRS:
Strongly Disagree = 1 Disagree = 2 Agree = 3 Strongly Agree = 4

1) During my involvement in job placement/job readiness activities with DRS, I received enough information from my employment specialist to be able to decide what I need to go to work.	1	2	3	4
2) I chose the job goal on my plan	1	2	3	4
3) My employment specialist explained what job placement/job readiness services were available so I could choose what necessary to reach my goal.	1	2	3	4
4) If DRS could not provide the services I needed, I was given information about other programs that could help me.	1	2	3	4
5) When I needed services from someone other than my employment specialist, I was able to choose the services provider.	1	2	3	4
6) My employment specialist was responsive to my by:				
Returning my phone calls	1	2	3	4
Listening to me	1	2	3	4
Answering my questions	1	2	3	4
Understanding the problems that I faced	1	2	3	4

*Satisfaction Survey modified from Moore Consulting Needs Assessment for DRS

Dealing with my complaints or concerns about services	1	2	3	4
If my concern was not resolved with Oklahoma DRS, I was provided information on the Client Assistance Program (CAP)	1	2	3	4
7) When I worked with DRS staff other than my employment specialist, they were helpful.	1	2	3	4
8) My plan for employment was developed quickly.	1	2	3	4
9) I am employed (if "No" go to question 14).	YES		NO	
10) My pay is enough for my basic needs.	1	2	3	4
11) I am satisfied with my benefits (medical, dental, vacation, etc…).	1	2	3	4
12) I am satisfied with my job.	1	2	3	4
13) My job uses the skills and abilities that are important to me.	1	2	3	4
14) Please list any additional comments you have about your participation in your job placement/job readiness activities or DRS services overall.	1	2	3	4

VITA

Andre Lamont Washington

Candidate for the Degree of

Doctor of Philosophy

Dissertation: EFFECTS OF DESKTOP VIRTUAL REALITY ENVIRONMENT TRAINING ON STATE ANXIETY AND VOCATIONAL IDENTITY SCORES AMONG PERSONS WITH DISABILITIES DURING JOB PLACEMENT/JOB READINESS ACTIVITIES

Major Field: Education (Occupational Studies)

Biographical:

Education: Completed the requirements for the Doctor of Philosophy in Education (Occupational Education) at Oklahoma State University, Stillwater, Oklahoma in May 2013.

Completed the requirements for the Masters of Science in Rehabilitation Counseling at Langston University, Langston, Oklahoma in May 2003.

Completed the requirements for the Bachelor of Science in Recreational Management at University of Central Oklahoma, Edmond, Oklahoma in August 2001.

Experience: Langston University, 2007 – present
Urban League of Greater Oklahoma City, 2004-2007
Department of Rehabilitation Services, 2001-2003
Capital Chamber of Commerce – Board Member, 2009 - present

Professional Memberships:
National Rehabilitation Association (NRA) 2002 – present
National Association of Multicultural Rehabilitation Concerns, 2002 – present
Oklahoma Rehabilitation Association (ORA) 2002 – present
Oklahoma Association of Multicultural Rehabilitation Concerns, 2002 - present