Diffusion of Virtual Reality (VR) and Artificial Intelligence (AI) Innovations in Career Centers: Perceptions of Acceptability, Appropriateness, and Expected Feasibility of Implementation

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In loving memory of Dr. Bobbie B. Ticknor…

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Abstract

This dissertation explores career center leaders' perceptions of integrating virtual reality (VR) and artificial intelligence (AI) technologies for job and internship interview training. Grounded in Rogers' (2003) Diffusion of Innovations theory, the study examines how higher education institutions can adopt these innovations to address challenges of providing scalable, "high-touch" experiences at scale in career services. The study uses quantitative and qualitative analyses to investigate the acceptability, appropriateness, and expected feasibility of VR and AI implementation in career centers.

The research team collected data from nine career center leaders representing diverse higher education institutions. The analysis examines the influence of institutional characteristics, such as public versus private institutions and centralized versus decentralized career center models, on perceptions of technology adoption through univariate, bivariate, and multivariate analyses. Although the small sample size limits statistical significance, the findings provide valuable qualitative insights into the nuanced perceptions of career center leaders.

The results show that career center leaders generally perceive VR and AI as acceptable and appropriate for enhancing interview skills through immersive training simulations. However, participants expressed concerns about feasibility, including resource constraints and staff training needs, which present barriers to adoption. The study identifies strategies such as public-private partnerships and pilot programs as potential solutions. These findings, aligned with trends in public administration emphasizing innovation in service delivery, highlight the importance of transferability over generalizability. The implications extend beyond higher education, suggesting that VR and AI could enhance workforce development programs and contribute to economic development by preparing students for modern job market demands.

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Chapter 1:

Introduction

Declining enrollment in higher education institutions poses significant challenges for career centers. With fewer students, colleges and universities experience reduced revenue, which affects the allocation of resources to student support services such as career centers. These units, responsible for career development and building student social capital, now face increasing pressure to adapt their strategies and maximize impact despite constrained budgets and limited personnel.

As prospective students increasingly question the return on investment of higher education, career centers must innovate to meet evolving expectations. Students seek career development resources that support advancement through promotions within their current organizations or transitions into new industries. Career centers must balance rising service demand with shrinking budgets and limited staff. Traditional in-person mock interviews, while effective, are resource-intensive and difficult to scale. The need for more immersive and scalable solutions has prompted some career centers to explore technologies like virtual reality (VR) and artificial intelligence (AI) to offer efficient, impactful interview training.

VR and AI deliver scalable and immersive training experiences that align with key career readiness competencies defined by the National Association of Colleges and Employers (NACE). These competencies—technology fluency, career and self-development, critical thinking, and communication—are essential in preparing students for the workforce. Tools like Meta Quest and

VirtualSpeech© create realistic simulations and provide real-time feedback on interview performance, supporting continuous improvement and stronger career outcomes.

Implementing any technology presents challenges and requires thoughtful navigation of the innovation-decision process, as Rogers (2003) outlined. The process begins with gaining knowledge, followed by persuasion and decision-making, leading to implementation and confirmation. Data-driven strategies are vital for assessing the impact of VR and AI technologies. For example, devices like the Meta Quest 2 head-mounted display (HMD) and VirtualSpeech© software generate feedback by analyzing and recording eye contact, filler words, and speaking pace. Additionally, the AI enables users to practice interviews tailored to specific companies, industries, or general interview formats and provides feedback on response relevance and storytelling quality.

The present study explores how career center leaders perceive the value of VR and AI technologies by examining their impressions of the insights and feedback these tools produce. Guided by Rogers's (2003) innovation-decision process, participants are introduced to VR AND AI innovations to support persuasion and evaluation. The findings aim to inform stakeholders and decision-makers about how these tools might address organizational needs and enhance understanding of technology-driven solutions in higher education, particularly within career centers.

This chapter outlines the employment landscape and the importance of interview training and related skills. It reviews how career centers help students prepare for the workforce, with interview readiness as a critical factor in securing jobs and internships. The discussion also considers current methods of interview training and highlights the need for scalable solutions like VR and AI. Finally, the research questions and hypotheses are presented.

The State of Employment

The employment landscape has shifted significantly since the COVID-19 pandemic. Although employment rates have risen from 51.3% in 2020 to 60% by June 2024 (U.S. Bureau of Labor Statistics, 2024), specific industries, especially tech, have experienced waves of layoffs and organizational restructuring. In this changing job market, job seekers must demonstrate strong interview skills to secure roles, reinforcing the relevance of career centers that provide adequate interview preparation. At the same time, new opportunities are appearing in other sectors, with major business hubs like Chicago and New York City reporting growth in technical job postings (CompTIA, 2024), offering fresh paths for career development and advancement.

These layoffs also illustrate the importance of staying responsive to shifting market conditions. Companies like Dell, Intel, and Tesla have laid off thousands of employees (Varanasi et al., 2024). Mark Zuckerberg of Meta (2022) and Marc Benioff of Salesforce (2023) oversaw significant staff reductions after misjudging demand and consumer behavior. Their hiring decisions were based on pre-pandemic trends from 2015 to 2019, a period of rapid tech-sector expansion fueled by advances in AI, cloud computing, and cybersecurity (Buchwald & Zarracina, 2023). During this boom, the tech industry added 1.3 million jobs, reaching a historic peak (CompTIA, 2023).

The pandemic accelerated economic shifts, creating a temporary spike in demand for tech products like gaming systems and computers. This increase was fueled by stimulus checks, remote work, and a growing dependence on home entertainment and virtual learning environments (Mulay et al., 2021). Even with rising demand, companies faced ongoing supply chain disruptions and labor shortages (Van Dam & Siegel, 2022). As a result, many tech firms hired beyond their actual need, creating a gap between workforce size and sustained market demand (Gooding, 2021). These trends have prompted renewed discussions about a potential recession and reinforce the need for job seekers to sharpen their interview skills to remain competitive in a tightening labor market (Lucero et al., 2021; Mbah et al., 2023).

Need for Interview Skills

As individuals move from college into their careers, developing strong interview skills remains essential for securing employment and internship opportunities (Wendlandt & Rochlen, 2008). Research by Vespia, Freis, and Arrowood (2018) found that 39% of students lack confidence in their interview abilities, even though confidence is a key factor in converting interviews into job offers, as shown by Littman-Ovadia, Lazar-Butbul, and Benjamin (2014). Strong preparation can leave a lasting impression on recruiters, increase self-assurance, and reduce interview-related anxiety (Petruzziello et al., 2021; Schneider et al., 2019). The U.S. Department of Education (2017) identifies interview skills as a core component of work readiness, directly impacting hiring outcomes for candidates.

Career centers at colleges, universities, and community organizations are key in building work readiness, particularly through interview training (Dey & Cruzvergara, 2014). Symonds and O'Sullivan (2017) found that individuals motivated to build work readiness experience better employment outcomes. However, with rising demand for job support (U.S. Bureau of Labor Statistics, 2022), career centers are under pressure to serve more students and clients. As career professionals respond to this growing need, it becomes increasingly important to adopt scalable models that enhance both student success and institutional effectiveness (Kozhuk, 2023).

Employment contributes to quality of life, mental health, and a sense of belonging while offering critical financial stability (Ivanov et al., 2020). Because interview performance often influences hiring decisions, targeted preparation can increase a candidate’s likelihood of success

(Joshi et al., 2020). Even though strong interview skills are consistently linked to better employment outcomes (Hirsch, 2017; Lent & Brown, 2013; Lord et al., 2019), many career centers still lack scalable tools to maximize resources and serve more students.

Today's evolving employment landscape—shaped in part by the post-pandemic recovery—makes it more important than ever for job seekers to stand out in a competitive market. While some industries continue to expand, others are experiencing layoffs, making interview preparation a critical differentiator. As employers adapt to shifting conditions, individuals entering the workforce must be prepared to meet these new expectations. Strong interview skills help bridge the gap between traditional career services and the modern demands of the job market.

Non-Scalable and Less-Immersive Interview Training

The importance of interview skills is widely recognized, yet the traditional methods used by career centers are due for modernization. In-person mock interviews provide personalized feedback, but they are limited by the availability of career coaches and the time required for each session. Career centers often struggle with scalability, as individual coaches can only conduct a handful of daily interviews, restricting how many students they can support. Although these mock interviews offer "real-world" experiences and personalized guidance (Gega, 2017), they remain time-consuming and labor-intensive (Dey & Cruzvergara, 2014).

Career coaches typically allocate 45 minutes per session, including the interview and follow-up feedback (National Association of Colleges and Employers, 2021). Given the constraints of a standard eight-hour workday, this significantly limits the number of students they can assist. These time pressures reinforce the need for scalable approaches that expand access to interview training.

A recent National Association of Colleges and Employers (NACE) publication emphasized the urgency of scaling career services to meet rising demand for accessible, high-impact interview preparation (Hawkins, Anderson, & Lierman, 2023). Smith et al. (2022b) introduced the concept of "scaling-out," which involves extending proven interventions to new populations or settings (p. 214). This strategy broadens access to critical skill-building opportunities. In response, many career centers have turned to technology platforms such as Big Interview, StandOut, Interviewing.io, and Pramp. These tools allow students to practice independently and receive feedback from AI, peers, or career coaches (Castrillon, 2024).

While these platforms offer scalability and save time, they often lack the immersive, realistic settings that support deeper learning. Although they replicate online interview formats like Zoom or Teams, they fail to deliver face-to-face preparation's engagement and interactivity. As career centers work to meet growing demand and reach larger student populations, scalable tools that provide both efficiency and immersive training are becoming increasingly essential.

Exploring Virtual Reality (VR) and Artificial Intelligence (AI) Innovations

Virtual reality (VR) and artificial intelligence (AI) tools offer immersive and scalable training solutions, such as VirtualSpeech© and the Meta Quest 2. VR enhances engagement by simulating realistic scenarios and providing users with interactive, controlled environments (Smith, 2022a; Ticknor & Tillinghast, 2011; Xiong et al., 2021). AI adds immense value by delivering personalized feedback and performance analytics, helping users target areas for improvement. These technologies positively influence job interview training by recreating diverse scenarios and settings (Hartholt et al., 2019; Meta, 2024; VirtualSpeech, 2024).

Integrating VR into career centers offers a promising way to provide immersive training while expanding access to more users (Krishnan et al., 2022). As career education adapts to the demands of a shifting workforce, innovative frameworks like career construction and life design continue to influence how institutions support student development. Buford (2022) emphasizes that incorporating life design principles can meaningfully shape students' career outlooks, helping them find purpose and direction in their professional journeys.

This perspective highlights the importance of scalable and immersive technologies like VR and AI in strengthening career readiness by offering applied, real-world practice. These modern tools enhance traditional support systems by reshaping how students explore career possibilities. While in-person methods remain resource-intensive, online platforms such as Big Interview, Interviewing.io, and Pramp prioritize scalability but offer less immersive learning environments (Castrillon, 2024; Gega, 2017; Metz & Business, 2020).

By contrast, VR delivers engaging and efficient training experiences. This approach enables career centers to enhance interview preparation while optimizing training delivery (Mulders et al., 2022). VR is more impactful when paired with AI, providing automated feedback on performance metrics such as eye contact, pacing, and response content. By tailoring experiences to specific industries, employers, job roles, and interview formats, VR and AI deliver high-touch, scalable training, making them powerful tools for advancing career development.

Previous Studies with Virtual Reality and Artificial Intelligence Interview Training

Research has shown that virtual reality (VR) can effectively improve job interview skills and reduce anxiety across various populations. For example, Vasquez et al. (2015) explored how virtual environments could enhance social skills among K–12 students with autism spectrum disorder (ASD), establishing a foundation for VR's use in interview training. Genova et al. (2021) conducted a pilot study using VR Job Interview Training (VR-JIT) with adolescents on the autism spectrum, finding notable skill gains, though anxiety levels remained unchanged.

Smith et al. (2021) focused on transition-age youth receiving special education services, underscoring the importance of job interview skills in achieving employment. Similarly, Adiani et al. (2022) developed a VR platform for autistic adults that offered real-time feedback during mock interviews, highlighting its potential to address interview-related anxiety.

In rehabilitative contexts, VR-JIT has also shown promising results. Smith et al. (2022c) found that it significantly improved employment outcomes for returning citizens. In another study, Smith et al. (2022a) reported enhanced interview performance and reduced anxiety among individuals with serious mental illnesses who used VR-JIT.

Other research has explored broader populations. Bell (2022) and Kong et al. (2023) documented confidence and interview readiness improvements among general job seekers following immersive VR training. Burke et al. (2020) emphasized the effectiveness of Virtual Interactive Training Agents (ViTA) in boosting self-efficacy and interview skills in young adults with ASD and intellectual disabilities.

Ustel et al. (2021) contributed further by collecting feedback from peer specialists on the acceptability and feasibility of VR-JIT, pointing to the need for thoughtful implementation planning. These studies demonstrate the broad potential of VR and artificial intelligence (AI) to improve interview preparation across diverse populations. They also reinforce the importance of continued research within college career centers, particularly to understand the factors that shape the successful adoption of these innovations.

Research Framework

Building on this need, the present study tackles the challenge of integrating innovative technologies—specifically virtual reality (VR) and artificial intelligence (AI)—into higher education career centers. These technologies have the potential to provide scalable and immersive interview training solutions. However, a significant gap exists in understanding how career center leaders perceive VR and AI technologies' acceptability, appropriateness, and expected feasibility. This gap poses a considerable barrier to implementing these innovations in public and private organizations, regardless of whether they employ centralized or decentralized career center models.

Following Rogers' (2003) diffusion of innovations theory, this research closely follows the innovation-decision process. This process begins with knowledge acquisition, progresses through persuasion and decision-making, and ultimately leads to implementation and confirmation of success. By evaluating the perceptions of career center leaders regarding VR and AI through this framework, this study provides valuable insights into the feasibility of adopting these technologies within higher education.

This research aims to explore and analyze how career center leaders view VR and AI as tools for training and preparing students for interviews. Specifically, it examines how these leaders evaluate VR and AI's acceptability, appropriateness, and feasibility as solutions for their career centers. Additionally, the study seeks to analyze key institutional and programmatic factors influencing these perceptions, such as whether an institution is public or private and whether the career center operates under a centralized or decentralized model.

The findings of this study will offer practical insights for public administrators and decision-makers in higher education who are responsible for driving innovation within career centers. By contributing to the broader discussion on technological adoption in education, this research may inform strategies for implementing VR and AI to enhance interview training and career readiness.

The study involved a convenient sample of nine career center leaders, including lead career counselors, assistant directors, associate directors, directors, and assistant deans. These leaders work in public or private higher education institutions across Georgia. Research participants received an orientation on the history, fundamental principles, and roles of virtual reality (VR) and artificial intelligence (AI) in career development. This orientation was followed by hands-on experience with the VirtualSpeech© platform and Meta Quest 2 innovations, after which they provided feedback regarding potential implementation within their organizations.

This dissertation explores the pre-implementation outcome measures of acceptability, appropriateness, and expected feasibility as perceived by career center leaders and addresses eight specific research questions.

1. What are the perceptions of career center leaders regarding the acceptability of implementing VR and AI innovations?
2. To what extent do career center leaders consider VR and AI innovations appropriate?
3. According to career center leaders, what is the expected feasibility of implementing VR and AI innovations?
4. How does the type of institution (public or private) influence the programmatic characteristics related to the acceptability, appropriateness, and expected feasibility of implementing VR and AI innovations in career centers?
5. How does the career center model (centralized or decentralized) influence the programmatic characteristics related to the acceptability, appropriateness, and expected feasibility of implementing VR and AI innovations in career centers?

6. What is the relationship between programmatic characteristics and the acceptability, appropriateness, and expected feasibility of implementing VR and AI innovations in career centers?

The following chapters provide a comprehensive understanding of the research topic. Chapter 2 presents a focused review of the literature on interview training, examining traditional mock interviews and emerging technologies such as virtual reality (VR) and artificial intelligence (AI). Chapter 3 outlines the methodology, including the research design, data collection, and analyses used to explore the study's research questions. Chapter 4 shares the analysis results, highlighting key findings about the perceptions of implementing VR and AI in career centers. Finally, Chapter 5 interprets these findings and discusses their implications for practice, policy, and future research in career readiness and public administration.

Chapter 2:

Literature Review

The career development landscape has undergone significant transformation, shaped by technological advancements and shifting workforce expectations (Cong, 2023; Ghanbaripour et al., 2024). This chapter presents a solid review of literature examining the evolving role of career centers, the concept of career readiness, and the integration of virtual reality (VR) and artificial intelligence (AI) in training practices. By tracing the historical development of career centers and exploring recent innovations, this review highlights how these institutions have responded to the changing needs of students and employers (Tan et al., 2022; Ustel et al., 2021).

The first section explores the origins of career centers, beginning with early vocational guidance in the 20th century and moving toward today's focus on technology integration (Rosenbaum, 2001). Key shifts in their structure and mission are examined to show how career centers have adapted in response to broader societal and technological change (Wirantana, 2018). This historical overview sets the stage for understanding career centers' opportunities and challenges, especially as they begin to adopt emerging tools like VR and AI (Smith et al., 2022a; Smith et al., 2022c).

The following section focuses on the concept of career readiness, with particular attention to the competencies outlined by the National Association of Colleges and Employers (NACE) (NACE, 2024). This portion addresses how career readiness influences employability, long-term career success, and student motivation. It also considers how VR and AI may support the development of these competencies (Bell, 2022; Burke et al., 2020). By placing career readiness within the broader context of workforce preparation, this section emphasizes the need for alignment between educational training and industry expectations (Kong et al., 2023).

Following this, the review examines traditional mock interview training and its challenges related to scalability. These limitations are compared with virtual training platforms that offer more accessible and immersive solutions (Hirsch, 2017; Levashina et al., 2014). This comparison evaluates how VR and AI provide flexible solutions for diverse student populations, including individuals from underrepresented and special populations (Vasquez et al., 2015; Williams & Smith, 2024). It draws on current studies showing how these tools support skill-building and reduce interview-related anxiety (Adiani et al., 2022; Cabell & Gnilka, 2021).

The chapter concludes by identifying gaps in the literature, particularly concerning how career center leaders perceive the implementation of VR and AI technologies. Addressing these gaps sets the foundation for introducing the study's research framework, guided by Rogers' (2003) diffusion of innovations theory.

Through this structured review, the chapter aims to offer a clear understanding of the historical context, current practices, and emerging possibilities for career centers amid technological change. It also considers how VR and AI may enhance student preparedness and help institutions better meet employer expectations.

Role of Career Centers

Since the early 1900s, they have provided resources and services shaped by each era's economic, cultural, and social norms (Dey & Cruzvergara, 2014). The historical changes in the roles of career centers reflect their evolving significance for students in higher education and clients in non-profit organizations. Key factors such as economic activity, labor markets, political events, and cultural norms have influenced these changes, often coinciding with significant historical milestones. The history of career centers illustrates important shifts based on socioeconomic factors, technological innovations, and generational trends.

Paradigm Shifts

Each paradigm shift in education can be classified as reactive, proactive, interactive, or hyperactive (Dey & Cruzvergara, 2014). The first three shifts, between 1900-1920, the 1920s-1930s, and the 1940s-1960s, were reactive. These shifts focused on meeting the needs of students through vocational guidance and job placement. The fourth shift occurred during the 1970s-1980s and was proactive, emphasizing career exploration and planning. The fifth shift, from the 1990s to 2008, was interactive and characterized by extensive professional networking. The sixth and seventh shifts, from 2008 to 2019 and 2020 to the future, were hyperactive, marked by the emergence of dynamic networking hubs and technology integration.

Paradigm Shift 1 (1900-1920): Vocational Guidance. Before establishing career centers at colleges and universities, faculty members were responsible for mentoring students in their career paths (Herr et al., 1993). Frank Parsons founded the first career center, the Vocations Bureau, in Boston, Massachusetts, in the early 1900s (Vinson et al., 2011). This initiative was created in response to many immigrants seeking opportunities in America, supporting their life transitions through a center within the Civic Service House, a public service agency.

Paradigm Shift 2 (1920s-1930s): Teachers Guidance. As industrialization advanced and the baby boomer population grew after World War I, the demand for teachers increased significantly (Vinson et al., 2011). Career centers began to shift their focus from faculty mentorship to vocational guidance; however, only half of higher education institutions had established dedicated career centers (Pope, 2000).

Paradigm Shift 3 (1940s-1960s): Job Placement. After World War II, the economic boom shifted the focus of career centers to job placement for returning veterans, especially those benefiting from the GI Bill (Dey & Cruzvergara, 2014; Casella, 1990). Parson's Trait and Factor Theory played a role in placing graduating students into jobs, considering their abilities and the requirements of the positions (Kretovicks et al., 1999).

Paradigm Shift 4 (1970s-1980s): Career Counseling. During the economic downturns of the 1970s and 1980s, competition for job candidates increased significantly (Kretovicks et al., 1999). As a result, career centers began to evolve, focusing on helping students with career exploration and planning. This shift aimed to promote self-actualization and encourage students to take responsibility for their learning and development (Casella, 1990).

Paradigm Shift 5 (1990s-2008): Professional Networking. The rise of technological advancements in the 1990s, particularly in the “dot com” era, led to increased competition among job candidates (Dey & Real, 2010). This shift emphasized the integration of employer relations, allowing career centers to facilitate professional networking opportunities for students, moving beyond mere attendance metrics to measure success through learning outcomes.

Paradigm Shift 6 (2008-2019): Connected Communities. The effects of the 2008 recession prompted a significant transformation in career centers, leading them to focus more on accountability for employability (Dey & Cruzvergara, 2014). These centers expanded their services to include professional development, internships, mentorship, and networking. As a result, they transformed into dynamic networking hubs that foster genuine relationships with stakeholders.

Paradigm Shift 7 (2020-Future): Integration of Technology. The COVID-19 pandemic marked a turning point for career services, accelerating technology adoption across higher education. Institutions began relying on virtual platforms such as Zoom and Microsoft Teams to host meetings, workshops, and career events. This rapid transition emphasized the need for creative approaches to sustain student engagement and support career development during disruption (Hooley, 2022). Sloan et al. (2022) observed that practitioner-focused institutions adapted their policies and services to support adult learners better, further emphasizing the essential role of online education during the pandemic.

Many institutions could retain and even increase enrollment by adopting flexible programs, expanding career services, and prioritizing student well-being. This transformation reflects the growing significance of technology in providing scalable resources that address the changing needs of students and employers. Technology integration has become essential, allowing career centers to offer resources and services that align with the evolving demands of stakeholders.

As career centers adapt to the changing workforce landscape, a primary focus has emerged on career readiness. This concept highlights the need to equip students with essential skills and the role of career centers in that process. Prioritizing career development within higher education has become increasingly important in preparing students for the dynamic labor market (Xiaoqing & Noordin, 2024). Institutions must address gaps in career services that could hinder students' employability outcomes.

Research highlights the necessity for enhanced digital infrastructure to improve access to career resources, as many students encounter challenges due to insufficient support systems (Xiaoqing & Noordin, 2024). Additionally, aligning academic programs with industry needs is vital to ensure graduates possess the skills and competencies employers seek. By fostering partnerships between educational institutions and industries, universities can better prepare students with the tools necessary for success in a competitive job market.

The integration of advanced technologies like artificial intelligence (AI) and virtual reality (VR) into career development offers valuable opportunities to improve student engagement and experiential learning (Xiaoqing & Noordin, 2024). These tools provide personalized coaching through immersive simulations, preparing students for real-world scenarios and strengthening their career readiness. As the workforce evolves, higher education institutions must evaluate and adapt their career development strategies. By addressing these challenges and embracing technological innovation, career services can improve their effectiveness and contribute to stronger outcomes for students from college to career.

With support from organizations such as the National Association of Colleges and Employers (NACE), career center leaders have adopted a structured approach to encouraging career readiness among students and alums. By aligning resources and services with defined competencies, these centers aim to prepare individuals for successful transitions into the workforce. This proactive initiative recognizes the need for talent to demonstrate career readiness, which is increasingly viewed as a crucial form of "career currency" (NACE, 2024). The competencies identified by NACE serve as a framework for higher education institutions, ensuring students possess the skills and abilities that employers desire. The following section will explore the key components of career readiness, examining the vital competencies necessary for securing employment and achieving long-term career success.

Career Readiness

Career readiness refers to acquiring skills and competencies that prepare individuals for successful entry into the workforce and sustaining their careers. Career centers play a crucial role in this process by providing resources and services to enhance the career readiness of students and alums. These centers may address various career readiness competencies depending on their capabilities and scope.

The National Association of Colleges and Employers (NACE) established the Career Readiness Initiative to address the career development and workforce recruitment needs of career center professionals. Launched in 2015 with input from a task force of career centers and recruitment professionals, this initiative defined career readiness and its essential competencies, incorporating periodic reviews to maintain relevance and effectiveness (NACE, 2024).

While there are eight competencies in total, this section will focus on the four most relevant to virtual reality (VR) and artificial intelligence (AI). The following sections will explore NACE's definition of career readiness, these key competencies, and their implications for employability, effective career management, and motivation for ongoing personal and professional development.

NACE Competencies: A Framework for Career Readiness

The National Association of Colleges and Employers (NACE, 2024) asserts that career readiness is essential for lifelong career management and success in the workplace. For college graduates, transitioning into the workforce requires a solid foundation of career readiness to facilitate a successful career launch. Career readiness is a crucial form of career currency, enabling graduates to secure employment and navigate their career journeys effectively.

NACE explains that career readiness provides a framework for higher education institutions to align their programs with career-related objectives and outcomes. Employers actively seek evidence of career readiness in college graduates when sourcing and selecting talent. They evaluate candidates' skills and abilities to ensure they can fulfill the responsibilities of open positions. Additionally, career readiness offers a pathway for employers to develop talent through experiential learning and internship programs (NACE, 2024).

The eight competencies encompass career readiness: career and self-development, communication, critical thinking, equity and inclusion, leadership, professionalism, teamwork, and technology (NACE, 2024). This section will focus on four competencies that are particularly relevant to integrating VR and AI into career services: technology, career and self-development, critical thinking, and communication. By enhancing these competencies through training and development provided by career centers, college graduates can be better prepared for employment and effective lifelong career management (NACE, 2024).

Technology. In today's digital age, proficiency in technology is essential, as it is integrated into every industry (National Association of Colleges and Employers, 2024). College graduates must demonstrate their ability to use technology to improve efficiency, effectiveness, and productivity. The emergence of virtual reality (VR) and artificial intelligence (AI) in career services highlights this necessity. For example, VR platforms can offer immersive training for job interviews, allowing graduates to practice and receive real-time feedback in a realistic environment. AI can simplify job matching, analyze applicant data, and provide insights into industry trends, helping graduates navigate their career paths more effectively. Moreover, the AI embedded within VR provides targeted feedback through customizable experiences. By incorporating these innovative tools, career centers can better prepare students to meet the evolving demands of the job market.

Career & Self-Development. Proactive self-development involves continuous professional learning, an awareness of strengths and areas for improvement, effective career navigation, and networking (National Association of Colleges and Employers, 2024). College graduates who exhibit this competency actively seek growth opportunities and use feedback for ongoing improvement. In the context of virtual reality (VR) and artificial intelligence (AI), career centers can utilize these technologies to provide personalized development experiences. For instance, VR simulations can create realistic practice environments for job interviews or networking scenarios, allowing graduates to refine their skills and build confidence in a safe setting. Additionally, AI-driven platforms can assess individual strengths and recommend tailored professional development resources, enhancing self-awareness and supporting career navigation.

Critical Thinking. Critical thinking requires the ability to analyze information, evaluate evidence, and make informed decisions (National Association of Colleges and Employers, 2024). Critical thinkers approach problems systematically, considering multiple perspectives and potential solutions while recognizing the implications of their decisions. Virtual reality (VR) and artificial intelligence (AI) training programs can enhance students' critical thinking skills by immersing them in realistic scenarios that require analytical reasoning and problem-solving. For example, through simulations, students can confront complex workplace challenges, evaluate various courses of action, and reflect on the outcomes of their decisions in a safe environment. This experiential learning fosters the development of critical thinking abilities, enabling graduates to navigate uncertainties and make sound judgments in their professional endeavors—skills vital for success in today’s dynamic work landscape.

Communication. Effective communication is characterized by the ability to exchange facts, ideas, information, and perspectives with individuals inside and outside an organization (National Association of Colleges and Employers, 2024). College graduates must understand the importance of verbal, non-verbal, and written communication. Career centers can utilize VR technologies to create immersive training modules where students practice public speaking and presentations in realistic settings. For instance, a VR program might simulate a boardroom meeting where graduates must convey their ideas to a diverse audience. This allows them to refine their active listening, persuasion, and cultural sensitivity skills. This hands-on practice not only develops communication skills but also prepares graduates to navigate complex interactions in the workplace effectively.

Implications of Career Readiness

The competencies defined by NACE enhance individual employability and serve as a critical foundation for ongoing career success and personal development. By equipping individuals with essential skills and knowledge, these competencies create a pathway for effective career management and adaptability in a constantly changing job market. Understanding the importance of career readiness is vital, as it influences individual aspirations and institutional strategies for supporting student success. This section examines how career readiness affects employability and successful career management and motivates lifelong personal and professional development.

Employability. Employability is a complex concept influenced by various factors and is essential in determining an individual's ability to secure and maintain employment (Dacre Pool & Sewell, 2007). Many use the terms employability and career readiness interchangeably to describe similar ideas. Some scholars argue that employability includes transferable skills and general abilities (Boden & Nedeva, 2010; Holmes, 2013). In contrast, others highlight the significance of attitudinal, social, and self-regulatory skills that enhance effective communication and teamwork (Hora et al., 2018).

Beyrouti (2017) defines employability as encompassing essential attitudes, skills, and traits. While definitions may vary, there is a consensus that employability represents a framework of skills demonstrating an individual's ability to perform effectively. It signifies successful entry into the workforce and ongoing career development. Moreover, employability involves an interdependent relationship between career center resources and career readiness development.

Tomlinson and Nghia (2020) emphasize that career readiness is critical for graduates' immediate and long-term employment outcomes. Developing career readiness is viewed as a form of career capital that enhances an individual’s perceived employability and signals a strong potential for success to employers. Tomlinson (2017) identifies five types of capital—cultural, human, identity, social, and psychological—that play a vital role in graduates’ transition into the workforce.

Human capital is the most important type, consisting of an individual's knowledge, skills, and abilities (Tomlinson, 2017). This capital provides cognitive and immediate value in how employers assess an individual’s employability. Social capital refers to the networks and environments where individuals gather knowledge through interactions, such as networking events and professional conferences. Cultural capital involves exposure to diverse cultures, equipping individuals with the knowledge and practices necessary to demonstrate employability, particularly regarding the targeted organizations' audiences.

Additionally, identity capital relates to how individuals perceive themselves concerning their approach to the labor market and their potential for employee success (Tomlinson, 2017). Individuals' investment in career development and goals reflects their proactive approach and motivation for career readiness. Finally, psychological capital represents one's ability to overcome challenges and adapt to adverse situations. Openness to new experiences and the willingness to take risks to pursue career opportunities showcase adaptability. These forms of career capital provide individuals with the necessary framework to assure employers of their employability.

Successful Career Management. The ability to effectively manage one's career significantly impacts job acquisition, long-term success, and overall well-being. Jackson and Wilton (2016) suggest that enhanced competencies gained through successful career management lead to better employment outcomes. Employers are increasingly looking to recruit talent demonstrating career readiness competencies, particularly in managing careers amidst fluctuations and challenges. The authors also emphasize that work-integrated learning is essential in fostering successful career management among students.

Effective career management is a foundation for overcoming challenges in securing and navigating employment opportunities. Its importance is reflected in the psychological and identity capitals, which are forms of career capital. Aligning with Tomlinson's (2017) concept of psychological capital, effective career management boosts an individual's self-efficacy in exploring various career pathways. Individuals with higher self-efficacy are more motivated to engage in career development and pursue lifelong growth opportunities (Berdrow & Evers, 2011). Furthermore, self-efficacy is closely linked to improved employment outcomes for graduating students (Purcell et al., 2013).

Motivations for Ongoing Personal-Professional Development. Pursuing career readiness competencies motivates individuals to engage in ongoing personal and professional development, underscoring their commitment to lifelong learning. Those who demonstrate these competencies will continuously seek personal and professional growth, reflecting their dedication to competence. Possessing these competencies aligns with future aspirations for further development. According to Fahnert (2015), enhancing employability requires a curriculum that integrates knowledge-based and transferable skills, supporting continuous growth. This approach cultivates a lifelong learning mindset, starting with career readiness.

The motivations for ongoing development are closely linked to human and psychological capital. Human capital includes individuals' technical knowledge, transferable skills, and experiences (Tomlinson, 2017). This capital plays a crucial role in employability, as employers look for candidates who meet the minimum job qualifications. Personal and professional development is also connected to identity capital, highlighting how individuals invest in their growth and maintain their motivation for career readiness. The significance of both human and identity capital reinforces the idea that career readiness is a valuable form of career capital.

Integrating virtual reality (VR) and artificial intelligence (AI) innovations may greatly enhance career readiness by aligning with key competencies such as problem-solving, communication, and adaptability. VR can simulate real-world job scenarios, equipping individuals with essential skills and potentially increasing their attractiveness to employers. Similarly, AI-driven tools can offer personalized career planning and skill assessments, helping individuals make informed decisions about their career paths and development opportunities. In theory, these technologies could encourage a culture of lifelong learning, motivating individuals to engage in continuous self-improvement and professional growth. Thus, incorporating VR and AI is expected to support immediate employability while empowering individuals to navigate their careers more effectively and pursue ongoing development throughout their professional lives. These concepts align with the broader understanding of career readiness and its impact on employability, career management, and professional motivation.

Shifting our focus to traditional mock interview training, it is essential to acknowledge its foundational role in preparing individuals for successful career paths. While advancements in technologies such as VR and AI present innovative ways to enhance career readiness, the established method of mock interviews remains a critical tool for developing essential interviewing skills. These traditional training sessions provide invaluable opportunities for individuals to practice their responses, receive constructive feedback, and build confidence in their abilities, which is especially important in a competitive job market. Therefore, understanding the effectiveness of traditional mock interview training as a career readiness tool is vital as we explore its components, benefits, and relevance in today's employment landscape.

Traditional Mock Interview Training: Immersive, Not Scalable

Training students and clients in interview techniques is vital for career readiness, equipping individuals with the necessary skills to excel in securing employment or internships. Mastering these skills is essential, as interviews are a primary method for talent selection (Macan, 2009; McCarthy & Cheng, 2014). However, the interview process can trigger anxiety for many, making the development of these skills crucial (Schneider et al., 2019). Addressing interview anxiety is important, as employers often consider how it may impact job performance. In this context, mock interviews provide a practical setting for individuals to practice and learn effective strategies, helping to alleviate anxiety. A typical mock interview includes an interviewer asking questions similar to those in an actual interview, followed by feedback highlighting the interviewee's strengths and areas for improvement.

As noted by Wirantana (2018), behavioral skills training, particularly through mock interviews, is essential for career centers. This research assessed the alignment of career center training with behavioral skills training (BTS) and evaluated staff implementation and student performance results. The findings indicated a low initial prevalence of BTS among staff, but improvements were observed following the study. The measurement of student progression was based on the percentage of appropriate answers during mock interviews, showing significant improvements when students engaged with staff.

Mock interviews have long been recognized as effective for developing job interview skills. Levashina et al. (2014) argue that students can significantly enhance their chances of success in actual interviews through practice and training. Rosenbaum (2001) emphasized the critical role of job interviews in employers' hiring decisions, which often hinge on their assessment of applicants' skills and job suitability. Various studies have evaluated the impact of mock interview training on career-related self-efficacy and learning experiences (Cabell & Gnilka, 2021; Harchar, 2005; Hirsch, 2017; Rockey-Harris, 2021).

Hirsch (2017) developed the Northwestern Mock Job Interview program to assess marketable job skills among 535 students from historically underrepresented populations. This structured interview consisted of 13 questions aimed at assessing skills and thought processes across various workplace domains, conducted by trained human resources professionals to ensure credibility. The results indicated that more than half of the students were considered hirable based on their communication and teamwork ratings. Interviewers noted that students needed to effectively translate their classroom experiences into responses during the mock interview, emphasizing the importance of articulating how their academic background relates to workplace competencies. While this study focused on high school students, the application of mock interviews is equally beneficial for college students.

Cabell and Gnilka (2021) investigated the impact of STEM career planning, which included mock interviews conducted with career counselors, on students' career-related self-efficacy. Their study involved 286 undergraduate engineering students in a career planning course to prepare STEM majors for workforce entry. The course required participation in a mock interview and career counseling sessions. The researchers used the Career Search Efficacy Scale (CSES) to measure the influence of these experiences on students’ self-efficacy regarding career readiness. They found a positive correlation between mock interviews and CSES scores, indicating that even participating in a single mock interview enhanced students' confidence in their interview abilities. Cabell and Gnilka (2021) also highlighted the effectiveness of combining mock interviews with career counseling sessions for optimal career readiness outcomes.

Harchar (2005) examined the role of mock interviews in enhancing self-efficacy among teacher and administrator candidates in education. The study included 50 administrator candidates and 120 teacher candidates engaged in student teaching at Southeastern Louisiana University. Both qualitative and quantitative data were collected, revealing that 100% of administrator candidates and 65% of teacher candidates perceived mock interview training as beneficial. The survey data indicated high confidence levels among administrator candidates, while 87% of teacher candidates reported confidence in their interview skills. These findings highlight the effectiveness of the traditional mock interview method in bolstering interview confidence through active participation (Harchar, 2005).

Understanding the dual benefits of mock interviews for both interviewers and interviewees supports their continued use in developing essential interview skills. While traditional mock interviews remain compelling and immersive, providing students with a simulated in-person interview experience, resource constraints within many career centers could improve their scalability. The increasing demand for mock interviews can challenge the availability of resources to accommodate all interested students.

Virtual Interview Training: Scalable, Less-Immersive

The world of work is rapidly evolving due to advancements in artificial intelligence (AI), globalization, and technology. As highlighted by the National Association of Colleges and Employers (NACE) competencies, proficiency in these areas is essential for career readiness. Leveraging technology to enhance productivity and solve complex problems has become crucial. Career centers are increasingly utilizing scalable technological solutions for interview preparation. Tools such as Big Interview, StandOut, Pramp, and Interviewing.io offer flexible, interactive, and customizable platforms that help students develop their interview skills. While each tool has unique features, they all serve as valuable resources to complement traditional interview training.

Big Interview

Career centers continue to seek technological solutions that address the demand for interview training. Big Interview (2024) is a platform widely trusted by organizations like Google, Yale, and the University of Chicago. Designed for higher education institutions, it provides a comprehensive framework for students to practice and improve their interview skills, offering video-based training and written resources. Big Interview's AI technology analyzes students' responses, offering feedback on content accuracy, structure, and alignment with interview questions.

However, while AI feedback offers value by saving time on initial assessments, it lacks attention to nonverbal cues like eye contact, tone, and pacing—elements crucial in real-life interviews. Career centers using Big Interview as a tool to supplement traditional mock interviews might contend that while it provides a convenient, scalable option, many students still prefer the realism of in-person mock interviews, where interpersonal feedback is more holistic and comprehensive.

StandOut

In addition to Big Interview, StandOut (2024) is another scalable option that provides students with video-based mock interviews aimed at enhancing confidence and career readiness. The platform uses AI technology to track progress by evaluating key areas such as speech clarity and comprehension. Like Big Interview, StandOut allows students to practice in a structured and automated setting without needing a scheduled interview with a career coach. This is particularly relevant for students preparing for virtual interviews, given the increasing prevalence of video interviews in the hiring process.

However, StandOut shares some limitations with Big Interview regarding immersiveness. A realistic, physical interview environment is necessary to maintain the interviewee's sense of presence. While video technology offers valuable practice opportunities, it cannot fully replicate the pressure and dynamics of in-person interviews, which continue to be a standard component of many organizations' hiring processes.

Pramp

A distinctive peer-to-peer interview preparation platform that enables live, interactive mock interviews between users is Pramp (2024). Unlike other platforms that depend solely on pre-recorded questions or AI-generated feedback, Pramp connects users with fellow students or professionals for real-time mock interviews. This interactive approach effectively combines scalability with realism, allowing students to encounter the unpredictability of interview scenarios.

Additionally, Pramp (2024) offers structured feedback from peers, which is practical and reflective of real-world interview conditions. The platform's peer-to-peer model is especially beneficial for students preparing for technical interviews, as it focuses on fields such as software engineering and data science. Furthermore, Pramp's interactivity provides a higher engagement level than AI-only platforms. However, it does not offer the authoritative feedback that career center coaches or industry professionals might provide in person.

Interviewing.io

The platform Interviewing.io (2024) enhances scalability by directly connecting students with experienced professionals from leading tech companies for mock technical interviews. The platform utilizes anonymized interviews to minimize bias and simulate real hiring situations. Its real-time feedback from industry professionals distinguishes it from other platforms that depend on AI or pre-determined responses. Students can practice their skills while receiving insights from experts who understand the intricacies of the hiring process in specific industries. Although Interviewing.io primarily concentrates on technical fields, its model illustrates a growing trend in using technology to create more authentic and scalable interview experiences. Unlike traditional virtual platforms, it fosters a greater sense of accountability and urgency for students, as they are paired with actual professionals, providing a more realistic experience while remaining scalable.

Virtual interview platforms like Big Interview, StandOut, Pramp, and Interviewing.io each offer unique strengths in preparing students for the job market. Big Interview and StandOut feature robust AI-driven solutions focused on scalability; however, they may need more immersive realism, essential for comprehensive interview practice. In contrast, platforms like Pramp and Interviewing.io enhance interactivity and realism by facilitating live interactions between peers and professionals. This approach bridges the gap between scalability and authenticity.

The array of platforms exemplify the evolving landscape of interview preparation, where career centers must balance the demand for accessible, scalable solutions with the necessity of delivering realistic, high-quality interview experiences. Some researchers leverage these tools to examine their impact on learning outcomes and success metrics. Hudak and colleagues (2019) studied the effects of virtual interview technology on students' self-reported communication skills within an introductory communication course at Pennsylvania State University (PSU). The PSU faculty integrated an online platform for simulated mock interviews into the curriculum, significantly increasing students' confidence and self-assessment scores regarding their interview skills after receiving structured instruction (Hudak et al., 2019).

The instructional activities, which included lectures, simulations, and feedback mechanisms, effectively prepared students for various aspects of the interview process, such as crafting concise responses and maintaining appropriate non-verbal communication. Furthermore, the findings emphasized the importance of virtual interview training in enhancing students' readiness for contemporary job markets, where technology-mediated interviews are becoming increasingly common. Participants reported improved their interviewing abilities and demonstrated greater engagement with career services. This suggests a heightened awareness of professional presentation and strategies following virtual interview training. Overall, this research contributes to the literature on the effectiveness of technologies in training environments, highlighting their potential to overcome gaps in traditional interview training and develop essential career competencies in students (Hudak et al., 2019).

While virtual interview platforms provide scalable and flexible solutions for career centers, they represent only one aspect of the technological landscape in interview training. These tools offer significant value in preparing students; however, the evolution of more immersive technologies, such as virtual reality (VR) combined with artificial intelligence (AI), presents new opportunities for creating deeply engaging, lifelike experiences. In the next section, we will explore how VR and AI, with their potential for immersion, presence, and scalability, are revolutionizing interview preparation and the broader world of work. These technologies represent a shift from virtual platforms to fully immersive environments, providing deeper interactions with simulated interview scenarios.

Virtual Reality (VR) and Artificial Intelligence (AI): Scalable, Immersive Innovations

In an era where technology rapidly transforms our interactions and experiences, virtual reality (VR) and artificial intelligence (AI) emerge as groundbreaking career development and training forces. These scalable and immersive innovations are changing how individuals engage with digital environments, enhancing learning and performance. This section examines the foundational concepts of VR and AI, their core principles, historical advancements, and their potential for scalability across various sectors. By exploring how these technologies simulate reality and adapt to user needs, we can better appreciate their significant implications for the future of training and education.

Virtual Reality (VR)

Virtual reality (VR) is typically defined as a computer-generated simulation of a three-dimensional environment that enables user interaction through devices like Head-Mounted Displays (HMDs) and touch controllers. According to Ticknor and Tillinghast (2011), a virtual environment is a "simulated, computer-generated world incorporating three-dimensional visualization that allows user interaction through transmission devices" (p. 4).

The history of VR spans over a century, with early examples of immersive environments utilized for military and aerospace training (Ticknor, 2018). Notable milestones include Edward Link's flight simulator from 1929 and Morton Heilig's invention of the Sensorama in 1956, both of which established the foundation for modern VR. Heilig's Sensorama aimed to engage multiple senses—touch, sight, smell, sound, and feel—to provide a semi-immersive experience.

Further advancements during the 1960s, such as Ivan Sutherland's creation of the first HMD, and developments in the 1980s, including Jaron Lanier's introduction of the DataGlove, transformed the VR experience. The modern resurgence of VR began with Palmer Luckey's launch of the Oculus Rift in 2012, followed by its acquisition by Facebook, Inc. This resurgence has spurred rapid technological progress, positioning VR as an essential tool for immersive training and education. Through VR, users can enter a virtual world and experience a profound sense of physical and emotional presence, which can be tailored to various contexts (Ticknor, 2018).

Immersion. A key virtual reality (VR) principle is the user's capacity to become deeply immersed in the virtual environment. The level of immersion depends on how accurately the technology captures and represents the user's movements and interactions. Markowitz and Bailenson (2021) emphasize that higher-quality immersive environments utilize advanced technologies, such as head-mounted displays (HMDs), to track movement and provide sensory feedback, including auditory and haptic responses. More immersive experiences allow users to fully integrate into the virtual world (Ticknor, 2019).

Presence. The concept of presence is closely related to immersion and refers to the user's perception of "being there" in a virtual environment. According to Ticknor (2019), *presence* is “the psychological state in which a participant accepts, interacts, and is physically, socially, and emotionally engaged in the virtual world” (p. 1321). A well-designed virtual experience enhances this sense of presence by closely mimicking real-world interactions and environments, enabling users to feel that their actions and surroundings are authentic.

Scalability. Bondi (2000) describes scalability as “a desirable attribute of a network, system, or process” (p. 1). Virtual reality (VR) technology has become increasingly scalable, making it accessible to larger audiences and various industries. Early versions of VR, such as flight simulators used by military and NASA pilots, were designed for specialized training environments. Today, VR is more widely available, with devices like the Meta Quest 2 and platforms like VirtualSpeech® offering scalable training opportunities. These technologies enable organizations to integrate VR into various applications, including education, healthcare, and corporate training, without requiring expensive, specialized equipment.

Moreover, this scalability reduces the need for full-time professional staff, as student employees or volunteers can check out the equipment and provide quick tutorials. This allows technology to facilitate training effectively. The untethered nature of newer head-mounted displays (HMDs) further enhances VR’s scalability by allowing users to access immersive environments without being confined to specific locations.

Stellar (2022) highlights the importance of scalability in higher education, especially in light of rising tuition costs and the demand for more efficient service delivery models. His research emphasizes how career centers can leverage emerging technologies to reach broader audiences and strategically allocate their staff resources. Cruzvergara, as quoted by Stellar, suggests that career professionals should act as "content creators" for students and "channel marketers" for employers, transforming career centers into dynamic hubs for career education at scale. This vision aligns with the shift toward virtual and scalable platforms, ensuring that career services remain accessible and adaptable to future needs.

VR interview training significantly advances career preparation methods, providing an immersive learning environment that simulates real-life interview situations. This technology allows individuals to practice their responses and body language in a controlled setting, which is particularly beneficial for those who may struggle with anxiety during interviews. One of the main advantages of VR is its ability to offer immediate feedback on performance, enabling users to receive constructive critiques that enhance their learning outcomes.

Moreover, VR training can be accessed anytime and anywhere, making it a more inclusive option for individuals facing financial barriers to traditional training methods. By familiarizing users with the interview process in a safe environment, VR can effectively reduce anxiety and increase confidence levels. Moreover, VR systems can collect valuable data on user performance through artificial intelligence (AI), which can inform improvements in training programs and deepen the understanding of effective interviewing techniques.

Artificial Intelligence (AI)

Artificial Intelligence (AI) is a branch of computer science focused on creating systems that can perform tasks typically requiring human intelligence. John McCarthy (2007) describes AI as “the science and engineering of making intelligent machines, especially intelligent computer programs” (p. 2). AI aims to replicate or simulate human cognitive functions such as learning, problem-solving, and decision-making. While AI aims to mimic human intelligence, it is not confined to biological processes, allowing developers to explore creative solutions beyond what is observed in the natural world.

The objectives of AI can be categorized into two main approaches: systems that think and act like humans (the human approach) and systems that think and act rationally (the ideal approach). The human approach seeks to emulate human thought processes and behaviors and focuses on the ability of machines to replicate how humans perceive, interpret, and respond to various stimuli (Xu et al., 2021). This has significant implications for interview training in the career readiness space. AI-driven systems, such as conversational agents and virtual interview platforms, can simulate real-world interactions, providing users realistic mock interview experiences. These systems adapt their responses to human behavior and offer personalized feedback based on the interviewee's communication style and performance.

In contrast, the ideal approach emphasizes creating systems that think and act rationally, independent of human cognitive limitations. In this context, AI is designed to optimize decision-making processes based on logic, data, and predefined algorithms (Xu et al., 2021). This approach can enhance candidate assessment by objectively evaluating responses in interview training. AI-driven platforms can analyze vast datasets to identify trends and provide feedback on verbal and non-verbal communication, offering insights into areas for improvement. By combining these two approaches, AI systems in career readiness can provide scalable solutions that mimic human interactions while leveraging data-driven insights to enhance performance and readiness for job interviews.

The introduction of OpenAI’s ChatGPT marks a significant turning point in AI development (Dwivedi et al., 2023). ChatGPT utilizes natural language processing (NLP) as a generative model to generate human-like responses based on user input. This breakthrough has wide-ranging implications for interview training platforms. By employing advanced generative models, AI can learn the structures of languages, software code, natural images, and other data types. This adaptability allows AI systems to continuously improve and expand their ability to replicate human interactions, making them more effective in preparing candidates for various professional scenarios (Dwivedi et al., 2023).

In addition to these advancements, AI tools like ChatGPT and Bard have emerged as valuable resources for job seekers in their ongoing professional development and career management (Giusto, 2024). These tools can assist individuals in exploring career options, brainstorming ways to leverage their skills, identifying necessary skill development, and analyzing job postings. For instance, prompts such as "What are the top skills needed to be a/an [X]?" can guide users in understanding the skills required for their desired career paths (Giusto, 2024).

However, users must approach AI-generated outputs critically. The responsibility for verifying information lies with the individual, as AI may produce inaccurate or misleading data (Giusto, 2024). Therefore, coaching job seekers to use AI as a supplement to their judgment can enhance the overall effectiveness of their career management strategies.

The role of AI in career readiness encompasses a broader spectrum of applications. Stryker and Kavlakoglu (2024) point out that AI's overarching goal is to create systems capable of reasoning, understanding, and interacting with the world in efficient and scalable ways. For example, AI-driven systems can analyze large volumes of job market data to predict hiring trends, help career centers optimize their services, and provide tailored recommendations to job seekers. By integrating AI into career centers, organizations can offer immersive, scalable, personalized support that enhances users' career preparedness.

Advancements in VR and AI innovations have significantly transformed the landscape of immersive training and education. These technologies provide scalable solutions that enhance user engagement and adaptability, paving the way for innovative applications across various sectors. As we explore the evolution of VR, it is essential to recognize how its unique capabilities have been studied in diverse contexts, from therapeutic interventions to skills training. The following section reviews previous research that highlights the effectiveness of VR, showcasing its potential benefits.

Previous Research with Virtual Reality

Virtual reality (VR) has emerged as a transformative tool across various industries, offering immersive and interactive experiences that extend beyond traditional learning and training methods. Since its inception, VR has demonstrated the ability to create simulated environments where users can practice skills, undergo rehabilitation, and face real-life challenges in a controlled and safe manner. This has positioned VR as a valuable resource in fields such as education, healthcare, and criminal justice, where experiential learning is often difficult to achieve without advanced technological interventions. Exploring the diverse ways VR has been implemented provides a comprehensive view of its capabilities and highlights its potential to reshape conventional practices. The following section presents examples of VR applications in these fields, illustrating their broad utility before focusing on how it has been leveraged for interview training.

Since 2011, innovations in virtual reality have expanded, with researchers, practitioners, and students investigating its capabilities across various sectors. The versatility of VR is evident in the breadth of its applications, ranging from education to healthcare, corrections, and beyond. For example, Ticknor (2017) utilized VR desktop technology in corrections research with juvenile offenders, offering cognitive behavioral therapy (CBT) through a juvenile residential program. Before the experiment, the lead facilitator received thorough training and assessment to ensure understanding. Ten boys participated, completing pre- and post-surveys measuring feedback, engagement, system usability, and the effectiveness of virtual role-play.

In this study, the youth customized virtual avatars and explored the system, using the technology to develop essential life skills such as active listening, communication, and feedback exchange. Laptops, headsets, and microphones facilitated interaction with the group facilitator and peers in the virtual world, where participants could teleport to different environments to apply lessons from the initial lecture. Ticknor's (2017) findings revealed that the youth preferred role-playing and skill development in the virtual environment to traditional in-person approaches. The virtual space was perceived as less judgmental, making it easier for participants to engage and practice new skills.

Beyond correctional environments, VR also demonstrates its capacity to create therapeutic settings in mental health interventions. Gega (2017) asserted that VR enables individuals with anxiety to confront their fears through exposure therapy. Patients can engage in fearful situations, such as public speaking, dating, or job interviewing, within a safe and controlled virtual environment. By gradually becoming accustomed to anxiety-provoking stimuli and altering their cognitive appraisals, patients can reshape their beliefs about feared outcomes. Therefore, VR allows clinicians to simulate challenging or unrealistic situations to recreate in the real world, making it an invaluable tool for exposure therapy in clinical practice. This features VR's ability to simulate real-world challenges, crucial in treating various psychological conditions.

Similarly, a systematic review by Tan et al. (2022) explored VR and augmented reality (AR) in psychosocial rehabilitation for adults with neurodevelopmental disorders. The review highlighted various VR and AR interventions, emphasizing their potential to enhance therapeutic outcomes by providing immersive environments for social skills training, emotional regulation, and cognitive development. The findings suggest that these technologies effectively address the unique challenges faced by individuals with neurodevelopmental disorders, ultimately improving their quality of life and psychosocial functioning, thereby supporting the use of VR in mental health interventions.

VR has also found applications in healthcare settings, particularly in neurorehabilitation. Canning et al. (2020) explored the use of VR for individuals with Parkinson's disease (PD), focusing on the rehabilitation of gait and balance impairments. VR-based interventions offer training environments where individuals can safely practice motor skills, benefit from cognitive and sensory-motor input, and gradually progress through their rehabilitation. The controlled VR setting is particularly beneficial for individuals with PD, allowing them to rehabilitate safely and effectively in a manner difficult to replicate in traditional clinical environments.

As demonstrated by VR's wide-ranging applications in fields such as corrections, mental health, and neurorehabilitation, the technology's potential to create controlled, immersive environments is invaluable for skill development and behavior modification.

Previous Research with VR and AI for Interview Training

Virtual reality (VR) and artificial intelligence (AI) in job interview training have rapidly increased, providing immersive and realistic experiences that help individuals improve their skills. As job markets become more competitive, VR and AI are increasingly utilized to address shortcomings in traditional training methods. These technologies offer personalized feedback that enhances practical and technical skills (Bell, 2022; Chang et al., 2024; Kong et al., 2023; Miah et al., 2024). They are particularly beneficial for diverse populations, including neurodivergent individuals, marginalized groups, general job seekers, and students (Adiani et al., 2022; Vasquez et al., 2015).

This literature review categorizes studies thematically, starting with the applications of VR and AI for marginalized populations, such as individuals with autism or disabilities (Adiani et al., 2022; Genova et al., 2021; Smith et al., 2021; Vasquez et al., 2015; Williams & Smith, 2024). Research indicates that VR enhances social skills, reduces anxiety, and improves interview performance for these groups. The second theme focuses on rehabilitative applications, where VR assists returning citizens and individuals with serious mental illnesses in re-entering the workforce (Smith et al., 2022a; Smith et al., 2022c).

Next, the review addresses general employment skills development, illustrating how VR and AI enhance interview preparedness and boost confidence among job seekers and students (Bell, 2022; Burke et al., 2020; Kong et al., 2023). Finally, studies regarding the system-wide integration of VR and AI in educational and workforce training highlight the increasing implementation of these technologies in structured training environments (Chang et al., 2024; Cong, 2023; Ghanbaripour et al., 2024; Miah et al., 2024).

The review concludes with insights from Ustel et al. (2021), who examined peer perspectives on VR job interview training, aligning closely with the methodology of this dissertation. Together, these studies emphasize the growing significance of VR and AI in shaping the future of career readiness.

VR and AI for Marginalized or Special Populations

Vasquez et al. (2015) explore the use of virtual environments (VEs) to enhance social skills in K-12 students with autism spectrum disorder (ASD). The study highlights how students with ASD often face challenges in social interactions, which can impede their ability to successfully engage in job interviews and other professional scenarios later in life. By leveraging virtual environments, the researchers created controlled, simulated social situations that allowed students to practice and improve key social skills. The study employed a systematic review of peer-reviewed articles focusing on VEs and found these environments can offer a safe, repeatable platform for students with ASD to rehearse essential social interactions without the pressure of real-world consequences.

The results indicate that VEs are an effective method for addressing social impairments in students with ASD, particularly in K-12 educational settings. Vasquez and colleagues (2015) also noted that virtual environments provided an engaging and interactive medium for students to learn, which traditional classroom settings may lack. Despite the benefits, the study calls for more research into the long-term impacts of VE interventions on social skill development and real-world applications, such as job interviews. The findings from this study lay a foundation for future research into how virtual reality can be used to support neurodivergent populations in transitioning to professional environments.

Genova et al. (2021) conducted a pilot randomized controlled trial to examine the effectiveness of Virtual Reality Job Interview Training (VR-JIT) in improving job interview performance among adolescents on the autism spectrum. The study recognized that many individuals on the autism spectrum struggle with social communication, which is particularly challenging in high-pressure scenarios like job interviews. To address this, the study implemented a 10-hour VR-JIT intervention in a high school setting, allowing adolescents to practice interviewing with a virtual human and receive feedback on their performance.

Results from the study showed significant improvements in interview skills among participants who underwent VR-JIT compared to those in the control group (Genova, 2021). However, while interview performance improved, participants' self-reported anxiety and self-efficacy did not show corresponding enhancements. The study concluded that VR-JIT has the potential to be an effective tool for improving job interview skills in adolescents on the autism spectrum but may need to be supplemented with additional support to address anxiety and self-confidence in interview settings.

Smith et al. (2021) examined the vocational outcomes of transition-age youth receiving special education services, specifically focusing on job interview skills as a critical intervention target for obtaining competitive employment. The study reviewed the employment rates of 656 youth participating in pre-employment transition services across 47 schools. The researchers found that 20.8% of these youth were currently employed, and 88.8% of the employed individuals had interviewed before securing their jobs, underscoring the importance of job interview skills.

The findings suggest that targeted interventions focusing on job interview skills may significantly improve the vocational outcomes for transition-age youth with disabilities. Smith and colleagues (2021) concluded that while overall employment rates among these youth remain low, the high correlation between interviewing and employment indicates the need for more structured job interview training within special education settings. The study calls for further research on the best way to integrate interview training into pre-employment services to improve employment rates for this population.

Adiani et al. (2022) present a novel approach to addressing job interview anxiety and atypical behaviors in autistic adults by developing a VR-based platform called Career Interview Readiness in VR (CIRVR). The system includes real-time gaze detection and stress monitoring to provide adaptive feedback during virtual job interviews. The primary focus of the study was to assess the feasibility and usability of the CIRVR platform in helping autistic individuals practice interview skills in a low-stress environment.

The results showed that CIRVR was generally well-received, with autistic and neurotypical participants expressing satisfaction with the platform's usability (Adiani et al., 2022). The real-time stress detection feature allowed for individualized feedback, which was particularly helpful for managing anxiety. However, the study noted that autistic participants experienced higher levels of stress during interviews compared to neurotypical participants, indicating that while the platform was useful, additional support may be necessary to reduce interview-related anxiety entirely. The study’s findings support the potential for CIRVR to be a valuable tool for job coaches and employers working with autistic job candidates.

Williams & Smith (2024) focuses on BIPOC (Black, Indigenous, and Persons of Color) autistic transition-age youth (TAY), examining the effectiveness of virtual job interview training in improving job interview skills, reducing anxiety, and increasing the likelihood of obtaining employment. The study highlights how autistic individuals from minority backgrounds often face compounded challenges when entering the workforce, including racial biases and social skill deficits, which can impede their job prospects.

The study revealed that participants who received virtual interview training showed significant improvements in their job interview skills and reported lower levels of interview anxiety. Moreover, these participants were more likely to secure employment at the six-month follow-up than those who only received pre-employment services. The findings suggest that virtual interview training could serve as an effective intervention for BIPOC autistic youth, helping them overcome barriers to competitive employment by improving their readiness and reducing anxiety during interviews. The promising outcomes seen in neurodivergent and marginalized populations suggest broader applicability of VR AND AI interventions, as evidenced by their effectiveness in rehabilitative settings for returning citizens and individuals with serious mental illnesses.

VR and AI in Rehabilitative and Workforce Reentry Populations

Smith et al. (2022c) conducted a randomized controlled trial (RCT) to evaluate the effectiveness of Virtual Reality Job Interview Training (VR-JIT) for returning citizens, a population that often faces significant challenges when seeking employment after incarceration. The study involved 44 male participants divided into two groups: one group received standard services, while the other received standard services plus VR-JIT. Participants in the VR-JIT group reported higher levels of interview skills, training motivation, and reduced interview anxiety.

At the six-month follow-up, participants who underwent VR-JIT were significantly more likely to have gained employment than those who did not receive the virtual training (Smith et al., 2022c). The study highlights the potential of VR-JIT to fill a gap in prison-based vocational services and address the critical barrier that interviews present for returning citizens. Future research is encouraged to validate these findings further and explore practical strategies for implementing VR-JIT in prison settings.

In a separate study, Smith et al. (2022a) investigated the effectiveness of VR-JIT for individuals with serious mental illness (SMI) who were receiving Individual Placement and

Support (IPS) services. The study randomly assigned 90 participants to either IPS with VR-JIT or IPS as usual. While the overall employment rates were not significantly different between the two groups, non-responders who had not secured employment within the first 90 days showed more significant improvements in employment outcomes with VR-JIT.

Non-responders in the VR-JIT group found employment more quickly and demonstrated significant improvements in interview skills, confidence, and reduced anxiety (Smith et al., 2022a). These findings suggest that while VR-JIT may only benefit some IPS participants, it is particularly valuable for those who need help finding employment within the traditional IPS model. This indicates that VR-JIT could be an important tool for employment specialists working with harder-to-employ individuals. Building on the success of VR-JIT for those with serious mental illness, similar advancements in VR-based job interview training have been developed for broader populations using interactive systems that provide tailored feedback and realistic simulations.

VR and AI for General Employment Skills Development

Bell (2022) describes developing and implementing a VR-based job interview training program aimed at individuals with serious mental illness. The program uses a virtual hiring manager named Molly Porter, developed by Bell and the Maryland-based company SIMmersion. Molly interacts with job seekers, asking interview questions and providing real-time feedback based on the interviewee's responses. This interactive system allows participants to practice job interviews in a virtual environment that simulates the anxiety and unpredictability of real-life interviews.

The study found that individuals who underwent VR training with Molly Porter were more likely to secure employment than those who did not (Bell, 2022). The participants also reported feeling more confident and better prepared for real-world interviews after using the program. Bell argues that VR training offers more engagement and practice opportunities than traditional role-playing exercises, making it a valuable tool for vocational rehabilitation services.

Kong et al. (2023) developed and tested an immersive Virtual Reality (VR) interview training system for pre-employment learners. The study examined the relationship between the VR system's perceived usefulness and the learners' self-efficacy in job interviews. The system presented learners with pre-recorded interviewer questions, allowing them to simulate an interview environment. The experiment aimed to determine whether learners who believed in the VR system's effectiveness would experience higher self-efficacy in interviews.

The results indicated a positive correlation between the perceived usefulness of the VR system and the learners' self-efficacy (Kong et al., 2023)—participants who found the VR experience realistic and engaging reported feeling more confident and prepared for real-life interviews. Kong and fellow researchers concluded that VR training can significantly impact interview preparation, particularly for learners who embrace the technology and view it as beneficial. This study highlights the potential of immersive technologies to improve pre-employment training outcomes.

Burke et al. (2020) examined the use of Virtual Interactive Training Agents (ViTA) to improve job interview skills among young adults with autism spectrum disorders (ASD) and intellectual disabilities. The study involved 153 participants, the majority of whom were male and had ASD or intellectual disabilities. The ViTA system simulated interview scenarios, allowing participants to practice responding to common job interview questions while receiving feedback to improve their performance.

The results demonstrated statistically significant increases in self-efficacy among participants and improved performance on all three subscales measured (interview skills, confidence, and anxiety). Burke et al. (2020) concluded that ViTA provides a practical and scalable solution for improving interview readiness in young adults with developmental disabilities. The study emphasizes the need for further development of VR interventions that can support the employment goals of neurodivergent populations. Although VR interventions like ViTA have proven effective in improving interview readiness among neurodivergent populations, the rapid adoption of VR technology is also transforming educational and workforce training systems more broadly, creating immersive learning environments that extend beyond interview preparation.

Integrating VR and AI in Educational and Workforce Training Systems

The use of virtual reality (VR) in educational settings has rapidly increased in recent years, transforming traditional teaching methodologies by providing immersive and interactive experiences. The VR in education market is projected to grow significantly, from USD 0.931 billion in 2019 to USD 15.39 billion by 2027, reflecting a compound annual growth rate (CAGR) of 42.3% during this period (Roy, 2024). This growth is primarily attributed to the increased adoption of VR technology in schools and universities, where VR tools are being utilized to enhance teaching by creating immersive learning environments. These environments enable students to explore concepts, interact with simulations, and engage more deeply with educational content. Additionally, the COVID-19 pandemic has accelerated VR adoption as educational institutions have shifted to remote and hybrid learning models, with affordable VR hardware increasing accessibility across all levels of education (Roy, 2024).

Cong (2023) discusses the growing use of VR to enhance soft skills training, particularly in business schools. The article explains how traditional simulations used for soft skills development, such as role-playing, have evolved with the integration of VR. Cong highlights the importance of interpersonal skills, such as teamwork, empathy, and communication, as employers increasingly seek candidates who excel in areas artificial intelligence cannot replicate.

In response to this demand, institutions like RMIT University have incorporated VR modules into their curricula, replacing in-person simulations with immersive virtual environments (Cong, 2023). These VR scenarios are designed to help students navigate complex interpersonal situations, such as client interactions or team dynamics, in a manner that mimics real-world settings. Cong concludes that VR represents a powerful tool for business schools and training programs to equip students with the interpersonal skills necessary for success in a competitive, technology-driven job market.

Ghanbaripour et al. (2024) conducted a systematic review of the impact of emerging technologies—such as VR, augmented reality (AR), and mixed reality (MR)—on student engagement, learning outcomes, and employability in built environment (BE) education. The review analyzed 61 studies published between 2013 and 2023, focusing on how these technologies enhance the learning experience by providing immersive, interactive environments that bridge the gap between theoretical knowledge and practical application.

The findings revealed that VR, AR, and MR technologies significantly improve student engagement and motivation, leading to a better understanding of complex concepts and enhanced learning outcomes (Ghanbaripour et al., 2024). Regarding employability, the review concludes that integrating digital tools into BE curricula equips students with essential skills that are increasingly demanded in the modern workplace. However, the study also identifies barriers—

such as high implementation costs and the need for extensive faculty training—that limit the broader adoption of these technologies in education. Ghanbaripour et al. offer practical recommendations for educators and policymakers to overcome these challenges and maximize the benefits of immersive technologies.

Chang et al. (2024) conducted a systematic review of the integration of autonomous AI into VR training (VRT) systems, particularly in teaching social, safety, and professional skills. The study analyzed 20 articles that examined VRT applications in various contexts, including job interview training, emergency response scenarios, and soft skills development. A central focus was on the flexibility of VRT for scaling behavioral skills training, making it accessible to children and adults, regardless of disabilities.

The review found that VRT systems effectively teach and generalize social and professional skills across diverse settings and populations, with 75% of the articles reporting successful skill transfer beyond the training environment. Chang and colleagues (2024) emphasized the potential of VRT combined with AI to provide tailored, interactive learning experiences. The study concluded with a call for further research to assess the cost-benefit analysis of VRT systems and to explore ways behavior analysts can leverage AI-driven virtual training platforms to improve job readiness and skill acquisition.

Miah et al. (2024) systematically analyzed the impact of Industry 4.0 technologies, such as AI, big data analytics, and VR, on workforce employability and skills in South Asia. The study reviewed 48 peer-reviewed articles published between 2013 and 2022, identifying key success factors, challenges, and necessary skills for thriving in an Industry 4.0 environment. The authors emphasized the growing importance of technical and digital skills and the ability to work with emerging technologies. The analysis revealed that while Industry 4.0 technologies have the potential to boost productivity and efficiency significantly, challenges remain.

Facilitator Perspective on VR in Career Development

Ustel et al. (2021) examined the perspectives of peer specialists on delivering vocational interventions, focusing on Virtual Reality Job Interview Training (VR-JIT). The study involved five focus groups with 34 peer specialists who shared their insights regarding the acceptability, feasibility, and effectiveness of VR-JIT in their mental health practices. Additionally, the researchers trained eight peer specialists to serve as VR-JIT instructors. They collected feedback on integrating the tool into vocational services for individuals with mental health conditions.

The peer specialists generally perceived VR-JIT as superior to traditional vocational interventions, believing that the technology offered a safe and effective way for clients to practice job interviews. They also felt that their unique position as peer specialists allowed them to provide valuable support to clients using this tool, particularly by sharing their recovery stories. Ustel et al. (2021) concluded that VR-JIT shows excellent promise as a vocational tool in mental health settings and that peer specialists are well-suited to facilitate its implementation.

Likewise, real-world applications of VR and AI in higher education institutions demonstrate a growing interest in using these technologies for career development. However, many institutions need formal research to assess the long-term effectiveness of these initiatives, which highlights an important gap in the literature.

Thematic Analysis of VR and AI Training Outcomes

Studies focused on marginalized populations, including neurodivergent individuals and those with disabilities (Adiani et al., 2022; Genova et al., 2021; Smith et al., 2021; Vasquez et al., 2015; Williams & Smith, 2024), consistently demonstrate that virtual reality interventions significantly improve job interview skills. For example, Vasquez et al. (2015) found that K-12 students with autism spectrum disorder (ASD) benefited from repeated exposure to social scenarios in virtual environments, enhancing social skills critical for interviews. Similarly, Genova et al. (2021) observed notable improvements in skill development among adolescents with ASD who used VR Job Interview Training (VR-JIT), though they reported high levels of anxiety.

Despite these positive skill development outcomes, many studies revealed ongoing challenges related to interview anxiety and confidence, particularly among autistic individuals (Adiani et al., 2022) and BIPOC autistic youth (Williams & Smith, 2024). In these populations, the anxiety-reducing potential of VR and AI tools was limited. This suggests that while VR effectively develops technical skills, supplementary emotional or mental health support may be needed to address these individuals' complex challenges during interviews fully.

In contrast, studies focusing on rehabilitative populations, such as returning citizens and individuals with serious mental illnesses (SMI), yielded more comprehensive outcomes. Smith et al. (2022a) and Smith et al. (2022c) demonstrated that VR-JIT not only improved job interview skills but also significantly reduced interview anxiety and increased motivation. These positive results were particularly evident among non-responders in the Individual Placement and Support (IPS) program, who had previously struggled to secure employment. The anxiety-reducing impact of VR-JIT and enhanced interview confidence highlight the tool's unique benefits for populations facing high employment barriers.

The distinction between marginalized and rehabilitative populations may stem from the degree of personalization in the interventions. VR-JIT interventions for returning citizens and individuals with SMI often incorporate motivational elements and emotional support, which appear to influence both skill development and anxiety reduction directly. In contrast, interventions for neurodivergent populations may require additional psychological components to address emotional challenges like anxiety effectively.

VR and AI training outcomes for general job seekers and students are also encouraging. Bell (2022) and Kong et al. (2023) reported that job seekers utilizing virtual hiring manager Molly Porter and VR interview simulations experienced significant improvements in self-efficacy and interview preparedness. After practicing in these virtual environments, participants felt more confident and better equipped to handle real-world interview scenarios. Notably, Kong et al. (2023) found that the perceived usefulness of the VR system was directly correlated with self-efficacy, indicating that participants who embraced the technology felt more prepared for interviews.

Despite these promising results, integrating technology-based solutions, such as virtual reality (VR) and artificial intelligence (AI), is essential for enhancing job readiness, especially for marginalized populations like returning citizens. Russo et al. (2022) identified several barriers to effective technology adoption in this context, including cost, personnel availability, scalability, information sharing, and health concerns like cybersickness. These barriers can significantly impact the feasibility of implementing VR AND AI interventions to improve job interview skills.

Evidence-based practices demonstrate that innovative methodologies for developing job interview skills can improve employment outcomes (Russo et al., 2022). However, the broader adoption of VR remains contingent on identifying best practices for content and implementation. Pilot programs can provide valuable insights into the effects of VR training on key outcomes, reinforcing the need for thorough evaluation and adaptation in various settings.

Moreover, the growing acceptance and feasibility of technology-based solutions are noteworthy, particularly regarding the principles of innovation diffusion (Rogers, 2003). As these technologies gain traction, it is essential to address challenges related to collaboration, organizational structures, and the digital divide among individuals with varying levels of digital literacy.

Interestingly, while these studies focused on technical skill development and confidence-building, the reduction in interview anxiety—observed in rehabilitative populations—was less emphasized in broader employment skills development. This may suggest that VR AND AI interventions prioritize skill acquisition and confidence over addressing deep-seated emotional or psychological barriers for general populations.

Real-World Applications of VR and AI in Higher Education Institutions

Some universities across the United States have begun integrating virtual reality (VR) and artificial intelligence (AI) into their career development and interview training programs, showcasing the practical application of these technologies in real-world settings. However, despite their growing popularity, many of these implementations need more formal, peer-reviewed research that evaluates their effectiveness, leaving a gap in the literature that needs to be addressed.

The University of Michigan (2024) is one institution that has embraced VR for career development, using simulations that allow students to practice job interviews in realistic, immersive settings. This approach enables students to gain hands-on experience with the interview process, which can help them build confidence and refine their communication skills. By incorporating VR into its career center, the University of Michigan provides students with an innovative way to prepare for professional environments. However, formal research needs to evaluate the long-term effectiveness of this program.

At Georgia State University Robinson College of Business (2024), undergraduate and graduate students can use VR interview platforms that simulate both virtual and in-person interviews. These platforms focus on enhancing students' communication and nonverbal skills, such as body language and eye contact. The career center highlights the importance of immersive technologies in preparing students for the modern job market. Yet, as with other institutions, there is no formal evaluation of the effectiveness of VR training on long-term employment success.

Similarly, Valdosta State University (2024) offers virtual reality training in its career center, focusing on preparing students for high-stakes interviews. The VR platform at Valdosta State is designed to mimic real-world interview scenarios, allowing students to practice their responses in a simulated, low-pressure environment. While students report positive experiences, the lack of formal research on the program's outcomes leaves its full impact on career readiness unmeasured. Moreover, a complete Virtual Reality Lab is available to students, faculty, and staff centrally located in the campus library founded by Dr. Bobbie Ticknor.

The integration of virtual reality extends into academic courses, such as those taught by Bobbie Ticknor in the Criminal Justice department at Valdosta State University. Dr. Ticknor utilizes the university's VR lab to provide immersive learning experiences, allowing students to engage in realistic simulations that replicate scenarios they may encounter in the criminal justice field. This hands-on approach offers students a unique perspective and helps them develop practical skills in a controlled, virtual environment, preparing them for real-world applications in their careers. This initiative demonstrates the broader educational potential of VR, blending career readiness with academic instruction.

At Vanderbilt University (2024), virtual reality is also incorporated into the curriculum through the course *Virtual Reality for Interdisciplinary Applications*. This project-based course introduces students to VR technology, offering hands-on experience in creating immersive simulations that address real-world problems across various disciplines. Co-taught by faculty from Computer Science and History, students gain substantial training in VR tools while collaborating on innovative projects guided by faculty mentors. The course equips students with the skills to plan and execute their VR projects, fostering interdisciplinary learning. The promising results from structured VR and AI interventions in controlled research settings suggest that their broader implementation in career centers could yield similar benefits if rigorously evaluated.

These examples illustrate the increasing adoption of VR and AI technologies in career centers, yet the need for formal, peer-reviewed research presents a critical gap. While anecdotal evidence from students and administrators points to the potential of these tools, more empirical data is needed to ensure their effectiveness in producing tangible improvements in employment outcomes is maintained. Comprehensive studies are needed to fully understand the impact of VR and AI on interview preparedness, skill development, and long-term career success. Bridging this gap is essential for determining how best to integrate these innovations in career centers, ensuring they effectively support students' transitions from education to the workforce. This dissertation seeks to address this need by conducting a rigorous analysis of career center leaders' perceptions of VR and AI innovations, ultimately contributing to developing evidence-based practices in career readiness training.

Gap in Research

Despite the growing interest in using virtual reality (VR) and artificial intelligence (AI) for interview training, significant gaps exist in the literature, particularly regarding their application in higher education career centers and the insights of career center leaders. A review of existing studies reveals that much of the research has focused on VR as a standalone tool, emphasizing its ability to enhance communication, social skills, and interview confidence (Bell, 2022; Burke et al., 2020; Smith et al., 2022a). However, integrating AI with VR in a structured and supportive role has received comparatively little attention.

AI has the potential to significantly enhance VR by personalizing feedback, tracking performance over time, and creating adaptive learning environments tailored to individual needs. Although AI-driven virtual training is an emerging field, its use in interview training within educational and career center settings still needs to be explored. This dissertation aims to address this gap by examining how AI can enhance VR-based interview training, contributing to a growing but still underdeveloped area of research.

Furthermore, most existing studies on VR for interview training have been conducted in clinical or highly controlled settings, often focusing on specific populations such as individuals with autism or returning citizens (Genova et al., 2021; Smith et al., 2022c). Research on implementing VR and AI in higher education career centers still needs to be completed despite these centers' critical role in preparing students for the job market. Traditional career development models, which often rely on workshops or mock interviews, are less immersive than VR and AI technologies that simulate real-world interview environments.

Universities such as the University of Michigan and Valdosta State University have begun experimenting with VR in their career development efforts. However, these initiatives need formal, peer-reviewed research to validate their long-term effectiveness on employment outcomes. Addressing this gap will improve our understanding of how higher education institutions can adopt and scale VR and AI technologies to support students' career readiness.

Another significant gap in the current literature concerns the perspectives of career center leaders and their role in adopting and implementing VR and AI technologies. While numerous studies have focused on the experiences of participants in VR-based job interview training programs (Smith et al., 2022a; Williams & Smith, 2024), little research has examined how career center leaders—who play a key role in shaping the adoption of these technologies—view their feasibility and appropriateness.

The study by Ustel et al. (2021) provides a relevant comparison, as it explored the perspectives of peer specialists delivering VR-based vocational interventions. Although these specialists worked in mental health settings rather than career centers, the study highlights the importance of understanding how facilitators perceive new technologies. Much like peer specialists, career center leaders are essential in driving technological innovation, prioritizing staff training, and securing the resources needed for successful implementation. Understanding their perceptions is critical for ensuring that VR and AI technologies are integrated effectively into higher education career centers.

This dissertation offers a meaningful contribution to the current body of research by addressing these gaps. First, it investigates the integration of AI with VR in career development contexts, an area still in its early stages but with great potential for enhancing training outcomes. Second, it focuses on higher education institutions, particularly career centers, which are overlooked mainly in existing VR and AI research. Finally, by centering the perceptions of career center leaders, this study provides valuable insights into the challenges and opportunities related to adopting these technologies. Through rigorous analysis, this research aims to bridge the gap between theoretical understanding and practical application, supporting the more effective use of VR and AI in preparing students for the workforce.

Theoretical Framework

The Diffusion of Innovations theory, developed by Rogers (2003), provides a framework for understanding how new technologies, such as virtual reality (VR) and artificial intelligence (AI), spread within organizations. Contrary to popular belief, groundbreaking technologies require strategic communication and targeted adoption efforts to ensure successful integration. Innovations seldom diffuse rapidly or uniformly; factors such as competing innovations, varying organizational needs, and different perceptions among adopters can all affect the diffusion rate (Rogers, 2003). Understanding these factors is essential for evaluating perceptions of innovations like VR and AI within organizations, as acceptability, appropriateness, and feasibility significantly influence implementation outcomes and overall success (Proctor et al., 2011; Weiner et al., 2017).

Diffusion of Innovations

The Diffusion of Innovations theory provides the framework for this study. According to Rogers (2003), diffusion is "the process in which an innovation is communicated through certain channels over time among the members of a social system” (p. 5). The four key components of diffusion are (1) innovation, (2) communication channels, (3) time, and (4) the social system.

Innovation. Rogers' (2003) diffusion of innovations theory defines innovation as any idea, object, or practice perceived as new by its adopter. The adoption of innovations depends on several factors, including knowledge and persuasion. Rogers emphasizes that not all innovations are equal, and distinguishing between them can be complex. Technology, a significant form of innovation, helps reduce uncertainty through hardware (for example, the Meta Quest 2) and software (such as VirtualSpeech), which provide the necessary information for problem-solving.

Diffusion focuses on how innovations spread by minimizing uncertainty. Key types of information include software-related data, which addresses cause-and-effect uncertainties, and innovation-evaluation information, which assesses expected outcomes. The perception of newness can vary among adopters, such as career center leaders, whose awareness of virtual reality (VR) and artificial intelligence (AI) may differ. This sense of newness creates uncertainty, driving adopters to seek information to alleviate it.

The innovation-decision process consists of four stages: (1) knowledge (awareness of the innovation), (2) persuasion (forming attitudes towards it), (3) decision (choosing to adopt or reject it), and (4) implementation (evaluating its acceptability, appropriateness, and feasibility). Finally, confirmation reinforces the decision to adopt the innovation. Peer networks also play a crucial role in adoption, as leaders often follow trends set by their peers within their professional networks. Building on the understanding of innovation, effective communication channels are essential for producing and sharing information and fostering mutual understanding among different entities (Rogers, 2003).

Communication Channels. Communication channels are essential for producing and transferring information and fostering mutual understanding among entities (Rogers, 2003). This two-way process can either align or diverge meanings and perceptions, which is crucial in the diffusion of innovations. Typically, the diffusion process involves an innovation, an adopter who understands it, and another who lacks that experience. Potential adopters often imitate and model behaviors from their networks to encourage implementation across organizations.

Homophily, which refers to individuals sharing similar attributes such as beliefs and education, enhances communication. Conversely, heterophily occurs when a change agent's expertise differs from the potential adopter's understanding, creating barriers to effective communication. It is important to consider the complexity of this process over time (Rogers, 2003).

Time. Crucial in the innovation-decision process time guides adopters from initial awareness to full implementation (Rogers, 2003). It also affects how early or late innovations are adopted and the speed at which individuals within a system embrace them. Most innovations follow an S-shaped adoption curve: they begin slowly, then surge, and finally taper off. The adoption rates vary across social systems due to factors such as culture and environment.

Innovations provide benefits by offering superior alternatives to previous practices. However, their adoption also drives social change, impacting centralized systems (where a few leaders make decisions) and decentralized systems (where decisions are made collectively across networks). Moreover, a social system comprises dynamic units collaborating to solve problems and achieve common goals (Rogers, 2003).

Social Systems. Dynamic units that work together to solve problems and achieve common goals form a social system (Rogers, 2003). Although each unit, such as professionals in a career center, may hold different perceptions and experiences, they are united by a shared objective. Key components of a social system include structure, system effects, and norms.

Structure refers to the arrangement of units in a predictable manner, which reduces uncertainty, especially when potential adopters learn from opinion leaders. Informal networks also influence communication flows. System effects pertain to the influences that these formal and informal structures exert on behavior, while norms are the established behaviors that guide the system. Occasionally, these norms may act as barriers to innovation, necessitating intentional communication for successful diffusion (Rogers, 2003).

Having explored the four core elements that affect the diffusion process, it is important to examine specific characteristics that Rogers (2003) identified as crucial to the adoption rate for innovations like VR and AI. Since innovations often spread slowly, leaders may seek strategies to accelerate this process. A key solution is understanding the organization's culture, environment, and individual factors. The success of an innovation's diffusion largely depends on its alignment with the organization's beliefs, values, and practices and the perceived credibility of change agents or opinion leaders among potential adopters. Rogers (2003) identified five characteristics that significantly impact the adoption rate for innovations.

Characteristics Impacting Rate of Adoption

Rogers (2003) identified five key characteristics that significantly influence the rate of innovation adoption: relative advantage, compatibility, complexity, trialability, and observability. These characteristics are closely related to the psychometric implementation outcomes of acceptability, appropriateness, and expected feasibility (Weiner et al., 2017).

Relative advantage refers to how better an innovation is perceived compared to previous solutions. This evaluation often considers convenience, economic benefits, social prestige, and user satisfaction. Innovations with clear advantages tend to be adopted more quickly (Rogers, 2003). *Compatibility* reflects how well an innovation aligns with the organization's values, past experiences, and needs. Innovations that fit well with existing practices are more likely to gain acceptance.

Complexity describes how difficult innovation is perceived regarding understanding and use. The easier an innovation is to use, the faster it tends to be adopted. Innovations that do not require significant new skills or knowledge are adopted more readily (Rogers, 2003). *Trialability* refers to how an innovation can be tested or experimented with before full adoption. Innovations that can be piloted or tested help to reduce uncertainty and are more likely to be accepted. For instance, this study was informed by a pilot conducted two years ago that investigated how virtual reality (VR) affected students' interview self-efficacy. Finally, *observability* is the degree to which the results of an innovation are visible to others. When the benefits of an innovation are clear and observable, it encourages wider adoption (Rogers, 2003).

Aligning Adoption Characteristics with Implementation Outcomes

Each of these characteristics corresponds to the implementation outcome measures outlined by Weiner et al. (2017). *Acceptability* aligns with relative advantage and complexity, as innovations that offer clear benefits and are easy to implement are perceived as more acceptable. *Appropriateness* corresponds to compatibility, reflecting how well the innovation fits within the organization's climate, needs, and past experiences.

Feasibility is linked to trialability, as innovations that allow for experimentation are often perceived as more feasible. For example, career center leaders interested in implementing scalable, immersive technologies like VR and AI may explore their utility through pilot programs or trials. Finally, *observability* reinforces all three outcome measures—acceptability, appropriateness, and feasibility—by making the innovation’s impact visible to potential adopters. Seeing tangible outcomes helps to solidify the innovation’s perceived value.

Rogers (2003) emphasized that diffusion is an exchange process within interpersonal networks, where social modeling by early adopters influences others. Adoption hinges on three criteria: acceptability, appropriateness, and expected feasibility. A deficiency in any of these criteria can lead to rejection, with consequences that affect the social system in both desirable and undesirable ways. Change agents and opinion leaders often struggle to predict how innovations will be perceived, underscoring the importance of implementation research in understanding and measuring subjective responses.

Implementation Research

The main aim of the diffusion of innovations is to achieve successful implementation within a social system, providing innovative solutions for potential adopters. Leaders often assess success based on productivity; however, this can be difficult in public organizations because of quantifiable outputs' short-term and vague nature (Shafritz et al., 2016). Relying on a single efficiency measure can oversimplify performance, so using multiple context-specific measures—such as psychometric implementation outcomes—offers a more comprehensive understanding.

Implementation science involves theoretical development and practical applications that facilitate the successful adoption of innovation (Damschroder et al., 2022). Contextual factors are active and dynamic, impacting implementation outcomes in real-world settings (Dopson et al., 2010; Hawe et al., 2004; Nilsen & Birken, 2020; Shojania & Grimshaw, 2004). Proctor and colleagues (2011) addressed the ongoing challenge of defining and evaluating success in implementation science by creating a taxonomy of eight distinct implementation outcomes. By recognizing these challenges and the importance of implementation research, we lay the foundation for exploring the specific outcomes that lead to successful adoption.

Key Implementation Outcomes

The authors view implementation outcomes as essential precursors to client and service outcomes. These outcomes arise from intentional, strategic behaviors aimed at implementing new service delivery modalities (Proctor et al., 2011). Three key outcomes—acceptability, appropriateness, and feasibility—align with Rogers' (2003) innovation characteristics, which help explain the adoption rate.

Acceptability, as defined by Proctor et al. (2011), reflects a provider's perception of how agreeable an innovation is. *Appropriateness* refers to the perceived fit and relevance of the innovation within a specific context (Proctor et al., 2011). Lastly, *feasibility* pertains to the degree to which an innovation can be effectively implemented in a given setting (Karsh, 2004, as cited in Proctor et al., 2011).

Although acceptability, appropriateness, and feasibility share similar meanings, it is important to recognize their distinct conceptual and practical differences. Openness and trialability, which relate to acceptability, consider individuals' needs and preferences. Norms and relevance, connected to appropriateness, address the technical and social efforts needed to achieve goals amidst varying conditions, challenges, and values. Resource availability and complexity pertain to feasibility, focusing on the relative ease of implementation, which is influenced by factors such as time, finances, effort, and environmental conditions (Proctor et al., 2011).

Conceptualization of Implementation Outcomes

Weiner et al. (2017) emphasized the importance of implementation research in conceptualizing and measuring implementation outcomes, which enhances the understanding of implementation processes, research efficiency, and organizational effectiveness. Their findings indicated that the acceptability, appropriateness, and feasibility measures exhibited substantial validity across multiple dimensions. By evaluating these measures before implementation, organizations can improve the successful diffusion of innovations (Weiner et al., 2017).

Understanding the distinct characteristics of acceptability, appropriateness, and feasibility is crucial for effectively applying these concepts in the context of innovation adoption.

Leading indicators of success, such as acceptability, appropriateness, and feasibility, empower organizational leaders to assess innovations through experiential learning. The formation of perceptions regarding adoption or rejection plays a vital role in informed decision-making. The measures identified by Weiner et al. (2017) are valid, reliable, and practical, applicable across various research areas, including pilot, efficacy, and exploratory studies.

Weiner et al. (2017) also highlighted the significance of these measures as preconditions for achieving desired client outcomes. While most implementation outcome measures evaluate scale reliability through inter-item consistency, few address predictive validity, responsiveness, and stability. The authors recommend using measures that are conceptually distinct yet interrelated, such as the Orientation of Innovation Acceptability Measure (OIAM), the Intervention Appropriateness Measure (IAM), and the Feasibility of Implementation Measure (FIM). Although the term "intervention" is used, it often aligns with the interchangeable use of "innovation" in Rogers' (2003) framework.

Finally, Michie et al. (2009) stressed the necessity of consistent language to describe behavior change techniques and implementation outcomes. This consistency is vital for the acceptability, appropriateness, and feasibility constructs, which are often misused interchangeably. By fostering a shared understanding of these key terms, researchers and practitioners can communicate more effectively about implementation processes, ultimately enhancing the effectiveness of innovations within social systems. The alignment between implementation research and Rogers' diffusion of innovations theory strengthens the foundation for successful innovation adoption, paving the way for meaningful improvements in service delivery and client outcomes.

Understanding the implications of these implementation outcomes is critical, as they inform decision-making and enhance the success of innovative solutions. However, while the frameworks of Rogers' Diffusion of Innovations Theory and Proctor and Weiner's implementation outcome measures provide valuable insights into the adoption of innovations, previous studies have often lacked specificity regarding their application in unique contexts, such as virtual reality (VR) and artificial intelligence (AI) in career centers. This oversight has contributed to a significant research gap concerning the specific application of VR supplemented by AI within career centers in higher education institutions. The present study aims to address this gap by examining the perceptions of career center leaders regarding these technologies and their implications for enhancing career services.

Summary

This literature review examines the transformative role of career centers in adapting to technological advancements and evolving workforce demands, explicitly focusing on integrating virtual reality (VR) and artificial intelligence (AI) in training practices. It traces the historical context of career centers, highlighting their dynamic evolution from early vocational guidance to contemporary technology-driven paradigms that address the diverse needs of both students and employers (Cong, 2023; Ghanbaripour et al., 2024; Tan et al., 2022).

The review outlines career readiness, a critical framework established by the National Association of Colleges and Employers (2024). It underlines key competencies essential for employability, particularly emphasizing how VR and AI can enhance the development of these skills, aligning educational practices with industry expectations (Bell, 2022; Burke et al., 2020; Kong et al., 2023).

A comparison is made between traditional mock interview training and emerging virtual platforms, noting the scalability limitations of traditional methods (Hirsch, 2017; Levashina et al., 2014). The synthesis of research indicates the effectiveness of VR and AI in fostering job readiness and alleviating interview anxiety, demonstrating their value for diverse populations, including marginalized and special groups (Adiani et al., 2022; Cabell & Gnilka, 2021; Vasquez et al., 2015; Williams & Smith, 2024).

Despite these promising findings, the literature still has gaps regarding career center leaders' perceptions of the implementation of VR and AI technologies. Addressing these gaps is crucial for understanding the barriers and facilitators of technological adoption in career services. Additionally, this chapter serves as a foundation for utilizing Rogers' (2003) diffusion of innovations theory as a framework to evaluate the acceptability, appropriateness, and feasibility of these innovations within career centers.

In conclusion, this comprehensive review emphasizes the critical role of VR and AI in enhancing career readiness initiatives, providing a structured analysis that informs both current practices and future directions for career centers. By leveraging these advanced technologies, institutions can better prepare students for successful transitions into the workforce, ultimately improving employment outcomes for graduates (Ghanbaripour et al., 2024; Miah et al., 2024). The following chapter will detail the methodology and data analysis used in this research, offering insights into the perceptions of career center leaders regarding implementing these innovative technologies.

Chapter 3:

Methodology

The current study replicated some of the methods used by Sherwood et al. (2022) to evaluate the perceptions of teachers, leaders, and students involved in pre-employment transition services (pre-ETS). Specifically, this study examines whether participants view virtual reality (VR) job interview training as appropriate, acceptable, and feasible for transition-age autistic youth. The roles of the teachers and leaders delivering pre-ETS, including job interview training, are similar to those of career center leaders in higher education. Therefore, data were collected from career center leaders across various higher education institutions to assess qualitative measures for univariate, bivariate, and multivariate data analyses.

Recruitment

Participants in this study were selected from a convenient sample of career center leaders in the higher education sector. Recruitment focused on leaders involved in the innovative decision-making processes related to virtual reality (VR) and artificial intelligence (AI) training. After receiving approval from the Institutional Review Board (Appendix A), a recruitment email was crafted and sent to targeted participants (Appendix B). This email included the study title, a detailed description of the research, and an outline of the potential risks and benefits associated with participation. It also included the official IRB statement and a written request for participants to consent to the researcher conducting the study on-site at their organization.

Once participation was confirmed, each participant received a calendar invite detailing the study session's scheduled date, time, and location. The recruitment process aimed to include various organizations, covering both public and private higher education institutions. This sampling approach comprehensively represented career center leaders across various leadership levels, from Lead Career Counselor to Assistant Dean.

Sample Characteristics

The participant sample consisted of career center leaders, each representing different higher education institutions, including research universities, comprehensive universities, state colleges, and technical colleges. Notably, the career centers varied in their models, being either centralized or decentralized. The selection process utilized convenience sampling from a professional network, including five leadership levels, allowing for diverse perspectives. The sample featured one Assistant Dean, four Directors, one Associate Director, two Assistant Directors, and one Lead Career Counselor.

The participant selection criteria were rigorous, requiring candidates to have at least three years of professional experience leading a career center within a higher education institution and to hold a master's degree. Nine participants from the convenience sample met these criteria and were chosen to engage in the innovative decision-making process related to virtual reality (VR) and artificial intelligence (AI). While the limited sample size reflects the study's exploratory nature, it facilitated a focused and detailed collection of insights from experienced leaders.

To support the adequacy of the sample size, the concept of "information power," as proposed by Malterud et al. (2016), was applied. Information power suggests that the more relevant and specific the information participants provide, the fewer participants are needed to generate meaningful data. Given these career center leaders' specialized expertise and direct involvement in decision-making processes regarding VR and AI innovations, the sample was sufficient to yield rich and insightful data. This reinforces the findings' validity and applicability to other career center leaders considering the adoption of immersive job interview training technologies.

Trial Design and Procedures

The training fidelity checklist was incorporated into this study to ensure consistency and scientific rigor throughout the innovative decision-making process (Appendix C). This process includes the phases of orientation, innovation experience, and evaluation for each research participant. The virtual reality (VR) and artificial intelligence (AI) training procedures began with an orientation session, during which participants were introduced to the innovations and the components of the experimental process (Appendix D).

After the orientation, career center leaders participated in job interview training facilitated by the Meta Quest 2 hardware and VirtualSpeech© software. This training was designed to provide participants with a comprehensive understanding of VR and AI's potential benefits and applications within their career centers. Upon completing the training, participants were given a structured quantitative questionnaire to evaluate their perceptions of the acceptability, appropriateness, and expected feasibility of implementing the VR and AI innovations (Appendix E). The technologies enhanced the training process and played a crucial role in shaping the participants' experiences and perceptions. The following section provides a detailed overview of the Meta Quest 2 hardware and VirtualSpeech© software that formed the basis of the VR job interview training.

Virtual Reality (VR) and Artificial Intelligence (AI) Innovations

The hardware used in this study included the Meta Quest 2 head-mounted display (HMD) and touch controllers, which provide participants with immersive virtual experiences (Meta, 2024). The Meta Quest 2 represents a significant advancement in virtual reality technology, offering a portable, wireless experience that is user-friendly and easy to set up. As Xiong et al. (2021) explain, innovations in virtual reality headsets, such as holographic optical elements (HOEs) and lightweight designs, have made devices like the Meta Quest 2 particularly effective for creating immersive and realistic simulations (p. 2). The compact form factor of the Meta Quest 2, along with its clear visuals and 3D sound, contributes to a high-quality VR experience, making it an ideal tool for job interview training simulations.

Figure 3.1

Meta Quest 2 head-mounted display and touch controllers.

Note. *Image from Meta Quest 2 product, by Meta, 2024 (https://www.meta.com/quest/). Copyright 2024 by Meta.*

The VirtualSpeech© application offers a variety of content modules designed for different communication scenarios, such as public speaking, storytelling, impromptu speaking, elevator pitches, and salary negotiations (VirtualSpeech, 2024). For this study, the Job Interview Preparation module allowed participants to practice interviews in an immersive virtual environment. Users could choose the type of interview tailored to a specific organization, industry, or job role. The interview questions were customized based on the user's preferences. Additionally, users could select from a diverse range of avatars, enhancing the inclusivity and personalization of the interview experience.

Figure 3.2

Diverse avatars.

Note. *From "VirtualSpeech," by VirtualSpeech©, 2024 (https://virtualspeech.com/). Copyright 2024 by VirtualSpeech. Reprinted with permission.*

The VirtualSpeech© software offers immediate, AI-driven feedback on essential communication aspects such as body language, eye contact, speech clarity, filler words, and speaking pace. As shown in Figure 3, the body language analysis visually highlights areas for improvement, allowing users to see how their posture, gestures, and overall physical presence impact their communication effectiveness. This detailed, real-time feedback helps users refine their interview skills by identifying specific weaknesses in nonverbal communication and allowing them to practice in a safe, virtual environment.

Figure 3.3

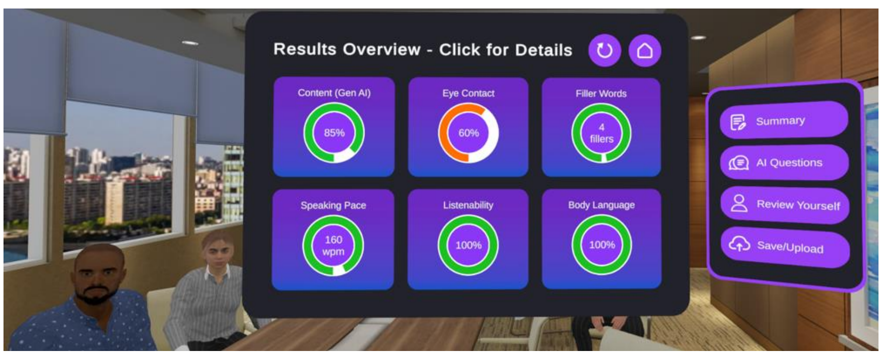
Body language assessment.

Note. *From "VirtualSpeech," by VirtualSpeech©, 2024 (https://virtualspeech.com/). Copyright 2024 by VirtualSpeech. Reprinted with permission.*

The AI, powered by ChatGPT, customizes interview questions to meet the specific needs of the user based on their chosen industry or role. This ensures a more relevant and realistic practice session. The AI also adjusts the difficulty and focus of questions according to the user's performance, making the interview process dynamic and responsive to their strengths and areas for improvement. Additionally, the feedback provided by the software goes beyond just body language; users receive a comprehensive performance breakdown across various communication metrics.

Figure 3.4

Results overview showing performance metrics in VirtualSpeech©



Note. *From "VirtualSpeech," by VirtualSpeech©, 2024 (https://virtualspeech.com/). Copyright 2024 by VirtualSpeech. Reprinted with permission.*

Each metric is visually displayed with percentages, helping users quickly identify their strengths and areas for improvement. For instance, the Results Overview allows users to see how their speaking pace compares to an ideal rate, providing practical insights into how their delivery affects the clarity and engagement of their message. Moreover, metrics on filler words and eye contact offer targeted feedback essential for refining verbal and nonverbal communication skills. This detailed analysis enables users to systematically address various elements of their performance, enhancing their job interview skills and overall communication competency.

Users can track their progress over time by receiving such detailed feedback, continuously improving with each session. The ability to review specific aspects, like filler words and speaking pace, allows participants to concentrate on their most critical areas for development. This comprehensive feedback system supports users in becoming more confident and polished communicators.

Integrating the Meta Quest 2 and the VirtualSpeech© application provides participants an immersive, hands-on experience of Virtual Reality (VR) and Artificial Intelligence (AI) technologies. These tools enable realistic simulations of communication scenarios, particularly for job interview preparation, allowing participants to engage deeply with these innovations. The immediate, AI-driven feedback empowers career center leaders to evaluate how the technology can enhance students' skills. At the same time, the variety of avatars and detailed performance metrics showcase the platform's adaptive and personalized nature, catering to their student populations' diverse needs.

However, for these advanced tools to be successfully implemented within organizations, decision-makers must follow a structured process to assess the feasibility and benefits of such innovations. This is where Rogers’ (2003) Innovative-Decision Process framework becomes critical. In the next section, we will explore how the procedures of this study align with Rogers' model, focusing on the early stages of knowledge acquisition, persuasion, and evaluation, all of which contribute to determining the long-term adoption or rejection of these innovations.

Innovative-Decision Process

The procedures of this study align with the innovative-decision process framework developed by Rogers (2003). This framework consists of five steps a decision-maker goes through, from initial awareness of an innovation to its final adoption or rejection. In this study, we focus on the first three steps of the decision-making process: knowledge acquisition through orientation and persuasion during the innovation experience. The third step corresponds to the evaluation phase, elaborated in the following sections. The final two steps of Rogers' process—implementation and confirmation—are addressed through the data analysis and the presentation of findings to relevant stakeholders. A visual representation of the innovative-decision process is included in the comprehensive conceptual framework of the dissertation (Appendix F).

Orientation. The innovative decision-making process began with an orientation session that covered the history, explanation, and implications of virtual reality (VR) and artificial intelligence (AI) technologies (Appendix D). Participants needed to understand how these innovations were relevant to their organizational needs before immersing themselves in the virtual environment. During this orientation, users learned to navigate the VirtualSpeech© software using the Meta Quest 2 head-mounted display (HMD) and touch controllers. Notably, the HMD is designed to cover only the upper front half of the face and the top of the head, ensuring comfort and ease of use.

The technology includes boundary and guardian settings to promote user safety throughout the VR experience. Although immersion in VR can significantly affect a user's awareness of their physical body in the real world, it is important to mention that VR can sometimes induce cybersickness. To mitigate this risk, participants were informed that they could remove the HMD at any time, with any symptoms of cybersickness subsiding soon after its removal. In our study, two users reported mild cybersickness after using the HMD for over 15 minutes; however, their discomfort quickly dissipated after removing the device, allowing them to continue enjoying the experience. The equipment was thoroughly cleaned before and after each use to ensure participants' safety and well-being. Participants were reminded that VR provides a controlled environment that encourages trial and error, highlighting the technology's adaptability and the interaction between users and these innovations.

Innovation Experience. Participants were seated within a designated boundary that the technology recognized throughout the interview. As a result, they did not need to make significant movements with their arms, legs, or hands. The head-mounted display (HMD) features guardian settings to ensure users maintain proper positioning in the physical environment. It issues warnings when users approach the boundary limits due to immersion in the virtual space.

Once the HMD and touch controllers were secured, participants explored the technological capabilities of the Meta Quest 2 HMD and the VirtualSpeech software, guided by navigation instructions provided by the researcher. As users became familiar with the virtual environment, they selected interview settings based on the type of interview, the chosen organization or industry, and the number of interviewers.

Each participant then engaged in a 15-minute mock interview, responding to questions posed by the interviewer. Following the interview, the software provided immediate feedback regarding their performance, which included metrics on body language and the content of their responses. An infographic slide appeared on their screen, presenting real-time metrics, goals, and explanations of the feedback received.

By immersing themselves in this VR-simulated experience, enhanced by AI, career center leaders gained valuable insights into the potential of these technologies to improve their students' interview readiness. This innovative experience serves as a tool in the decision-making process and a catalyst for personal growth and understanding. The structured questionnaire developed for this study is designed to elicit responses aligned with the participants' organizational needs, enabling decision-makers to experience the innovations firsthand and provide quantitative feedback on qualitative perceptions.

Evaluation. Participants shared their final thoughts after completing the innovation experience and were instructed to complete a structured questionnaire within 48 hours (Appendix E). The survey tool, Qualtrics, provided each participant with an anonymous link to ensure confidentiality. Participants answered 30 questions using multiple-choice formats, a five-point Likert scale, and open-ended feedback options. The evaluation addressed demographics, program characteristics, and perceptions of acceptability, appropriateness, and expected feasibility.

The questionnaire included definitions for acceptability, appropriateness, and expected feasibility measures. Acceptability questions focused on participants' experiences with the Meta Quest 2 HMD, VirtualSpeech© software, and the integrated AI. Appropriateness questions assessed how well the hardware and software met students' needs, aligned with work-readiness competencies, and supported the organization’s strategic goals. Expected feasibility questions considered budget, staff training, implementation logistics, and stakeholder support.

Study Measures

Career center leaders' perceptions regarding the acceptability of virtual reality (VR) and artificial intelligence (AI) job interview training, the appropriateness of these innovations, and the expected feasibility of their implementation were assessed using a structured questionnaire based on the work of Sherwood et al. (2022). These constructs were derived from validated measures developed by Weiner et al. (2017), which have been widely utilized in implementation science to evaluate new technologies.

As noted in the literature, the questionnaire employed a five-point Likert scale, a recognized method for capturing subjective data (Jebb et al., 2021). Likert scales effectively measure complex perceptions and attitudes, with each item rated from 0 (not at all) to 4 (very much). The reliability and validity of these scales were developed according to best practices for Likert scale construction established over the past 25 years (Jebb et al., 2021), ensuring that the questions were straightforward and provided precise measurements of the constructs being studied.

Acceptability

Acceptability refers to the perception among stakeholders involved in the implementation process that the innovation is agreeable, palatable, or satisfactory (Proctor et al., 2011). This measure consisted of seven items designed to assess participants' perceptions of the VR and AI interview training orientation. Example items included statements such as, "To what extent do you feel the VR and AI interview training orientation was useful for your role?" Responses were collected using a five-point Likert scale, with ratings ranging from 0 (not at all acceptable) to 4 (very acceptable). The scores for acceptability were summed to produce a total score for each participant.

Appropriateness

Appropriateness refers to how well an innovation fits, is relevant to, or is compatible with specific issues or problems it addresses (Proctor et al., 2011). This measure included six items, such as, "How well do you think virtual reality (VR) or artificial intelligence (AI) aligns with clients' motivations for interview preparation?" Responses were collected using a five-point Likert scale, with ratings ranging from 0 (not at all appropriate) to 4 (very appropriate). The summed scores for appropriateness provided a total score that reflected the participants' perceptions of how relevant the innovations were to their organizational contexts.

Expected Feasibility

Expected feasibility refers to the degree to which an innovation can be effectively implemented in a specific context (Karsh, 2004, as cited in Proctor et al., 2011). This measure includes seven items to assess participants' confidence in applying VR and AI innovations within their career centers. For example, one item might ask, "How confident are you that, after training participants, you can assist them in implementing VR and AI interview training?" Participants responded using a five-point Likert scale, with ratings ranging from 0 (not at all feasible) to 4 (very feasible).

Participant Demographics

The demographic information gathered through the structured questionnaire included several factors: gender, age range, race, education level, years of experience in career services, type of institution (public or private), and the model of the career center (centralized or decentralized). This demographic data is crucial for analyzing the responses and understanding the perspectives of career center leaders.

Programmatic Characteristics

Programmatic characteristics included various factors relevant to the participants' current job interview training methods. These factors encompassed satisfaction levels with existing training methods, the scalability of those methods, immersive experiences offered, the number of mock interviews conducted, staff size, available facilities, student population size, and the annual technology budget allocated for training. The study aimed to connect these programmatic characteristics with participants' perceptions of the acceptability, appropriateness, and expected feasibility of the proposed VR and AI innovations by collecting this information.

Research Questions and Hypotheses

This study formulated eight research questions, each accompanied by multiple related hypotheses aimed at exploring the perceptions of career center leaders regarding the acceptability, appropriateness, and expected feasibility of implementing VR and AI innovations.

Research question one explores the perceptions of career center leaders regarding the acceptability of implementing virtual reality (VR) and artificial intelligence (AI) innovations. The null hypothesis states that the summed score for acceptability of VR and AI innovations does not indicate a significant level of acceptability. Alternatively, it is hypothesized that the summed acceptability score will indicate a significant level.

Research question two addressed the extent to which career center leaders perceive VR and AI innovations as appropriate for their organizational and student needs. The null hypothesis states that the summed scores for appropriateness will not indicate a significant level of appropriateness. However, it is predicted that there will be a significant level of appropriateness of the VR and AI innovations.

Research question three investigates the perception of career center leaders of VR and AI regarding the expected feasibility of implementing VR and AI innovations in their organizations. The null hypothesis states that there will not be a significant level of expected feasibility as measured from the data reported by the career center leaders. The alternative postulates that there will be a significant level of expected feasibility for diffusing the VR and AI innovations within their career center.

Research question four analyzes how the type of institution, public or private, influences programmatic characteristics. Items that characterize the career center include current research-supported job interview prep training, satisfaction, scalability, immersion, mock interviews, career center staff size, available rooms, career center student size, and annual technology budget. The null hypothesis states that the type of institution does not impact the programmatic characteristics of a career center. Alternatively, it is predicted that at least one of the programmatic characteristics will have an impact on the type of institution.

Research question five assesses whether the influence of the career center's centralized or decentralized model is evident among the programmatic characteristics mentioned above. The null hypothesis states that the centralized or decentralized model will not influence the career center's programmatic characteristics. The alternative hypothesis posits that the career center model will impact at least one of the programmatic characteristics.

Research question six analyzes the influence of the career center's programmatic characteristics on the acceptability of VR and AI innovations. The null hypothesis claims that none of the programmatic characteristics significantly influence the appropriateness of VR and AI. However, the alternative predicts that at least one of the programmatic characteristics will influence the appropriateness of implementing the innovations.

Research question seven measures if the programmatic characteristics influence the expected feasibility of implementing VR and AI in the career center. The null hypothesis is that no programmatic characteristics will significantly impact the appropriateness. The alternative hypothesis postulates that at least one programmatic characteristic will influence the innovations' appropriateness.

Research question eight analyzes the influence of programmatic characteristics on the expected feasibility of implementing VR and AI. The null hypothesis states that none of the career center's programmatic characteristics significantly influence the expected feasibility of implementing the innovations. Alternatively, it is predicted that at least one of the programmatic characteristics will impact the expected feasibility.

Data Analyses

Various statistical analyses were utilized to address these research questions. The current study involved univariate, bivariate, and multivariate analyses to assess the qualitative perceptions of acceptability, appropriateness, and expected feasibility. The data analyzed comprised the structured questionnaire responses from nine research participants.

Univariate Analyses: Descriptive Statistics and Summed Scores

The initial step in the data analysis involved conducting univariate analyses to describe the sample's demographics and the program's characteristics. These descriptive statistics provided summary measures, including the mean, standard deviation, and range, effectively encapsulating the dataset. The sample demographics included gender, age range, race, education level, years of experience, type of institution (public or private), and the career center model (centralized or decentralized). The programmatic characteristics included career center staff size, the number of available rooms, student population size, and the annual technology budget. Furthermore, the data addressed current training methods, satisfaction levels, scalability, and the depth of job interview training immersion within the participants' organizations.

The second univariate analysis focused on calculating summed scores for the acceptability, appropriateness, and expected feasibility outcome measures, which are critical to addressing the research questions. These scores were obtained by summing responses to each item, assessing these constructs across all nine participants. As defined by Edelsbrunner (2022), summed scores aggregate responses to each scale, providing a quantitative overview of participants' perceptions of VR and AI technologies. This approach indicates how career center leaders perceive the potential of VR and AI, aligning with the research goal of assessing acceptability, appropriateness, and feasibility. Edelsbrunner (2022) also explained that summed scores simplify conceptualization and statistical computation, allowing researchers to generate meaningful data without more complex models like factor analysis. This method supports the study's objective of deriving practical insights without the need for sophisticated modeling.

Bivariate Analyses: Chi-Square and T-Test

To address the fourth and fifth research questions, chi-square tests were employed as the first bivariate analysis to examine the independence of paired observations across two datasets. This analysis determined whether one nominal variable could predict another (McHugh, 2013). Specifically, chi-square tests assessed the independence between categorical variables, evaluating how the type of institution (public or private) influences non-metric programmatic characteristics, such as job interview training availability and satisfaction levels (McHugh, 2013). The first model used the type of institution (private or public) as the independent variable, with non-metric programmatic characteristics as the dependent variables. The second model analyzed the career center model (centralized or decentralized) against non-metric programmatic characteristics.

In addition to the chi-square analyses, T-tests were conducted to compare means between two groups to identify significant differences (Mishra et al., 2019). T-tests required continuous data that followed a normal distribution and demonstrated homogeneity of variance. This aspect of the analysis focused on metric programmatic characteristics, including the number of daily mock interviews conducted, the size of the career center staff, the number of available rooms, the student population size, and the annual technology budget. Two separate models were used: the first tested the type of institution as the independent variable against the metric programmatic characteristics, while the second examined the influence of the career center model on the same dependent variables. These bivariate analyses explored relationships between two variables and demonstrated the need for further analysis to simultaneously assess relationships involving multiple variables.

Multivariate Analysis: Spearman Correlation

The final analytical technique used in this study was the Spearman correlation, chosen due to the small sample size of nine participants and its suitability for non-normally distributed data (de Winter, Gosling, & Potter, 2016). Unlike chi-square tests and T-tests used for categorical or metric data, the Spearman correlation measures the strength and direction of monotonic relationships between ranked variables, such as Likert scale responses. Three separate Spearman correlation models were constructed to analyze the relationships between program characteristics (independent variables) and the acceptability, appropriateness, and expected feasibility outcome measures. The first model focused on acceptability, the second on appropriateness, and the third on expected feasibility.

Summary

This chapter outlined the methodology used to examine career center leaders' perceptions of virtual reality (VR) and artificial intelligence (AI) innovations in job interview training. By employing a structured approach that encompasses detailed recruitment strategies, rigorous participant selection, and comprehensive data analyses, the study aimed to clarify the acceptability, appropriateness, and expected feasibility of these innovative training methods. The recruitment process successfully engaged a convenient sample of leaders from nine public and private higher education institutions, ensuring a diverse range of perspectives from various leadership roles. Inclusion criteria required participants to possess at least three years of experience and a master's degree, reinforcing the findings' credibility.

After an orientation on the hardware and software, career center leaders participated in immersive VR job interview training facilitated by Meta Quest 2 and VirtualSpeech© software. This innovative training module, enhanced by AI, provided participants with real-time feedback and performance evaluations, enabling them to navigate a comprehensive virtual interview environment. Following the training, participants completed a structured questionnaire within 48 hours to assess their perceptions of the training's acceptability, appropriateness, and expected feasibility.

The data analysis employed univariate, bivariate, and multivariate statistical techniques to understand the research participants' perspectives comprehensively. Univariate analyses provided descriptive statistics, while bivariate analyses, including chi-square tests and T-tests, explored the relationships between program characteristics. Additionally, the Spearman correlation was used to examine how various program characteristics were associated with perceptions of VR and AI interview training. This methodical approach clarifies the potential for implementing (or diffusing) VR and AI job interview training within higher education career centers, providing a valuable framework for future innovations in career readiness programs. The next chapter will present the results of the data analyses, revealing the perceptions of the three psychometric outcome measures.

Chapter 4:

Results

This chapter presents the study's unique findings, focusing on the perceptions of career center leaders regarding the acceptability, appropriateness, and feasibility of implementing VR and AI innovations. While building on existing research, our study adopts a novel approach by targeting a population that has not been extensively studied—career center leaders within higher education institutions. By concentrating on this specific group, we aim to fill a gap in the literature and provide fresh insights into how these leaders perceive and approach the implementation of VR and AI technologies within their career centers. Understanding the distinct characteristics of this population is crucial for contextualizing the findings, especially concerning technology adoption in career development settings.

Although the quantitative findings were not statistically significant due to the small sample size and have been moved (Appendix G), the comprehensive analytical framework and methodology remain vital to the study. These analyses, referred to as first-level, second-level, and third-level analyses, as defined by Jansen (2010), provide a robust foundation for understanding the nuanced interactions among institutional characteristics and programmatic factors.

The three levels of analysis—univariate, bivariate, and multivariate—tested several hypotheses related to the perceptions of career center leaders regarding the acceptability, appropriateness, and feasibility of implementing VR and AI innovations in their centers. The univariate analysis examined perceptions through summed scores. In contrast, the bivariate analysis explored how institutional characteristics (such as the type of institution—public or private—and career center model—centralized or decentralized) influence programmatic characteristics. The multivariate analysis further investigated the relationships among multiple programmatic characteristics and how they collectively impact VR and AI innovations' acceptability, appropriateness, and expected feasibility. Each level of analysis was aligned with specific research questions guiding this study.

The first-level analysis focuses on unidimensional descriptions, which examine individual variables to explore diversity within the sample population. This level corresponds with the univariate analyses conducted in this study, providing foundational insights into each characteristic and offering a detailed view of demographics and programmatic attributes. It sets the stage for more complex interactions in subsequent levels of analysis.

The second-level analysis integrates multiple dimensions by exploring interactions between two variables, corresponding with the bivariate analyses. This approach evaluates the relationships between institutional characteristics and programmatic outcomes, highlighting the interactions and influences among these dimensions. This level reveals key patterns that inform the acceptability, appropriateness, and feasibility of VR and AI implementation within career centers by identifying significant associations.

The third-level analysis extends the exploration by linking observed relationships and diversity in the data to broader contextual determinants, providing an explanatory framework. This level corresponds with the multivariate analyses, which assess how various programmatic characteristics collectively influence perceptions of VR and AI technologies. The multivariate approach allows for a comprehensive understanding of the combined impact of these factors, illustrating the complexities of technology adoption and its implications within different institutional contexts.

While the analyses are limited in statistical significance due to the small sample size, they demonstrate methodological rigor and provide a strong framework for future studies with larger samples. The qualitative insights gained from these analyses offer valuable perspectives on the perceptions of career center leaders, which can inspire and guide future research in this area.

Perceptions of Virtual Reality and Artificial Intelligence Adoption

The study examined the attitudes of career center leaders toward adopting virtual reality (VR) and artificial intelligence (AI) technologies, revealing optimism and concerns. Participants generally expressed a willingness to embrace these innovations, viewing them as potentially transformative tools for career development. However, their responses were significantly influenced by their organizations' specific institutional constraints and contextual factors, including resource availability, organizational readiness, and perceptions of stakeholder engagement.

The perceptions can be categorized into three key dimensions: acceptability, appropriateness, and feasibility. These dimensions offer a deeper understanding of the opportunities and challenges of integrating VR and AI into career services. By exploring these areas in detail, the study aims to provide insights that could inform future implementation efforts of such technologies in higher education institutions. While the small sample size may limit the findings, it lays the foundation for future research and application in similar contexts.

Acceptability

Career center leaders recognized the innovative potential of virtual reality (VR) and artificial intelligence (AI) in enhancing student engagement and job preparation. However, concerns were raised about the initial learning curve for students and staff and potential resistance to change from key stakeholders. For instance, some participants expressed skepticism about whether these technologies could effectively replicate traditional career services without compromising the essential personal touch in such interactions. Despite these concerns, there was a consensus on the unique value these tools could offer for skills development.

Appropriateness

Participants emphasized the importance of virtual reality (VR) and artificial intelligence (AI) in preparing students for their careers, particularly for real-world job interviews and professional interactions. They pointed out that VR can create simulations of high-pressure situations, such as interviews or networking events, providing students with a safe space to build their confidence. However, some leaders noted that the effectiveness of these tools may vary depending on the demographics and resources of each institution. This highlights the vital need for tailored implementation strategies to use these technologies successfully.

Expected Feasibility

Participants repeatedly questioned the feasibility of implementing VR and AI technologies. They cited several factors, including financial constraints, staff capacity, and technical infrastructure. For instance, smaller career centers doubted sustaining such programs without additional funding or institutional support. However, participants acknowledged that the feasibility of these technologies could improve over time as costs decrease and institutions begin to prioritize innovation in student services. This recognition of potential improvement leaves the audience feeling hopeful and optimistic.

The findings also supported the significant role of institutional context in shaping perceptions of VR and AI adoption. While the limited sample size does not allow for statistical significance, specific patterns that warrant further exploration emerged. It is essential to investigate these patterns based on institution type (private or public) and career center model (centralized or decentralized). This further exploration accentuates the importance of audience input, making them feel valued and necessary.

Institution Type

The study highlighted significant differences in perceptions of virtual reality (VR) and artificial intelligence (AI) technologies between public and private institutions, illustrating how the type of institution impacts readiness for adoption. Public institutions, which generally serve more extensive and diverse student populations, expressed considerable concerns about the scalability of these technologies. Leaders at these institutions emphasized the challenges of implementing VR and AI tools across a broad student base, citing resource limitations and the logistical complexities of ensuring equitable access. For instance, public institutions often operate under stricter budget constraints and must distribute resources among competing priorities, such as student support services, academic programming, and infrastructure development. These constraints can hinder their ability to invest in cutting-edge technologies, even as they recognize potential benefits.

In contrast, despite having smaller staff sizes, private institutions were more open to exploring the adoption of VR and AI technologies. This willingness may stem from greater flexibility in budget allocation and a focus on differentiating their career services to improve student outcomes and bolster institutional reputation. Leaders from private institutions noted that their smaller size and more autonomous financial structures allowed them to pilot innovative programs with fewer bureaucratic obstacles. However, they also acknowledged that their ability to sustain such initiatives long-term would depend on securing ongoing funding and demonstrating straightforward returns on investment.

The differences in resource availability and organizational priorities between public and private institutions suggest that strategies for adopting VR and AI technologies must be tailored to the unique contexts of each type. Public institutions could benefit from partnerships and external grants to overcome funding barriers. In contrast, private institutions might leverage their agility to experiment with targeted implementations, potentially serving as models for broader adoption across the sector.

Career Center Model

The potential benefits of adopting virtual reality (VR) and artificial intelligence (AI) in career centers are significant, highlighting the importance of organizational structure. With their streamlined decision-making processes and ability to pool resources, centralized career centers are better equipped to implement these technologies. Leaders from centralized models have noted the advantages of a unified framework, which allows for consistent strategic planning and easier coordination of technology initiatives. For example, centralized career centers often have dedicated teams responsible for assessing and deploying innovative tools, which can speed up the adoption process and ensure alignment with institutional goals.

In contrast, decentralized career centers face considerable challenges when adopting VR and AI technologies. These challenges arise from the fragmented nature of their operations, as they often involve multiple departments or campuses functioning independently. Leaders from decentralized models report difficulties coordinating efforts and securing necessary resources for large-scale implementation. A cohesive budget or shared infrastructure is necessary to ensure decision-making and consistency in technology access across different units. This decentralized structure also complicates achieving buy-in from all stakeholders, making it harder to standardize VR and AI tools.

Despite these challenges, leaders from decentralized career centers recognize the potential for incremental adoption. They find value in starting with pilot programs within specific departments or campuses. By demonstrating the benefits of these technologies in smaller, controlled environments, decentralized centers can lay the groundwork for broader implementation. Conversely, centralized models can leverage their structural advantages to more comprehensively integrate VR and AI into their existing frameworks, setting a standard for best practices in the field.

These insights underscore the necessity of developing tailored strategies for adopting VR and AI. While both centralized and decentralized models encounter unique obstacles, their respective strengths can be harnessed to create strategies fit for their specific contexts. Centralized models might focus on scaling initiatives across the entire institution, while decentralized models can concentrate on localized experimentation to build a compelling case for broader adoption.

To fully understand career center leaders' perceptions of the acceptability, appropriateness, and feasibility of VR and AI technologies, it is essential to consider the demographic and institutional contexts of the study participants. The following section offers a detailed overview of the sample demographics and institutional characteristics, providing critical insights into the diversity and unique attributes of the study population. This contextual information not only aids in interpreting the qualitative findings but also emphasizes the importance of these factors in shaping perceptions and the adoption of VR and AI technologies.

Sample Demographics

Table 4.1 outlines the demographic variables of participants, including gender, age, race, education level, and years of experience. These statistics establish a comprehensive understanding of the sample's composition and inform the interpretation of subsequent analyses. However, it is essential to note that the study utilized a convenience sampling method, selecting participants based on availability within a professional network. While this approach facilitated recruitment, it may introduce bias, as the sample may only partially represent the broader population of career center leaders. As a result, generalizability is limited, and caution is needed when applying these findings beyond the sample.

Table 4.1

Sample Demographic Descriptives

Characteristic	*n*	%	*M*	*SD*	*Range*
Gender					
Man	4	44.4	-	-	-
Woman	5	55.6	-	-	-
Age					
25-34	2	22.2	-	-	-
35-44	4	44.4	-	-	-
45-54	2	22.2			
55-64	1	11.1	-	-	-
Race					
Black or African American	3	33.3	-	-	-
White	6	66.7	-	-	-
Education					
Doctoral	2	22.2	-	-	-
Master's	7	77.8	-	-	-
Years of Experience	9	100	11.6	10.2	3-22

Note. n represents the frequency count of participants within each category. *M* indicates the mean value for years of experience, and *SD* represents the standard deviation for years of experience.

Understanding the demographic profile of career center leaders is essential for contextualizing their perceptions of VR and AI technologies. By identifying the diversity within the sample, this analysis supports the generalizability of the findings. It aligns with the research framework's aim to understand the broader perspectives of various institutional types. It is important to note that the small sample size of 9 participants limits the statistical power of the findings, making it difficult to generalize the results to a broader population of career center leaders.

Table 4.2 presents non-metric characteristics, such as the type of institution (public or private) and career center model (centralized or decentralized). This univariate analysis helps to identify structural variations across institutions, providing context for later analyses. However, it is essential to note that the sample included only two private institutions compared to 7 public institutions. This imbalance could influence the interpretation of differences between public and private institutions and limit the generalizability of the findings to all private institutions.

While the small sample size and the predominance of public institutions (77.8%) limit the generalizability of the findings across all higher education career centers, specific insights may still hold transferability to institutions with similar characteristics, such as those operating centralized career center models or with comparable resources. This distinction between generalizability and transferability is crucial when considering the broader application of these results.

Table 4.2

Non-Metric Programmatic Characteristic Descriptives

Characteristic	*n*	%
Type of Institution (TOI)		
Private	2	22.2
Public	7	77.8
Career Center Model (CCM)		
Centralized	6	66.7
Decentralized	3	33.3
Current-Research Supported Methods		
Not at all	1	11.1
Less	1	11.1
Somewhat	1	11.1
More	6	66.7
High	0	0
Job Interview Prep Training		
Not at all	0	0

Less	1	11.1
Somewhat	3	33.3
More	2	22.2
High	3	33.3
Current Satisfaction		
Not at all	0	0
Less	1	11.3
Somewhat	3	33.3
More	5	55.6
High	0	0
Current Scalability		
Not at all	1	11.1
Less	1	11.1
Somewhat	1	11.1
More	4	44.4
High	2	22.2
Current Immersion		
Not at all	1	11.1
Less	3	33.3
Somewhat	3	33.3
More	1	11.1
High	1	11.1

Note. Percentages reflect the distribution of responses for each programmatic characteristic.

The variation in institutional structure highlights the diverse contexts within which career centers operate. Understanding these differences is critical for exploring how programmatic factors influence the acceptability, appropriateness, and feasibility of implementing VR and AI technologies, directly addressing the research framework's objective of examining structural impacts.

Table 4.3 summarizes continuous variables, including the number of rooms available, staff size, and technology budget. These characteristics indicate the resources available within institutions, which may influence VR and AI adoption decisions.

Table 4.3

Metric Programmatic Characteristic Descriptives

Characteristic	*n*	*M*	*SD*	*Range*
Mock Interviews	9	5	1.4	4-8
Career Center Staff Size	9	4.4	2.2	1-8
Available Rooms	9	1.1	1.4	0-4
Career Center Student Size	9	6,468.90	13,978.90	100-43,000
Annual Technology Budget	9	13,888.90	32,551.70	0-100,000
Foresee Number of HMDs	9	2.7	1.7	0-5

Note. Data represents the variation and central tendencies for each metric programmatic characteristic. *M* denotes the mean, and *SD* is the standard deviation.

These metrics show the availability of resources, which provides insight into career centers' capacity to adopt new technologies. This directly aligns with the research framework's goal of evaluating the feasibility of VR and AI innovations, as resource allocation and availability are critical factors influencing implementation potential.

Transferability of Findings

While the study has a limited sample size, its findings offer valuable insights for career centers. For example, those in resource-constrained environments can learn from the study's focus on gradually adopting VR and AI tools. They should concentrate on areas these technologies can immediately impact, such as mock interviews and skill-building workshops. Likewise, institutions that operate under a centralized model can benefit from the observed advantages of resource pooling and strategic planning.

The broader aim of the study is to provide actionable insights that can be tailored to the specific operational contexts of career center leaders. The idea of transferability emphasizes that the findings are not restricted to the participants in this study but can guide decision-making at other career centers with similar circumstances.

Methodological Reflections

The study’s methodological design is robust and scalable, offering a comprehensive framework for future research involving larger sample sizes. Despite the limitations of a small participant pool, the application of univariate, bivariate, and multivariate analyses enabled thorough data exploration. This multi-level approach captured the diversity of individual perceptions and examined the relationship between institutional characteristics and innovation adoption, reinforcing the study's thoroughness.

Although the statistical significance was limited due to the small sample size, the methodology serves as a valuable framework for investigating similar questions in larger, more diverse populations. For example, using summed scores to assess acceptability, appropriateness, and feasibility provides a replicable metric for future studies. Integrating qualitative and quantitative elements ensures a balanced perspective, capturing both measurable and subjective dimensions of technology adoption and instilling confidence in the study’s approach.

While outliers in the data present a limitation, they also emphasize the need for nuanced interpretation in small-scale studies. By addressing these anomalies through visual aids such as scatterplots, histograms, and box plots, the study demonstrates its commitment to transparency and methodological rigor. This approach reinforces the reliability of the findings within the study's context and lays the groundwork for broader applications in future research.

Implications for Future Research

This study is a foundation for larger-scale research that can validate its findings and investigate additional aspects of virtual reality (VR) and artificial intelligence (AI) adoption in career centers. Future research could enhance the current methodology by including a more diverse array of institutions, utilizing longitudinal data, or examining the perspectives of other stakeholders, such as students and employers.

The findings highlight the urgent need for targeted interventions to address feasibility challenges, such as securing dedicated funding and developing technical expertise within career center teams, to ensure the successful adoption of VR and AI technologies. By focusing on these areas, institutions can improve their readiness for innovation and enhance the impact of VR and AI technologies on career development outcomes.

Finally, the study's emphasis on transferability provides a valuable framework for interpreting the results. While generalizability may be limited due to the small sample size, the insights gained can inform practical applications in similar contexts, bridging the gap between research and practice and leaving the audience feeling informed and prepared.

Summary of Results

This chapter explored career center leaders' perceptions regarding the acceptability, appropriateness, and feasibility of implementing virtual reality (VR) and artificial intelligence (AI) technologies in higher education institutions. Although the quantitative findings had limited statistical significance due to a small sample size, the study yielded unique qualitative insights into participants' nuanced attitudes. These insights, not commonly found in other studies, reflected optimism about the potential of VR and AI as transformative tools for career development while raising concerns related to resource constraints, organizational readiness, and scalability.

The chapter examined how institutional characteristics, such as type (public or private) and career center model (centralized or decentralized), influenced perceptions of VR and AI adoption. Public institutions highlighted challenges in scaling these technologies, while private institutions exhibited a greater willingness to explore them, driven by budget flexibility and specific institutional goals. Centralized career centers were found to be better positioned to implement VR and AI, as they benefit from streamlined decision-making and resource sharing. In contrast, decentralized centers faced coordination challenges that could impede their adoption efforts.

The demographic and institutional characteristics of the study participants provided important context for interpreting the findings, emphasizing the diversity of perspectives within the sample. This stresses the significance of distinguishing between generalizability and transferability, indicating that the insights gained from this research can help similar institutions tailor VR and AI implementations to their unique contexts, thereby making the audience feel included and represented in the research.

Despite its limitations, this study lays the foundation for future research and practical applications. The robust methodological framework, which includes univariate, bivariate, and multivariate analyses, provides a replicable basis for more extensive studies on VR and AI adoption in career centers. These findings not only highlight the potential for targeted interventions and incremental adoption strategies but also emphasize the need for collaborative efforts to address barriers to implementation, thereby empowering the audience and encouraging proactive measures.

Chapter 5 will discuss the implications of these findings in detail, connecting them to the broader context of public administration and the study's conceptual framework. This chapter will explore how the results inform strategies for reengineering in the public sector, particularly within career centers, to enhance technology adoption's feasibility, acceptability, and appropriateness. The discussion will also address the practical applications of these findings for career center leaders, offer policy recommendations, and outline directions for future research, providing a comprehensive analysis of how these results contribute to the field of public administration.

Chapter 5:

Discussion

This dissertation aimed to explore career center leaders' perceptions regarding adopting virtual reality (VR) and artificial intelligence (AI) technologies for interview training and career readiness. Specifically, the research aimed to evaluate these leaders' views on the acceptability, appropriateness, and feasibility of implementing these innovations within higher education career centers. The study employed Rogers' (2003) Diffusion of Innovations theory as a theoretical framework to analyze how organizations adopt or reject new technologies. This research addresses a critical gap in understanding technology adoption in career development and provides practical insights into how institutions can strategically implement these cutting-edge tools.

An important gap in the literature is addressed by focusing on a population—career center leaders—that has not been widely examined in the context of VR and AI adoption. The findings are timely, given the rapid technological advancements and the increasing pressure on educational institutions to deliver scalable and immersive career training solutions (Helbig & Matkin, 2021). The study's results highlight how career centers can potentially re-engineer their services to offer more efficient and impactful student support, aligning with broader trends in public administration aimed at enhancing service delivery through innovation.

The study included quantitative analyses of psychometric pre-implementation outcome measures. It utilized univariate, bivariate, and multivariate analyses to assess the perceptions of a convenience sample of nine career center leaders. The data revealed promising opportunities and significant challenges in integrating VR and AI into career training. While leaders expressed generally positive attitudes toward these technologies, concerns regarding feasibility—mainly related to resource constraints—were prominent. However, it is important to note that the small sample size (n = 9), convenient sampling method, and the breakdown of participants between public (7) and private (2) institutions may limit the generalizability of the findings.

Key Findings and Synthesis

This section synthesizes the key findings related to the acceptability, appropriateness, and expected feasibility of Virtual Reality (VR) and Artificial Intelligence (AI) technologies in career centers. The analysis is based on quantitative and qualitative insights, focusing on the perceptions of career center leaders regarding the potential of these innovations to enhance interview training and career readiness programs. By examining these three dimensions in detail, the study provides a comprehensive understanding of how institutional factors, such as the type of institution and career center model, influence the integration and scalability of VR and AI within public administration and higher education settings. The following subsections will elaborate on each key finding and discuss its broader implications for adopting technology in career centers.

Acceptability

The study found that career center leaders generally accept virtual reality (VR) and artificial intelligence (AI) as practical tools for interview training and career readiness development. This conclusion was supported by high summed scores in the univariate analysis, with participants rating these technologies positively in several areas, including ease of use, perceived benefits, and alignment with student needs. Acceptability is a crucial first step in the innovation-decision process, as defined by Rogers (2003). The positive reception indicates that career center leaders are open to further exploration of these technologies.

One key factor in the acceptability of VR is its ability to simulate real-life interview scenarios. Participants highlighted that the immersive nature of VR allows students to practice their interview skills in a low-pressure environment that closely resembles real-world conditions. This approach helps reduce anxiety and build confidence. However, it is important to recognize that the study's reliance on subjective perceptions means the results reflect the participants' personal views rather than objective outcomes. Additionally, since career center leaders with an existing interest in VR and AI were more likely to participate in the study, there is a potential risk of confirmation bias, where participants may have been predisposed to view the technologies positively.

AI also received high acceptability ratings, particularly its ability to provide immediate, personalized feedback on interview performance. AI-driven tools, such as the VirtualSpeech© platform used in this study, offer detailed analyses of body language, speech patterns, and interview responses. This feedback allows students to identify areas for improvement and refine their skills over time—something that is often difficult to achieve through traditional interview training methods, where feedback is typically subjective and limited by the interviewer's availability and expertise.

The acceptability of these technologies aligns with broader trends in public administration, which increasingly recognize the need to re-engineer public services for greater efficiency and scalability. The integration of VR and AI into career centers exemplifies this reengineering, providing a means to enhance the delivery of career services without significantly increasing costs or resource demands.

Appropriateness

Career center leaders have identified virtual reality (VR) and artificial intelligence (AI) as highly effective tools for enhancing student interview training, particularly regarding NACE career readiness competencies. These technologies are valued for their ability to address critical skills in high demand among employers, such as critical thinking, communication, and digital literacy. Catrino (2022) highlighted how career centers warrant new strategies to meet students' evolving needs by fostering creativity, adaptability, and human-centered problem-solving in career education.

For instance, VR interview simulations allow students to practice their communication skills in realistic environments, where they must articulate their thoughts clearly and respond to challenging questions. Likewise, AI-driven feedback helps students enhance their critical thinking by analyzing their responses and suggesting alternative approaches to questions. However, it is important to consider the subjective nature of these perception measurements, as participants' personal biases and experiences may influence their feedback.

The advantages of VR and AI extend beyond skill development; these technologies also promote inclusivity and equity in career training by offering tailored experiences that cater to the diverse needs of various student populations. For example, the VirtualSpeech platform allows users to choose avatars representing different cultural backgrounds, creating a more inclusive environment for students from underrepresented groups. This inclusivity is especially crucial in today’s job market, where employers increasingly seek candidates who demonstrate cultural competency and the ability to collaborate effectively within diverse teams.

In a broader context, the relevance of these technologies aligns with the ongoing shift toward digital government and the utilization of technology to enhance service delivery in public administration. The New Public Management (NPM) paradigm highlights the necessity for public institutions to adopt more market-oriented approaches, including using technology to improve efficiency and responsiveness. The integration of VR and AI in career centers is consistent with this trend, providing a means to deliver career services that are both more effective and responsive to the needs of today's students.

Expected Feasibility

While virtual reality (VR) and artificial intelligence (AI) were rated highly for their acceptability and appropriateness, concerns about the feasibility of implementing these technologies presented a more complex issue. The multivariate analyses revealed that feasibility concerns were significantly influenced by institutional factors such as budget constraints, staffing availability, and existing infrastructure. This is particularly relevant for smaller institutions or those with decentralized career center models, where the resources required to adopt and maintain VR and AI technologies may be limited. Additionally, outliers identified during the analysis could have affected some of the feasibility results, potentially skewing interpretations of feasibility across different institutions.

The study found notable differences in perceptions of feasibility between public and private institutions. Private institutions generally expressed more optimism about their ability to implement these technologies. However, the uneven distribution of public versus private institutions in the sample (with seven public and two private) may have restricted the ability to thoroughly compare the two types, affecting the generalizability of the results.

Another significant challenge identified in the study is the staff training necessary to implement VR and AI technologies effectively. Career center leaders expressed concerns regarding the time and resources required to train staff in using these technologies and the potential resistance from staff members who may feel unfamiliar or uncomfortable with new technologies. This reflects broader concerns in the public sector about technology adoption, where organizational inertia and reluctance to change can impede the implementation of innovations.

Despite these challenges, the study identified several strategies for overcoming feasibility barriers. One strategy is forming public-private partnerships, where career centers collaborate with technology firms or private institutions to share the costs and expertise needed for implementing VR and AI. Another potential solution is developing pilot programs that allow career centers to test these technologies on a smaller scale before committing to a full rollout. These strategies align with broader public administration approaches to innovation, where incremental and collaborative methods are often used to manage the risks associated with new technologies.

Relevance to Public Administration

The implications of this study for public administration are significant, particularly regarding the potential reengineering of public services to improve efficiency and outcomes. As discussed in Chapter 2, reengineering involves radically redesigning existing processes to enhance performance. This study clearly shows how career centers can leverage technology to achieve these goals.

In line with broader trends in higher education, blended learning and other digital educational technologies offer transformative potential for career services (Castro, 2019). Blended learning, as noted by Castro, integrates traditional face-to-face instruction with digital tools, enhancing educational outcomes through increased accessibility and personalized learning paths—similar to the potential of virtual reality (VR) and artificial intelligence (AI) for interview training. By adopting VR and AI, career centers can deliver more efficient and effective services tailored to the needs of students and employers (Shafritz et al., 2016).

These advancements have broader implications for other public administration areas, particularly workforce development and job readiness. For example, re-entry programs for individuals exiting the criminal justice system could utilize VR and AI to provide immersive job training and interview preparation. Similarly, government-funded workforce development programs could leverage these technologies to enhance the employability of individuals in high-demand industries such as technology and healthcare.

Another key implication of this study is VR and AI's role in developing a skilled workforce. By offering immersive and scalable interview training, career centers can better prepare students for the job market demands, thereby contributing to broader economic development. Integrating VR and AI technologies helps students develop essential skills such as critical thinking, communication, and digital literacy, which align with the NACE Career Readiness Competencies. This directly addresses the needs of employers across various industries, who increasingly seek candidates capable of navigating the complexities of modern workplaces, particularly in technology-dependent sectors.

Moreover, deploying these technologies within career centers has significant economic implications. Institutions that prepare students effectively for the workforce contribute to local and national economic development by ensuring graduates enter the job market equipped with the necessary skills for success in high-demand fields. In this way, career centers act as critical components of the campus talent pipeline, stimulating local economies by supplying industries with a steady stream of skilled workers (Helbig & Matkin, 2021).

These developments have important implications for government funding public higher education institutions and public-private partnerships that may support career readiness initiatives. Public institutions, in particular, often rely on government funding to maintain their services, and the ability to demonstrate successful student career preparation can help justify continued investment in these programs. Furthermore, private institutions may benefit from grants and partnerships with public organizations focused on developing talent for specific industries or sectors, further enhancing their capacity to adopt cutting-edge technologies like VR and AI.

Limitations

This study provides valuable insights into career center leaders' perceptions of the adoption of VR and AI technologies. However, several methodological limitations that affect the interpretation and generalizability of the findings and offer significant considerations for future research must be acknowledged.

One major limitation is the small sample size, which included only nine participants. This reduced the statistical power of the findings. More robust conclusions could be drawn with a larger sample, enhancing the generalizability of results across a broader range of career centers. Additionally, the sample comprised seven participants from public institutions and only two from private institutions, leading to an imbalance that may have impacted the comparability of the results between different types of institutions. This limited representation of private institutions restricts the study's ability to fully explore how institutional type influences perceptions regarding the adoption of VR and AI.

The study also utilized convenience sampling, selecting participants from a professional network. While convenient, this method may introduce selection bias, as individuals already familiar with or interested in VR and AI technologies were more likely to participate. This potential bias toward favorable perceptions may limit the diversity of the sample. Furthermore, since the study focused on career center leaders likely to be interested in technological innovations, there is a risk of confirmation bias. Participants may have been predisposed to view the technologies positively, resulting in less critical perspectives on their implementation. Future research should mitigate this bias by including a more neutral sample, encompassing participants who may be more skeptical of such innovations.

Another limitation is the reliance on self-reported perceptions of acceptability, appropriateness, and feasibility, which are inherently subjective. Self-reports may only partially capture the complexities involved in practically adopting these technologies. To gain a more comprehensive understanding, future studies should incorporate objective measures, such as actual implementation outcomes, student success metrics, or cost-benefit analyses, to assess the real-world impact of VR and AI on career readiness programs.

While the findings may apply to career centers with similar characteristics—such as those with centralized structures or comparable budget constraints—the small sample size and convenience sampling method limit the broader applicability of the results. As a result, the ability to generalize these findings to a broader population of career centers or other types of public organizations is constrained.

Lastly, outliers in the multivariate analyses may have skewed some of the results, particularly concerning feasibility. These outliers could represent institutions with particularly strong or weak capacities for adopting new technologies, and their influence on the overall findings should be interpreted with caution. Future research should consider more rigorous data screening to minimize the impact of outliers on the analyses.

Recommendations for Future Research and Practice

Based on this study's findings and limitations, several recommendations can be made for future research and practice. Future studies should include a larger and more diverse sample of career center leaders, especially from a broader array of public and private institutions. A larger sample size would enhance the generalizability of the findings and provide more robust insights into how different types of institutions perceive and implement virtual reality (VR) and artificial intelligence (AI) technologies.

Although this study focused on higher education career centers, future research could explore the potential applications of VR and AI in other public sector organizations, such as reentry programs, workforce development agencies, and government-sponsored training programs. Understanding how these technologies can be utilized in various contexts will offer valuable insights into their broader potential for improving public services.

Career centers and public organizations should consider implementing pilot programs to test the feasibility and effectiveness of VR and AI technologies before fully committing to their adoption. Public-private partnerships can also be beneficial, as they allow institutions to share the costs and expertise required for implementing these technologies, especially for those with limited budgets.

Future research should include objective measures of the impact of VR and AI, such as student success rates, employment outcomes, and cost-effectiveness analyses. These measures will provide a more comprehensive understanding of the actual benefits of these technologies beyond participants' subjective perceptions.

Researchers and practitioners should collaborate to develop strategies for overcoming the feasibility barriers identified in this study, including staff training, budget constraints, and infrastructure requirements. Solutions like phased implementations, modular training programs, and shared resources across institutions could help address these challenges and support the broader adoption of VR and AI technologies.

Conclusion

This dissertation examines how virtual reality (VR) and artificial intelligence (AI) can be effectively integrated into career centers at higher education institutions. By utilizing Rogers' (2003) Diffusion of Innovations Theory, the study provides a comprehensive framework for assessing these technological innovations' acceptability, appropriateness, and feasibility. The findings highlight that while VR and AI have significant potential to transform interview training and enhance career readiness, their successful adoption relies on a thorough understanding of institutional factors that may hinder widespread implementation.

The broader implications of these findings extend beyond career centers, offering valuable insights for the field of public administration. The integration of VR and AI represents a substantial paradigm shift in public service delivery, reflecting reengineering and digital transformation trends. Rather than merely tools for career preparation, these technologies serve as scalable, immersive solutions that can improve economic outcomes by cultivating a well-prepared and future-ready workforce. Their influence reaches the broader public sphere, fostering innovation in workforce development and ensuring a consistent influx of skilled professionals into the labor market (Shafritz et al., 2016).

Ultimately, the success of these innovations will depend on institutions' readiness to address challenges related to feasibility, resource allocation, and strategic implementation. As career centers and public organizations adapt to the rapidly changing world of work, VR and AI can be powerful instruments for promoting workforce development. By embracing these technologies, institutions can better fulfill their mission of developing adaptable professionals, thereby contributing to the evolving goals of public administration and shaping the workforce of the future (Shafritz et al., 2016). This study establishes a foundation for future research and paves the way for transformative practices that will define the future of career services and public sector innovation.

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Appendix A

Institutional Review Board (IRB) Approval

Institutional Review Board (IRB)
For the Protection of Human Research Participants

PROTOCOL EXEMPTION REPORT

Protocol Number: 04246-2021 **Responsible Researcher(s):** Phenix Culbertson

Supervising Faculty: Dr. Bobbie Ticknor

Project Title: *Virtual Reality-Delivered Job Interview Training: Acceptable, Appropriate, and Feasible for Implementation in Career Centers.* ***(updated 02.17.2023)***

INSTITUTIONAL REVIEW BOARD DETERMINATION:

This research protocol is **exempt** from Institutional Review Board (IRB) oversight under 45 CFR 46.101(b) of the federal regulations **category 2**. If the nature of the research changes such that exemption criteria no longer apply, please consult with the IRB Administrator (irb@valdosta.edu) before continuing your research study.

ADDITIONAL COMMENTS:

- *Modifications approved effective 02.17.2023.*
- *Please be reminded that research related correspondence must be conducted using your VSU issued student email address.*
- *Participants must receive a copy of the research statement (Virtual Reality).*
- *Upon completion of the research study, collected data must be securely maintained (locked file cabinet, password protected computer, etc.) and accessible only by the researcher for a minimum of 3 years. At the end of the required time, collected data must be permanently destroyed.*

☒ ***If this box is checked, please submit any documents you revise to the IRB Administrator at irb@valdosta.edu to ensure an updated record of your exemption.***

Elizabeth Ann Olphie *11.29.2021*
Elizabeth Ann Olphie, IRB Administrator

Thank you for submitting an IRB application.
Please direct questions to irb@valdosta.edu or 229-253-2947.

Appendix B

Sample Recruitment Email

This appendix includes the recruitment email used to invite participants to the study, "Diffusion of Virtual Reality (VR) and Artificial Intelligence (AI) Innovations in Career Centers: Perceptions of Acceptability, Appropriateness, and Feasibility of Implementation." The email outlines the study's purpose, participation details, and consent information. The recruitment process ensured the confidentiality and anonymity of participants. The recruitment email text is provided below.

Hello «First_Name»

You are being asked to participate in a survey research project entitled **"Diffusion of Virtual Reality (VR) and Artificial Intelligence (AI) Innovations in Career Centers: Perceptions of Acceptability, Appropriateness, and Feasibility of Implementation,"** which is being conducted by **Phenix Culbertson, a doctoral student at Valdosta State University**. Your participation is invaluable as it will help us understand the perceptions of career center leaders regarding the use of innovations, such as virtual reality and artificial intelligence, as a scalable, immersive tool for students' interview training in their organizations. While you will receive no direct benefits from this research study, your responses may significantly contribute to our understanding of teaching/training students how to prepare for interviews.

The date and time are «Session_Date__Time.» You will also receive a calendar invite. If the address entered is not correct, please update the location field of the Outlook calendar invite.

There are no foreseeable risks involved in participating in this study other than those encountered daily. Participation in the **orientation and innovation experience should take 1.5 hours** to complete. Completion of the **structured questionnaire post-evaluation should take at most 30 minutes**. The survey responses and your participation will be kept confidential and anonymous. Participation in the study will include a brief orientation on the history, basic principles, and uses of virtual reality and artificial intelligence, followed by how to use the technology and software. After, you will participate in the simulated experience using the Meta Quest 2 Head Mounted Display (HMD) and Meta Quest 2 Touch Controllers. The built-in app is VirtualSpeech©, which allows you to try the job interview training in a controlled, simulated environment. You will sit in a chair with sufficient space to use the remote control while wearing the HMD safely. The researcher will sanitize all equipment and workstations before and after each use to protect your health. You will complete a structured questionnaire after exploring the various lessons and activities within the VirtualSpeech© app powered by the Meta Quest 2 hardware.

The survey responses, and your participation, will be kept confidential and anonymous. No one, including the researcher, will be able to associate your responses with your identity. Your participation is voluntary. You may refrain from taking the survey, stop responding at any time, or skip any questions you do not want to answer. Your completion of the survey serves as your voluntary agreement to participate in this research project and your certification that you are 18 or older. Participants must be at least 18 years of age to participate in this study.

You may print a copy of this statement for your records. Questions regarding the purpose or procedures of the research should be directed to Phenix Culbertson at pjculbertson@valdosta.edu. This study has been exempted from Institutional Review Board (IRB) review in accordance with Federal regulations. The IRB, a university committee established by Federal law, is responsible for protecting the rights and welfare of research participants. If you have concerns or questions about your rights as a research participant, you may contact the IRB Administrator at 229-253-2947 or irb@valdosta.edu.

Please acknowledge that the researcher has permission to conduct this study with you as a participant in your office per IRB procedures.

Best regards,

Phenix J. Culbertson
Pronouns: he/him/his
Doctoral Student,
Valdosta State University Doctor of Public Administration Program
Associate Director of Employer Relations,
GSU Robinson College of Business Graduate Career Advancement Center

Appendix C

Training Fidelity Checklist

This appendix provides the checklist used to ensure consistency and fidelity in delivering the VR and AI training sessions for study participants. The checklist includes step-by-step instructions for setting up the Meta Quest 2 headset, guiding participants through the orientation, and conducting the interview training simulation. The training procedure is standardized to reduce variability across participant experiences. See the full checklist below.

DATE: ______________________ **PARTICIPANT #: ____________**

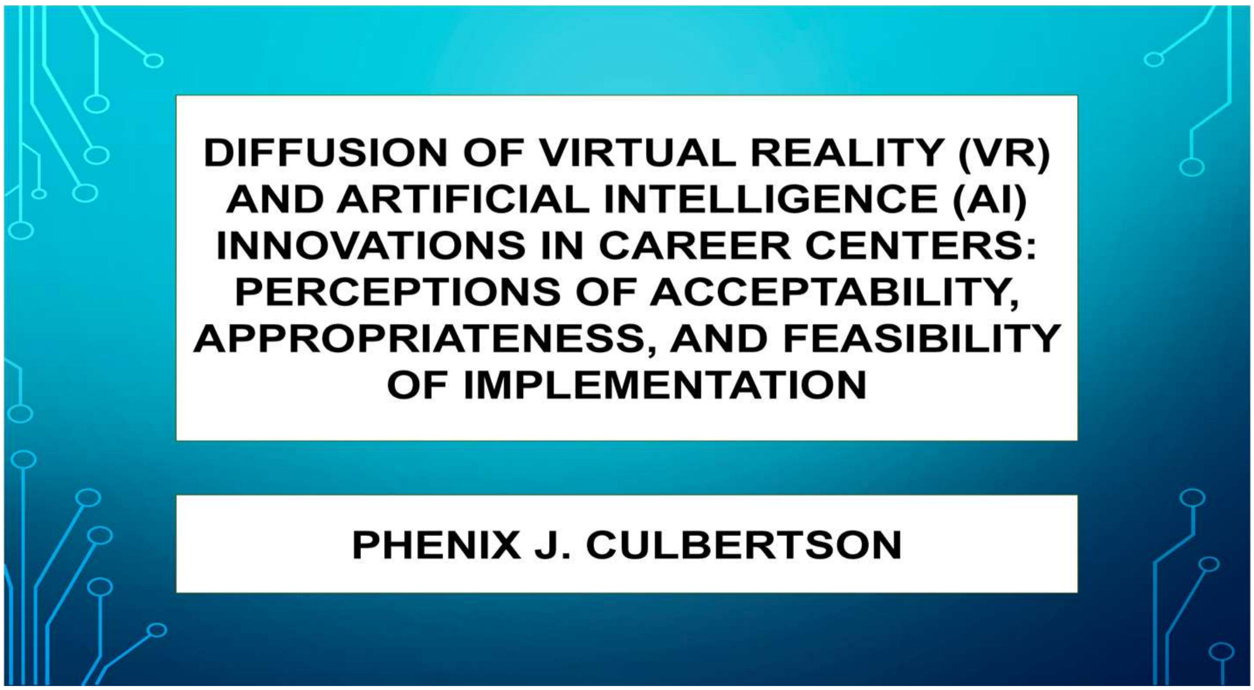
TRAINING FIDELITY CHECKLIST

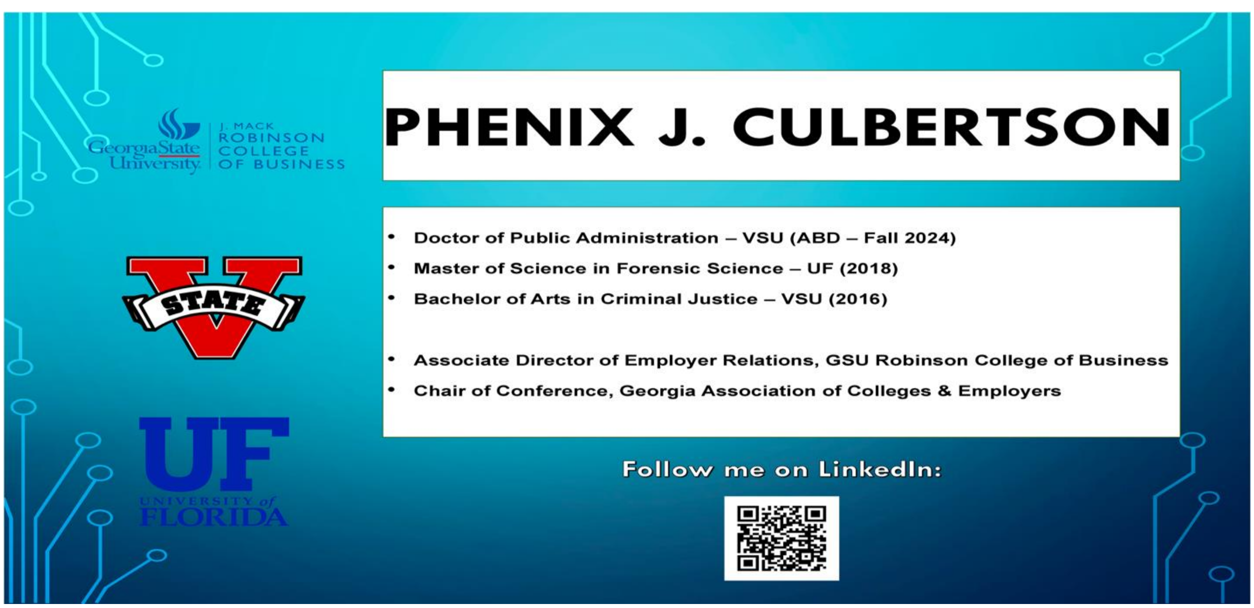
1. **Connect HMD Quest 2 to Wi-Fi & screen cast to phone**
2. **Introduction**
   - Welcome
   - Researcher Education and Career Background
   - Agenda
3. **Orientation**
   - Synopsis of research topic
   - Conceptual framework
   - Virtual Reality (VR) Innovation [Definition, Immersion, Presence, Scalability]
   - Artificial Intelligence (AI) Innovation [Definition, human & ideal approaches, chatGPT, input/output]
   - Meta Quest 2 & VirtualSpeech© benefits
   - How to use Meta Quest 2 Head Mounted Display (HMD) & Touch Controllers
   - How to use VirtualSpeech© software embedded with ChatGPT
4. **Experience Innovation**
   - Research participant experiences the VR/AI innovations for interview training
     - Place HMD securely on head
     - Remind participant to remove HMD at any time if feeling cyber sickness
     - Grab & control 2 Touch Controllers
     - Select "App Library" (Waffle Icon), then scroll down to select "VirtualSpeech" app
     - Select "Create New Boundary," then select "Confirm" for floor level, then select "Switch to Stationary Boundary," then select "Confirm"
     - Select "Training & Courses"
     - Select "Job Interview Preparation"
     - Select "Interview Practice (3D)" then "Begin"
     - Select type of interview (Company **OR** General Competency **OR** School/University **OR** Internal)
     - Select the type ofainterview questions (Questions Library **OR** Choose your Own AI-Generated)
     - Look to the bottom left n d select "Start Analysis"
     - Look to the top right and select "Show Live Feedback," and deselect "Enable Sound Distractions"
     - Select "Begin," then select play icon, and begin answering questions
     - When finished, select "Stop Analysis"
   - Discuss automated feedback, artificial intelligence, and immersion/presence of VR environment
   - Questions from research participant
5. **Evaluation**
   - Email research participant Structured Questionnaire via Qualtrics link to complete w/in 48 hours

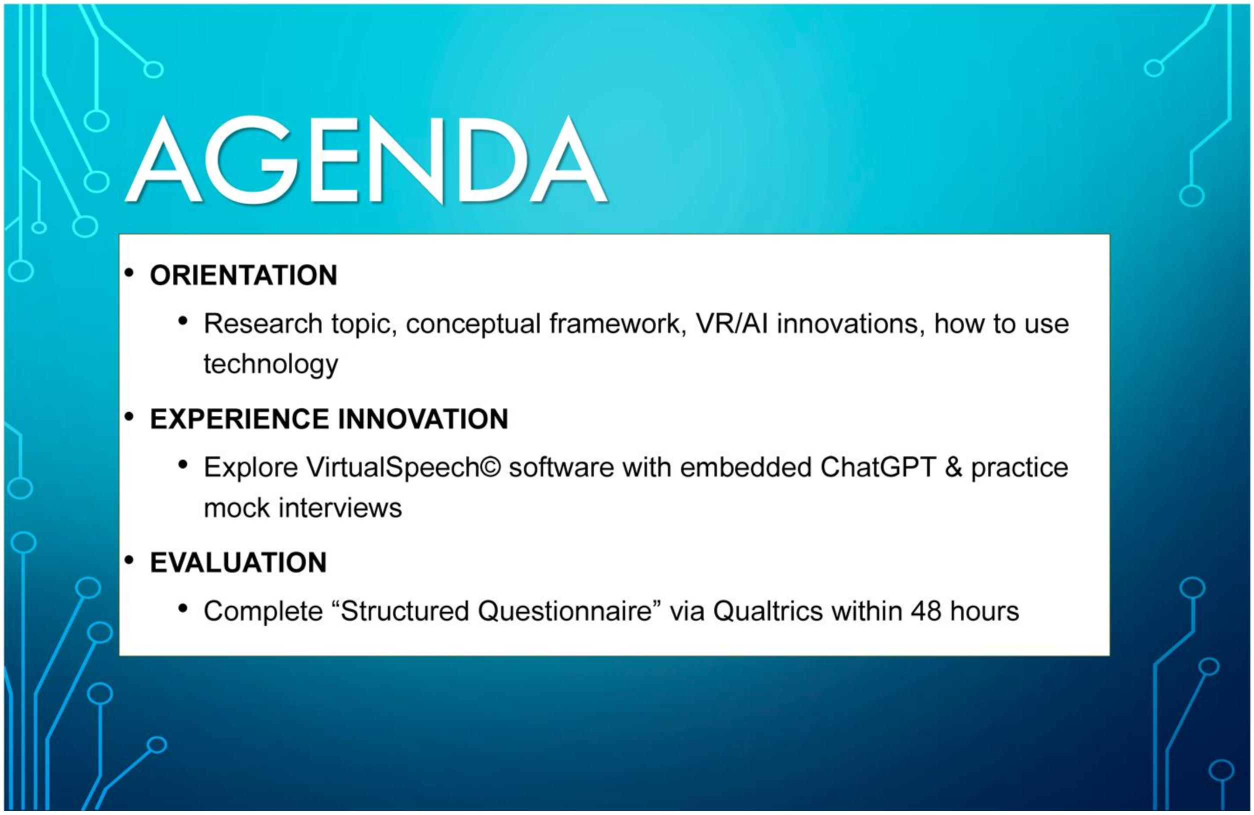
Appendix D

Orientation Slide Deck

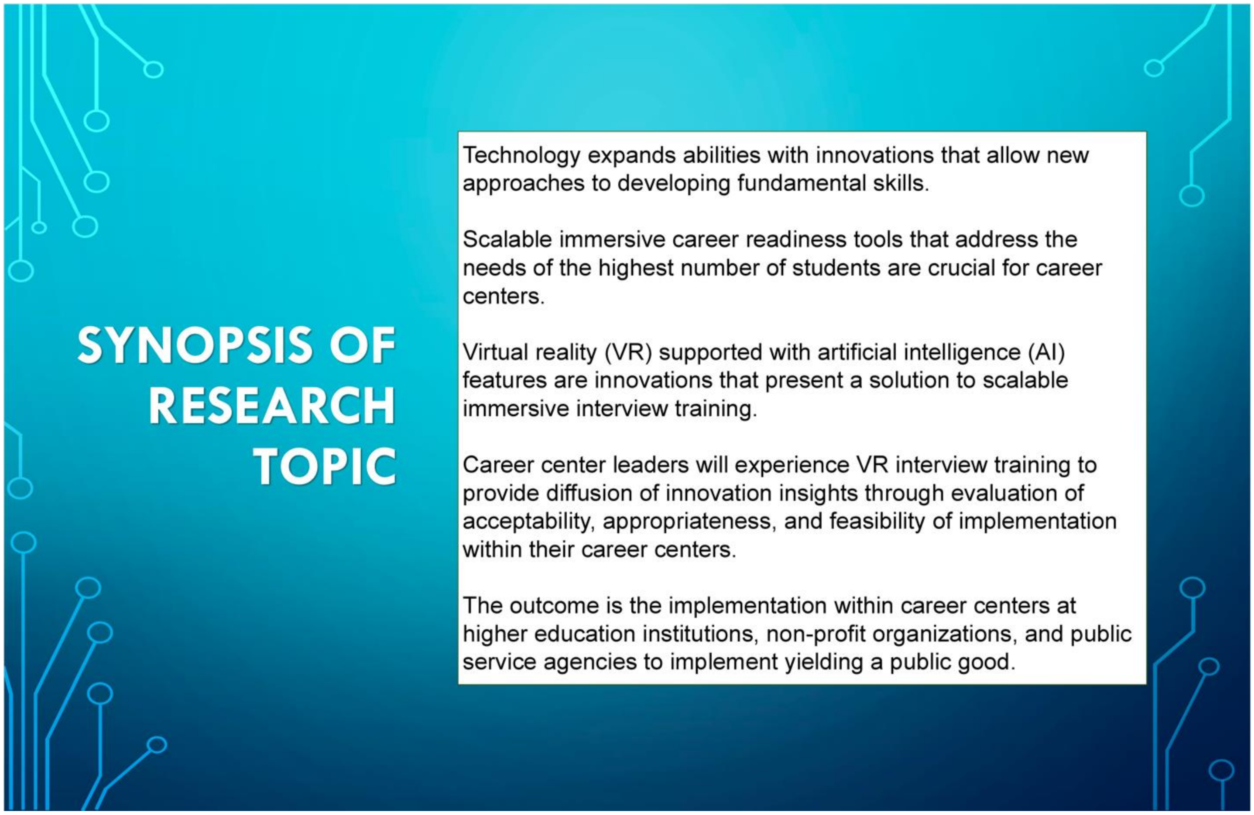
This appendix includes the slides presented during the participant orientation sessions. The slide deck outlines the research objectives, the significance of VR and AI technologies for career training, and instructions on using the Meta Quest 2 and VirtualSpeech© software. Participants were introduced to key concepts such as immersion, presence, and the importance of scalability in career center applications. A copy of the slide deck is provided below.

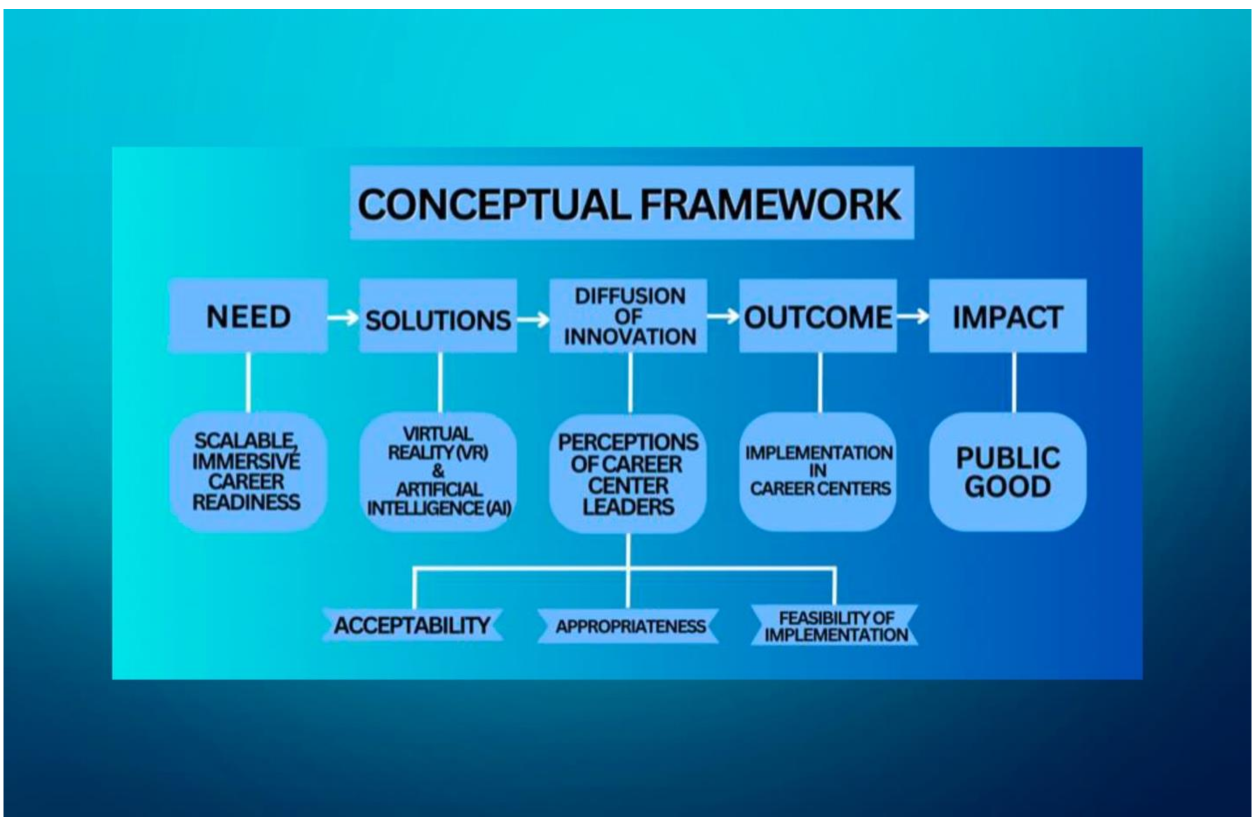





AGENDA
• ORIENTATION
• Research topic, conceptual framework, VR/AI innovations, how to use technology
• EXPERIENCE INNOVATION
• Explore VirtualSpeech© software with embedded ChatGPT & practice mock interviews
• EVALUATION
• Complete “Structured Questionnaire” via Qualtrics within 48 hours


ORIENTATION


SYNOPSIS OF RESEARCH TOPIC
Technology expands abilities with innovations that allow new approaches to developing fundamental skills.
Scalable immersive career readiness tools that address the needs of the highest number of students are crucial for career centers.
Virtual reality (VR) supported with artificial intelligence (AI) features are innovations that present a solution to scalable immersive interview training.
Career center leaders will experience VR interview training to provide diffusion of innovation insights through evaluation of acceptability, appropriateness, and feasibility of implementation within their career centers.
The outcome is the implementation within career centers at higher education institutions, non-profit organizations, and public service agencies to implement yielding a public good.


CONCEPTUAL FRAMEWORK
NEED
SOLUTIONS
DIFFUSION OF INNOVATION
OUTCOME
IMPACT
SCALABLE, IMMERSIVE CAREER READINESS
VIRTUAL REALITY (VR) & ARTIFICIAL INTELLIGENCE (AI)
PERCEPTIONS OF CAREER CENTER LEADERS
IMPLEMENTATION IN CAREER CENTERS
PUBLIC GOOD
ACCEPTABILITY
APPROPRIATENESS
FEASIBILITY OF IMPLEMENTATION

SCALABLE TECH SOLUTIONS BUT LESS IMMERSIVE OR REALISTIC

- Big Interview
- StandOut
- Both are always accessible to students via internet and license from the institution or organization
- Students practice interview questions looking at screen & AI provides feedback
- Lacks the immersive, realistic experience for students (clients) to feel like they are in actual interview

VIRTUAL REALITY: A SOLUTION

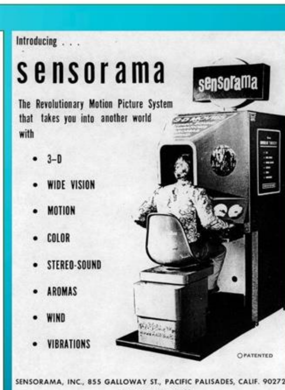
- ***Scope***
  - Allows individuals to experience a new perspective or lens in safe, controlled environment
  - Room for trial & error
- ***Simple Definition:***
  - Simulated environment created by technology using 3D visuals (i.e., Meta Quest 2) that can be interacted with in a seemingly real way through user input with transmission devices

VIRTUAL REALITY: A SOLUTION

- ***Immersion + Presence → Virtual Reality***
  - **Immersion**: user's "real" world awareness
  - **Presence:** psychological state of user accepting, interacting, and engaging physically, socially, or emotionally
  - Fully-Immersive vs. Semi-Immersive vs. Non-Immersive
  - Greater immersion → Greater sense of presence

BRIEF HISTORY OF VR

- **1900s** – Began w/ pilot simulations training – funded by Military & NASA
- **1950s** – Sensorama
- **1960s** – Head Mounted Display (HMD)
- **1970s** – Influx of videos & video cards
- **1980s** – VR Computer Programming Language (Jaron Lanier)




n Sutherland's HMD (late 1960's) (Department of Computer Science, Univ

BRIEF HISTORY OF VR
CONTINUED

- **1990s** – Internet became focus & many paused VR
- **2012/2013** – Kickstarter campaign $300 HMD & Kit sent out to encourage use of VR led by Palmer Luckey – generated $2.4 million
- **2016** – Facebook bought Oculus
- **2017-2019** – Cardboard HMD, Mobile VR apps, untethered VR, Oculus Go
- **2020** – Oculus (now Meta) Quest 2
- **2022** – Meta Quest Pro
- **2023** – Meta Quest 3

ARTIFICIAL INTELLIGENCE (AI)

"It is the *science* and *engineering* of making *intelligent machines*, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI *does not have to confine* itself to *biologically observable methods*." (McCarthy, 2004)

<u>Goals of AI (Xu et al., 2021)</u>

- Systems that think AND act like humans (Human approach)

- Systems that think AND act rationally (Ideal approach)

<u>Open AI's ChatGPT (Dwivedi et al., 2023)</u>

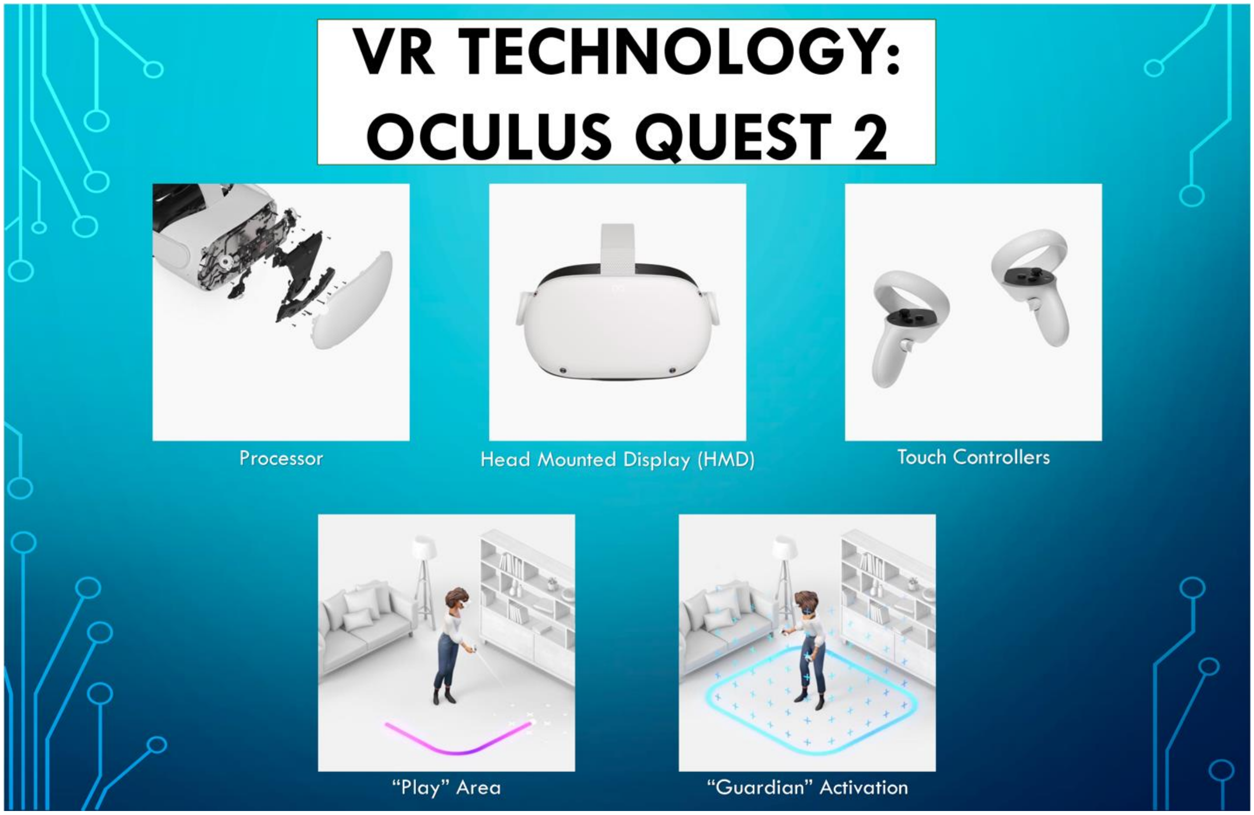
- Turning point in AI

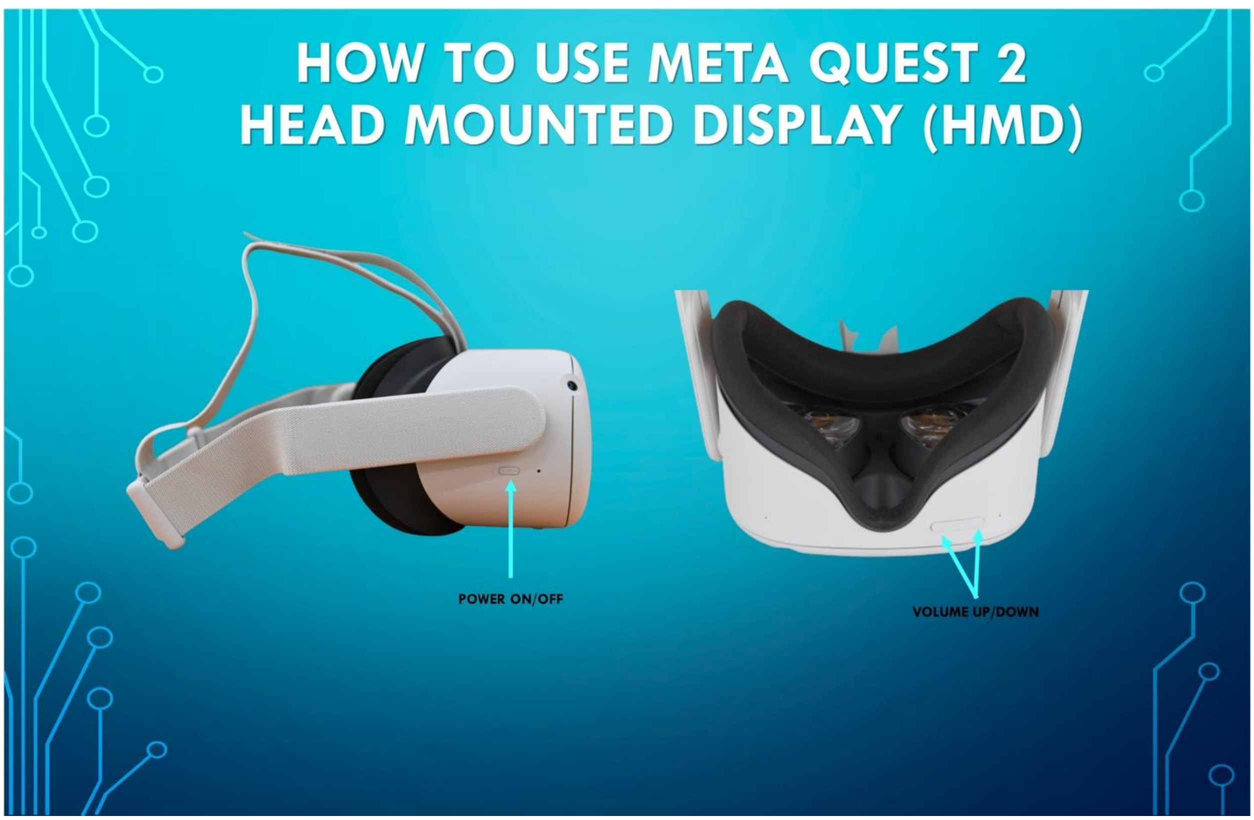
- Natural language processing

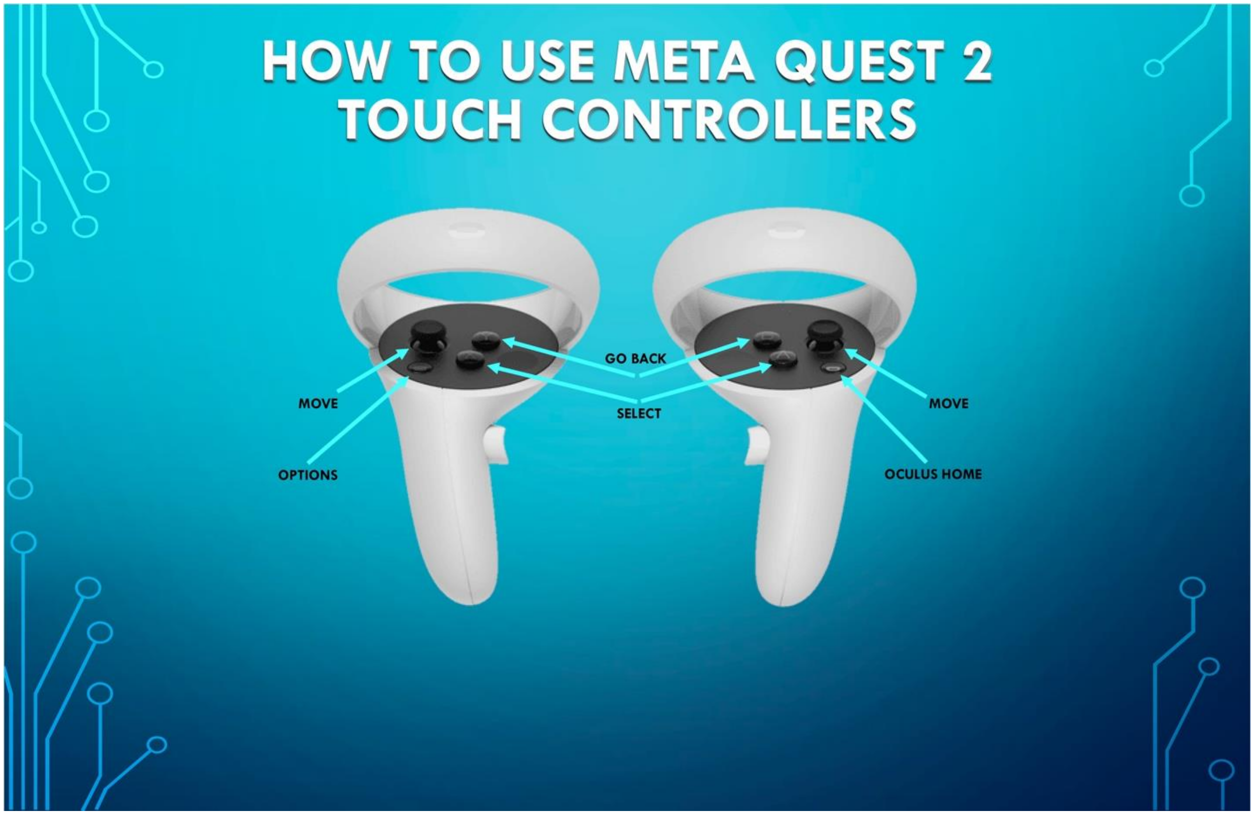
- Generative models learn grammar of software code, natural images & other data types

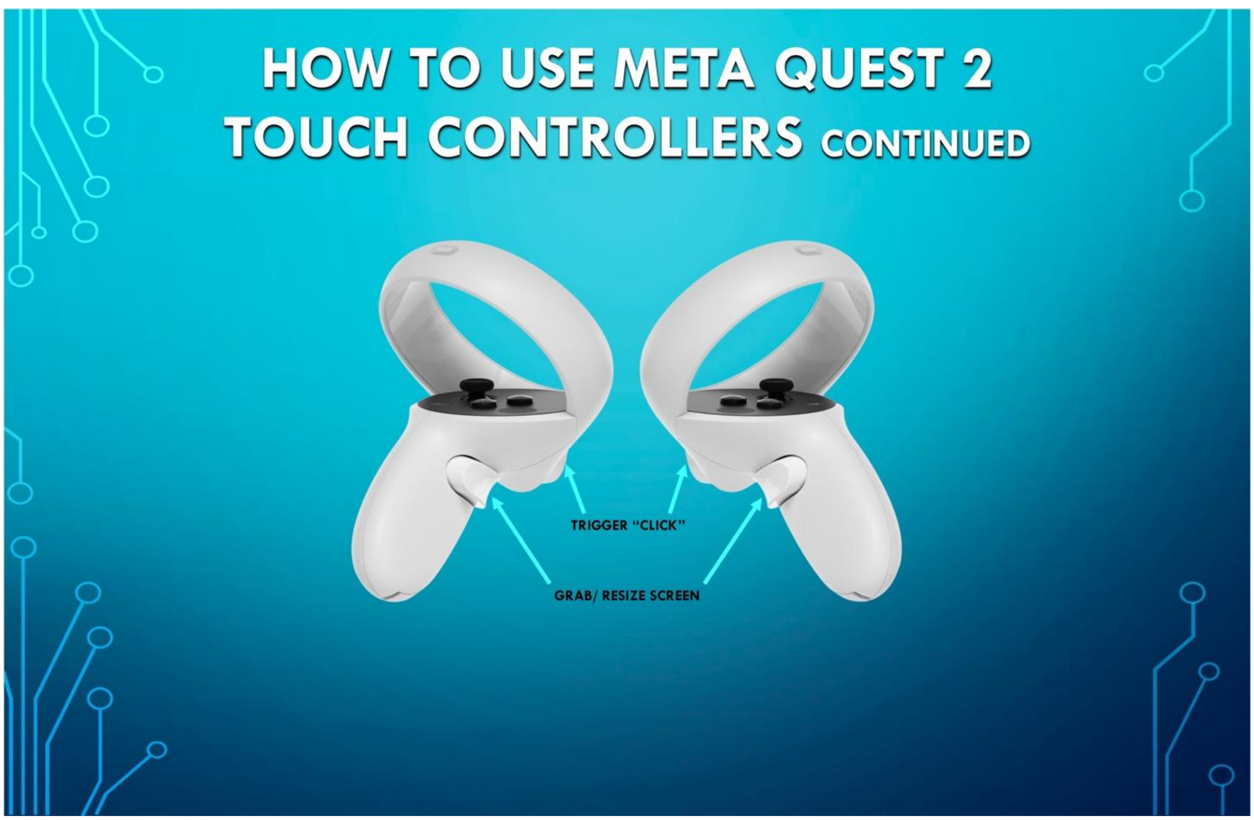
<u>Practical Use (Giusto, 2024)</u>

- Valuable resource for job seekers
- Input determines output


VR TECHNOLOGY:
OCULUS QUEST 2
Processor
Head Mounted Display (HMD)
Touch Controllers
"Play" Area
"Guardian" Activation


HOW TO USE META QUEST 2
HEAD MOUNTED DISPLAY (HMD)
POWER ON/OFF
VOLUME UP/DOWN

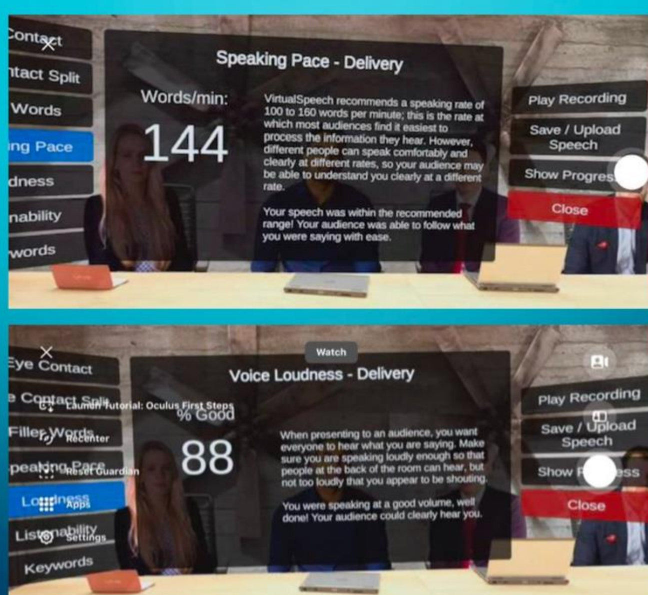

HOW TO USE META QUEST 2
TOUCH CONTROLLERS
GO BACK
MOVE
SELECT
MOVE
OPTIONS
OCULUS HOME


HOW TO USE META QUEST 2
TOUCH CONTROLLERS CONTINUED
TRIGGER "CLICK"
GRAB/ RESIZE SCREEN

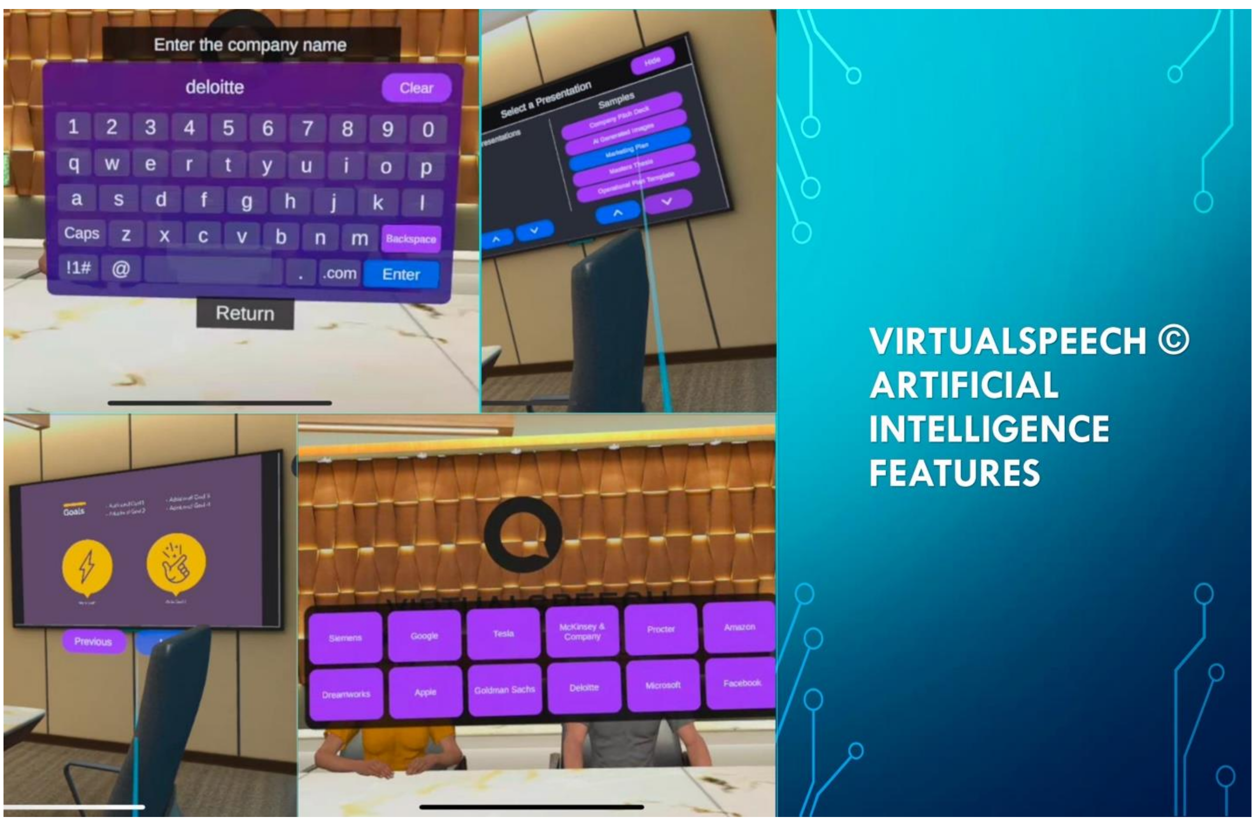
VIRTUALSPEECH

- What ***hiring managers seek*** & how to answer common questions
- Craft answers to ***competency questions*** via ***effective storytelling***
- Enhance answers to ***unexpected questions***
- Build ***authentic relationships*** with hiring managers
- Practice ***real interview questions***
- Easily identify areas for ***improvement*** with ***instant feedback***
- Increase ***confidence*** & interview ***success***

VIRTUALSPEECH © AUTOMATED FEEDBACK




VIRTUALSPEECH © AUTOMATED FEEDBACK CONTINUED
Eye Contact
Eye Contact Split
Filler Words
Speaking Pace
Loudness
Listenability
Keywords
Eye Contact - Audience Engagement
Score:
5/10
Close
Eye Contact: Room Split
Left Side
Right Side
100%
0%
Play Recording
Save / Upload Speech
Close
Filler Words - Delivery
Words:
2
Play Recording
Close


Enter the company name
deloitte
Clear
Caps
Backspace
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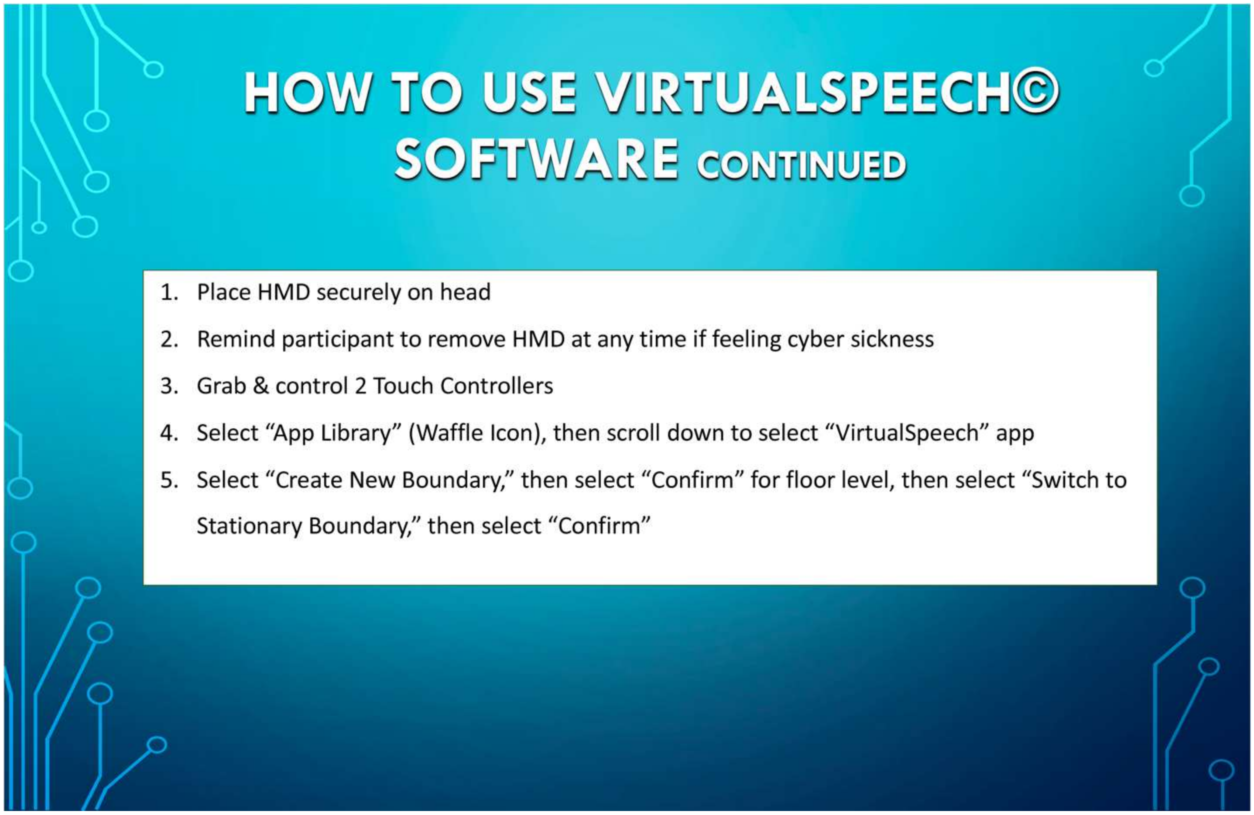
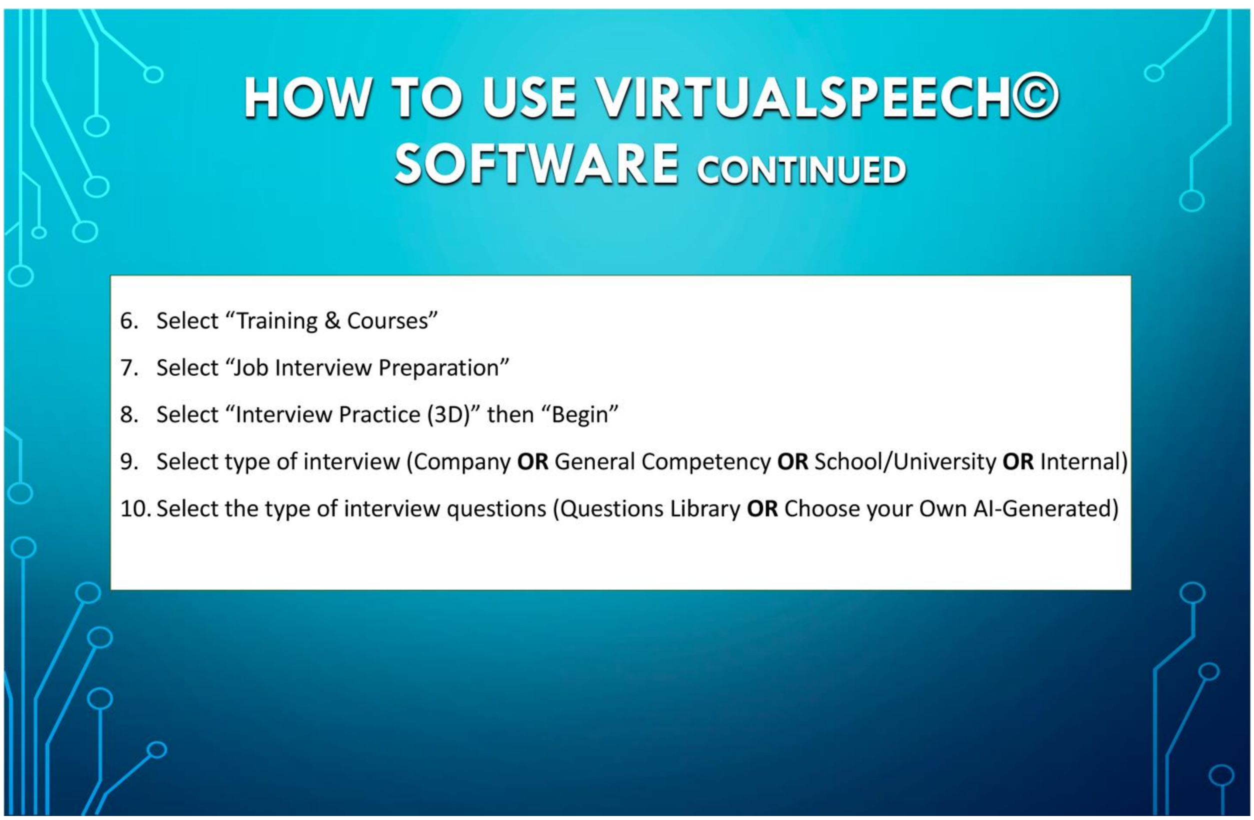
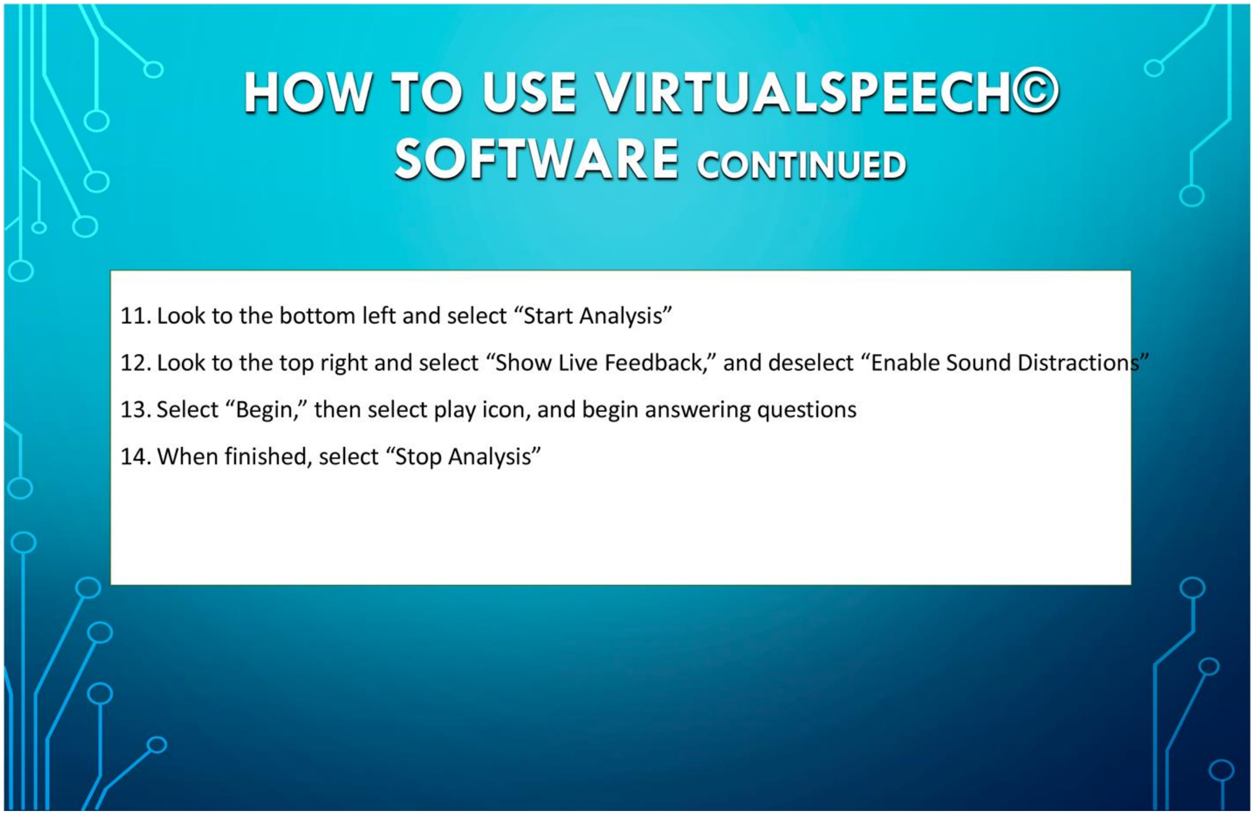
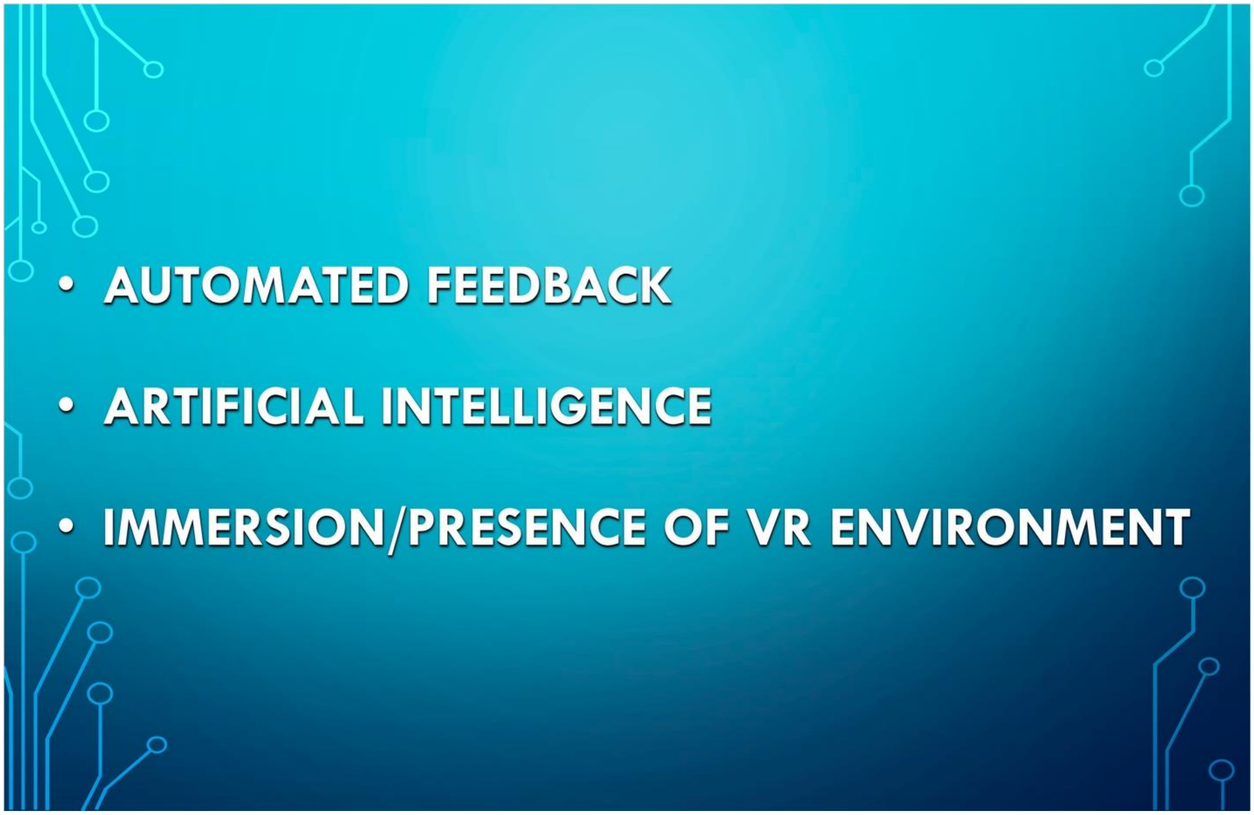
Enter
Return
Select a Presentation
Samples
Previous
Siemens
Google
Tesla
McKinsey & Company
Procter
Amazon
Dreamworks
Apple
Goldman Sachs
Deloitte
Microsoft
Facebook
VIRTUALSPEECH © ARTIFICIAL INTELLIGENCE FEATURES


HOW TO USE VIRTUALSPEECH©
SOFTWARE CONTINUED
1. Place HMD securely on head
2. Remind participant to remove HMD at any time if feeling cyber sickness
3. Grab & control 2 Touch Controllers
4. Select “App Library” (Waffle Icon), then scroll down to select “VirtualSpeech” app
5. Select “Create New Boundary,” then select “Confirm” for floor level, then select “Switch to Stationary Boundary,” then select “Confirm”


HOW TO USE VIRTUALSPEECH©
SOFTWARE CONTINUED
6. Select “Training & Courses”
7. Select “Job Interview Preparation”
8. Select “Interview Practice (3D)” then “Begin”
9. Select type of interview (Company OR General Competency OR School/University OR Internal)
10. Select the type of interview questions (Questions Library OR Choose your Own AI-Generated)

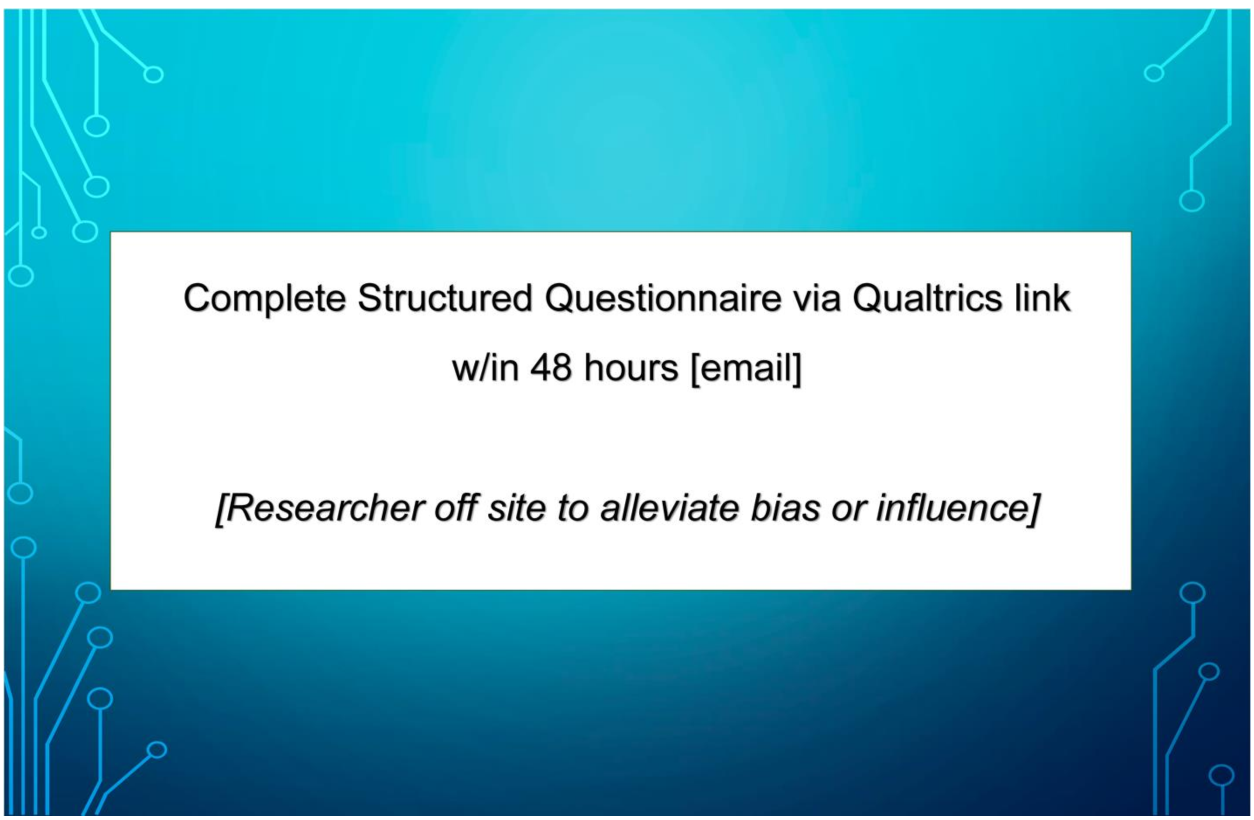

HOW TO USE VIRTUALSPEECH© SOFTWARE CONTINUED
11. Look to the bottom left and select “Start Analysis”
12. Look to the top right and select “Show Live Feedback,” and deselect “Enable Sound Distractions”
13. Select “Begin,” then select play icon, and begin answering questions
14. When finished, select “Stop Analysis”


EXPERIENCE INNOVATION


• AUTOMATED FEEDBACK
• ARTIFICIAL INTELLIGENCE
• IMMERSION/PRESENCE OF VR ENVIRONMENT


QUESTIONS?


EVALUATION


Complete Structured Questionnaire via Qualtrics link w/in 48 hours [email]
[Researcher off site to alleviate bias or influence]


REFERENCES
Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., ... & Wright, R. (2023). Opinion paper: “So what if ChatGPT wrote it?” Multidisciplinary perspectives on opportunities, challenges, and implications of generative conversational AI for research, practice, and policy. International Journal of Information Management, 71, 102642. https://doi.org/10.1016/j.ijinfomgt.2023.102642
Giusto, H. S. (2024, February 1). Tips for AI in career management. Professional Association of Résumé Writers and Career Coaches. https://members.parwcc.com/blogpost/1852195/497440/Tips-for-AI-in-Career-Management
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Ticknor, B. (2019). “Virtual reality and correctional rehabilitation: A game changer.” *Criminal Justice and Behavior, 46*(9), 1319-1336.
VirtualSpeech. (2024). *Job interview preparation.* https://virtualspeech.com/courses/interview-vr
Xu, Y., Liu, X., Cao, X., Huang, C., Liu, E., Qian, S., Liu, X., Wu, Y., Dong, F., Qiu, C.-W., Qiu, J., Hua, K., Su, W., Wu, J., Xu, H., Han, Y., Fu, C., Yin, Z., Liu, M., Roepman, R., ... Zhang, J. (2021). Artificial intelligence: A powerful paradigm for scientific research. Cell Reports Physical Science, 2(10), 100179. https://doi.org/10.1016/j.xinn.2021.100179


THANK
YOU

Appendix E

Structured Questionnaire Evaluation

This appendix contains the structured questionnaire used for data collection in the study. Participants completed this questionnaire after their VR and AI training experience. The questionnaire evaluates perceptions of acceptability, appropriateness, and expected feasibility using a Likert scale. Questions address the effectiveness of VR and AI technologies for career training and the feasibility of implementation in career centers. Following is the complete structured questionnaire evaluation.

Hello «First_Name»,

Thank you for participating in the study, **“Diffusion of Virtual Reality (VR) and Artificial Intelligence (AI) Innovations in Career Centers: Perceptions of Acceptability, Appropriateness, and Feasibility of Implementation,”** led by Phenix Culbertson.

Please complete the Structured Questionnaire here via Qualtrics within 48 hours. You may answer the questions based on the specific context and climate of your organization.

IRB Statement:
You are being asked to participate in a survey research project entitled “Diffusion of Virtual Reality (VR) and Artificial Intelligence (AI) Innovations in Career Centers: Perceptions of Acceptability, Appropriateness, and Feasibility,” which is being conducted by Phenix Culbertson, a doctoral student at Valdosta State University. Your participation is invaluable as it will help us understand the perceptions of career center leaders regarding the use of innovations, such as virtual reality and artificial intelligence, as a scalable, immersive tool for students’ interview training in their organizations. While you will receive no direct benefits from this research study, your responses may significantly contribute to our understanding of teaching/training students how to prepare for interviews.

There are no foreseeable risks involved in participating in this study other than those encountered daily. Completion of the survey should take at most 30 minutes. The survey responses, and your participation, will be kept confidential and anonymous. No one, including the researcher, will be able to associate your responses with your identity. Your participation is voluntary. You may refrain from taking the survey, stop responding at any time, or skip any questions you do not want to answer. Your completion of the survey serves as your voluntary agreement to participate in this research project and your certification that you are 18 or older. Participants must be at least 18 years of age to participate in this study.

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Best regards,

Phenix J. Culbertson
Pronouns: he/him/his
Doctoral Student,
Valdosta State University Doctor of Public Administration Program
Associate Director of Employer Relations,
GSU Robinson College of Business Graduate Career Advancement Center

Tools Saved at 1:55 PM Published Preview Publish

FINAL Structured Questionnaire 9.28.24

ExpertReview score Great

Default Question Block

IRB

You are being asked to participate in a survey research project entitled "Diffusion of Virtual Reality (VR) and Artificial Intelligence (AI) Innovations in Career Centers: Perceptions of Acceptability, Appropriateness, and Feasibility," which is being conducted by Phenix Culbertson, a doctoral student at Valdosta State University. Your participation is invaluable as it will help us understand the perceptions of career center leaders regarding the use of innovations, such as virtual reality and artificial intelligence, as a scalable, immersive tool for students' interview training in their organizations. While you will receive no direct benefits from this research study, your responses may significantly contribute to our understanding of teaching/training students how to prepare for interviews.

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Page Break

Demographics

DEMOGRAPHIC CHARACTERISTICS: Select the most appropriate answer.

1

Gender

- ○ Man
- ○ Woman
- ○ Transgender man
- ○ Transgender woman
- ○ Non-binary
- ○ Prefer not to say

2

Age

- ○ 18-24 years
- ○ 25-34 years
- ○ 35-44 years
- ○ 45-54 years
- ○ 55-64 years
- ○ 65+ years
- ○ Prefer not to say

3

How would you describe yourself?

- [ ] American Indian or Alaska Native
- [ ] Asian
- [ ] Black or African American
- [ ] Native Hawaiian or Other Pacific Islander
- [ ] White
- [ ] Other: Please describe
- [ ] Prefer not to say

4

Highest Completed Level of Education

- ○ High School or GED Equivalent
- ○ Some College
- ○ College Diploma or Certificate
- ○ Associate's Degree
- ○ Bachelor's Degree
- ○ Master's Degree
- ○ Doctoral Degree

5

How many years of experience do you have working as a career center leader? (Use a whole number)

6

Does your career center operate within a public or private organization?

- ○ Public
- ○ Private
- ○ Other: Please explain

7

Does your career center follow a centralized or decentralized model?

- ○ Centralized
- ○ Decentralized
- ○ Other: Please explain

--- Page Break ---

Programmatic Non-Met

PROGRAMMATIC CHARACTERISTICS: Select the most appropriate answer using the 5 points on the Likert Scale ranging from 0 (not at all) to 4 (very).

8

Are you current methods for interview training backed up by supporting research findings?

- ○ 0 (Not at all)
- ○ 1 (Less)
- ○ 2 (Somewhat)
- ○ 3 (More)
- ○ 4 (Very)

9

How much training have you received on preparing students for job interviews?

- 0 (None at all)
- 1 (Less)
- 2 (Some)
- 3 (More)
- 4 (High)

10

How satisfied are you with your career center's current interview training program?

- 0 (Not at all satisfied)
- 1 (Less satisfied)
- 2 (Somewhat satisfied)
- 3 (More satisfied)
- 4 (Very satisfied)

11

How scalable is your career center's current interview training program? [Scalability: ability of a system, network, or process to handle a growing amount of work or its potential to accommodate growth (Bondi, 2000)]

- 0 (Not at all scalable)
- 1 (Less scalable)
- 2 (Somewhat scalable)
- 3 (More scalable)
- 4 (Very scalable)

12

How immersive is your career center's current interview training program? [Immersion: awareness the user has of the real world during the simulation (Ticknor, 2019)]

- 0 (Not at all immersive)
- 1 (Less immersive)
- 2 (Somewhat immersive)
- 3 (More immersive)
- 4 (Very immersive)

Page Break

Programmatic Metric

PROGRAMMATIC CHARACTERISTICS: Type in a whole number.

13

On average, how many mock interviews with students can 1 full-time staff member deliver in a given day?

14

How many staff in your career center are responsible for delivering the current interview training program?

Page Break

15

How many rooms are available in your career center for the virtual reality (VR) interview training setup?

16

How many students does your career center provide interview training for?

17

On average, how much (dollar amount) is the annual budget for new technology in your career center?

18

How many Meta Quest 2 HMDs do you foresee as feasible to purchase for your career center? (Cost is approximately $300 per HMD)

Page Break

Acceptability

Select the most appropriate response using the 5 points on the Likert Scale ranging from 0 (not at all) to 4 (very). [Acceptability: perception among implementation stakeholders that innovation is agreeable, palatable, or satisfactory (Proctor et al., 2011)]

19

How acceptable was the presenter's introduction to the VR and AI innovations?

- 0 (Not at all acceptable)
- 1 (Less acceptable)
- 2 (Somewhat acceptable)
- 3 (More acceptable)
- 4 (Very acceptable)

20

How acceptable was the content of the orientation on how to use the VR and AI innovations?

- 0 (Not at all acceptable)
- 1 (Less acceptable)
- 2 (Somewhat acceptable)
- 3 (More acceptable)
- 4 (Very acceptable)

21

How acceptable was the length of the orientation session?

- 0 (Not at all acceptable)
- 1 (Less acceptable)
- 2 (Somewhat acceptable)
- 3 (More acceptable)
- 4 (Very acceptable)

22

How acceptable was the orientation on how to use the Meta Quest 2 Head Mounted Display?

- 0 (Not at all acceptable)
- 1 (Less acceptable)
- 2 (Somewhat acceptable)
- 3 (More acceptable)
- 4 (Very acceptable)

23

How acceptable was the orientation on how to use the Meta Quest 2 Touch Controllers?

- 0 (Not at all acceptable)
- 1 (Less acceptable)
- 2 (Somewhat acceptable)
- 3 (More acceptable)
- 4 (Very acceptable)

24

How acceptable was the orientation on how to use VirtualSpeech© software?

- 0 (Not at all acceptable)
- 1 (Less acceptable)
- 2 (Somewhat acceptable)
- 3 (More acceptable)
- 4 (Very acceptable)

25

How acceptable was the automated feedback feature (made possible by artificial intelligence) of the VirtualSpeech software?

- 0 (Not at all acceptable)
- 1 (Less acceptable)
- 2 (Somewhat acceptable)
- 3 (More acceptable)
- 4 (Very acceptable)

-- Page Break --

Appropriateness

Select the most appropriate response using the 5 points on the Likert Scale ranging from 0 (not at all) to 4 (very). [Appropriateness: perceived fit, relevance, or compatibility of the innovation and/or perceived fit of the innovation to address a particular issue or problem (Proctor et al., 2011)]

26

How appropriate is the Meta Quest 2 as a tool for providing interview training to students?

- 0 (Not at all appropriate)
- 1 (Less appropriate)
- 2 (Somewhat appropriate)
- 3 (More appropriate)
- 4 (Very appropriate)

27

How appropriate is the VirtualSpeech© software as a tool for providing interview training to students?

- 0 (Not at all appropriate)
- 1 (Less appropriate)
- 2 (Somewhat appropriate)
- 3 (More appropriate)
- 4 (Very appropriate)

28

How appropriate is virtual reality (VR) and artificial intelligence (AI) interview training for students seeking career readiness development?

- 0 (Not at all appropriate)
- 1 (Less appropriate)
- 2 (Somewhat appropriate)
- 3 (More appropriate)
- 4 (Very appropriate)

29

How appropriate is VR and AI interview training for helping your students obtain a job?

- 0 (Not at all appropriate)
- 1 (Less appropriate)
- 2 (Somewhat appropriate)
- 3 (More appropriate)
- 4 (Very appropriate)

30

How appropriate is VR and AI interview training for helping your students obtain an internship?

- 0 (Not at all appropriate)
- 1 (Less appropriate)
- 2 (Somewhat appropriate)
- 3 (More appropriate)
- 4 (Very appropriate)

31

How appropriate is VR and AI interview training to your career center's strategic plans?

- 0 (Not at all appropriate)
- 1 (Less appropriate)
- 2 (Somewhat appropriate)
- 3 (More appropriate)
- 4 (Very appropriate)

-- Page Break --

Expected Feasibility

Select the most appropriate response using the 5 points on the Likert Scale ranging from 0 (not at all) to 4 (very). [Feasibility: extent to which an innovation can be successfully carried out within a given setting (Karsh, 2004)]

32

How feasible is having the budget for implementing virtual reality (VR) and artificial intelligence (AI) interview training in your career center?

- 0 (Not at all feasible)
- 1 (Less feasible)
- 2 (Somewhat feasible)
- 3 (More feasible)
- 4 (Very feasible)

33

How feasible is having the technological capabilities for implementing VR and AI interview training in your career center?

- 0 (Not at all feasible)
- 1 (Less feasible)
- 2 (Somewhat feasible)
- 3 (More feasible)
- 4 (Very feasible)

34

How feasible would it be for staff to deliver VR and AI interview training in your career center?

- 0 (Not at all feasible)
- 1 (Less feasible)
- 2 (Somewhat feasible)
- 3 (More feasible)
- 4 (Very feasible)

35

How feasible would it be to train staff on how to deliver VR and AI interview training in your career center?

- 0 (Not at all feasible)
- 1 (Less feasible)
- 2 (Somewhat feasible)
- 3 (More feasible)
- 4 (Very feasible)

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36

How feasible would it be to obtain the buy-in from your organization's leaders to implement VR and AI interview training in your career center?

- 0 (Not at all feasible)
- 1 (Less feasible)
- 2 (Somewhat feasible)
- 3 (More feasible)
- 4 (Very feasible)

37

How feasible would it be to obtain the buy-in from your organization's students to implement VR and AI interview training in your career center?

- 0 (Not at all feasible)
- 1 (Less feasible)
- 2 (Somewhat feasible)
- 3 (More feasible)
- 4 (Very feasible)

38

How feasible would it be to create or set aside the physical space needed to implement VR and AI interview training in your career center?

- 0 (Not at all feasible)
- 1 (Less feasible)
- 2 (Somewhat feasible)
- 3 (More feasible)
- 4 (Very feasible)

Page Break

Import from library   Add new question

Add Block

End of Survey

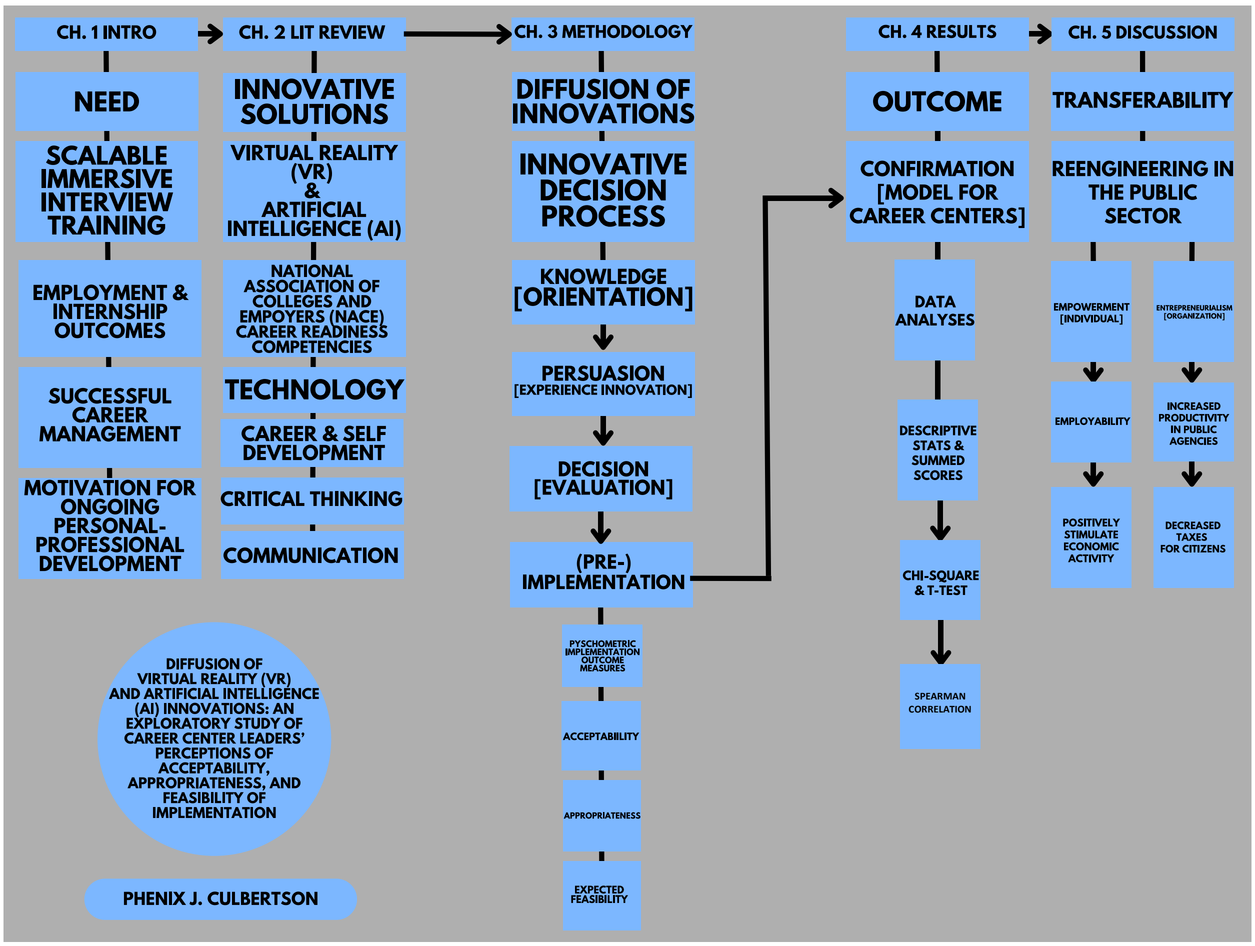
We thank you for your time spent taking this survey.

Your response has been recorded.

Appendix F

Dissertation Conceptual Framework

This appendix contains the conceptual framework used in the study, highlighting key elements such as career development, virtual reality (VR) and artificial intelligence (AI) innovations, and their diffusion within career centers. It maps the relationship between the research questions and the theoretical foundations of the study. The framework emphasizes the innovative decision process and psychometric implementation in assessing acceptability, appropriateness, and expected feasibility. A diagram visually represents the interconnections between these elements. For detailed reference, see the diagram included in Appendix A.



Appendix G

Quantitative Data Analyses Results

Summed Score Descriptives of Psychometric Implementation Outcome Measures

Table 4.4 presents the summed scores for acceptability, appropriateness, and feasibility measures. The results show that acceptability and appropriateness are perceived as high, while expected feasibility is viewed as moderate.

Table 4.4

Summed Score Descriptives of Psychometric Implementation Outcome Measures

Measure	*n*	*M*	*SD*	*Range*	*Cronbach's α*
Acceptability	9	26	2.7	21-28	.96
Appropriateness	9	20	4	12-24	.91
Expected Feasibility	9	18	7.2	3-28	.94

Note. Cronbach's Alpha (α) values indicate the internal consistency reliability of each summed score scale. A higher

Chi-Square Test Results for Type of Institution Across Programmatic Characteristics

Table 4.5 highlights the findings that suggest that the type of institution has a significant impact on programmatic characteristics, which may subsequently influence perceptions of VR and AI adoption. This is consistent with the study's aim to understand the role of institutional characteristics in shaping the implementation potential of innovative technologies.

Table 4.5

Chi-Square Test Results for Type of Institutions Across Programmatic Characteristics

Type of Institution	Current Research-Supported Methods				Job Interview Prep Training				Current Satisfaction				Current Scalability				Current Immersion			
	No		Yes		No		Yes		No		Yes		No		Yes		No		Yes	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Private	2	100	0	0	2	100	0	0	2	100	0	0	1	50	1	50	2	100	0	50
Public	1	14.3	6	85.7	2	28.6	5	71.4	2	28.6	5	71.4	2	28.6	5	71.4	5	71.4	2	28.6
χ^2	5.14*				3.21				3.21				0.32				0.74			
p	0.02				0.07				0.07				0.57				0.39			
Fisher's Exact Test	$p = 0.83$				$p = 0.17$				$p = 0.17$				$p = 1.00$				$p = 1.00$			

Note. *$p < 0.05$. A Pearson Chi-square Test (χ^2) revealed a statistically significant association between institution type and the use of research-supported methods ($p = 0.02$). No significant associations were found for the other programmatic characteristics. Fisher's Exact Test provides an alternative p-value when the sample sizes are small or when the assumptions of the Chi-square test are not met (e.g., expected frequencies are below 5 in some cells). Fisher's test is more accurate in these cases.

Chi-Square Test Results for Career Center Model and Programmatic Characteristics

Table 4.6 shows the results of chi-square tests examining the influence of career center models (centralized or decentralized) on programmatic characteristics. This analysis identifies how organizational structure may affect the implementation and availability of VR and AI technologies. The career center model's influence on programmatic characteristics supports the research framework's focus on evaluating structural impacts. These findings highlight how centralized versus decentralized models may impact the feasibility and appropriateness of implementing VR and AI innovations in career centers.

Table 4.6

Chi-Square Test Results for Career Center Model and Program Characteristics

Career Center Model	Current Research-Supported Methods				Job Interview Preparation Training				Current Satisfaction				Current Scalability				Current Immersion			
	No		Yes		No		Yes		No		Yes		No		Yes		No		Yes	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Centralized	3	50	3	50	4	67.3	2	33.3	3	50	3	50	2	33.3	4	66.7	5	83.3	1	16.7
Decentralized	0	0	3	100	0	0	3	100	0	0	3	100	0	0	3	100	2	66.7	1	33.3
χ^2	2.25				3.6				0.23				0				0.32			
p	0.13				0.06				0.64**				1				0.57			
Fisher's Exact Test	*p* = 0.46				*p* = 0.17				*p* = 0.63				*p* = 1.00				*p* = 1.00			

Note. $^{**}p < 0.06$. The Pearson Chi-square Test (χ^2) indicated no statistically significant associations between the career center model (centralized or decentralized) and most programmatic characteristics analyzed. However, the *p*-value for job interview preparation training is slightly above the traditional threshold for significance ($p = 0.06$), suggesting a near-significant trend toward an association that may require further investigation.

Independent Samples T-Test Results for Program Characteristics Across Type of Institution

Table 4.7 summarizes the group statistics for these variables, presenting the mean values, standard deviations, and sample sizes for both public and private institutions. The descriptive statistics revealed that public institutions, on average, possess larger staff sizes compared to private institutions, while private institutions demonstrated a marginally higher technology budget. The small number of private institutions makes it difficult to draw strong conclusions about the differences.

Table 4.7

Group Statistics for Program Characteristics Across Type of Institution (TOI)

Characteristic	TOI	*n*	*M*	*SD*	*SEM*
Mock Interviews	Private	2	7	1.41	1
	Public	7	4.43	0.79	0.3
Career Center Staff Size	Private	2	7.5	0.71	0.5
	Public	7	3.57	1.62	0.61
Available Rooms	Private	2	0.5	0.71	0.5
	Public	7	1.29	1.5	0.57
Career Center Student Size	Private	2	4,550	6,293.25	4,450
	Public	7	7,017.14	15,886.03	6,004.36
Annual Technology Budget	Private	2	6,500	4,949.75	3,500
	Public	7	16,000	37,220.07	14,067.86
Foresee Number of HMDs	Private	2	3	1.41	1
	Public	7	2.57	1.9	0.72

*Note***.** *N* represents the number of institutions in each category (Private or Public). *M* represents the average scores for each program characteristic. *SD* reflects the variability within each group, and *SEM* indicates the precision of the mean estimate.

The findings in Table 4.8 revealed differences in staff size between public and private institutions, with a p-value less than 0.05. This indicates that public institutions are more likely to allocate greater human resources to their career centers, potentially influencing their capacity for adopting VR and AI technologies. Conversely, no significant difference was observed in the technology budget between institution types, suggesting that both sectors allocate similar levels of financial resources toward technological investments. These significant differences between public and private institutions suggest that public institutions, with larger staff sizes, may have greater flexibility and capacity to implement and scale VR and AI technologies. Private institutions, despite having smaller staff sizes, showed marginally higher technology budgets, which could influence the type of technology investments made, though these differences were not statistically significant.

Table 4.8

Independent Samples T-Test for Program Characteristics Across Type of Institution

Characteristic	*Levene's Test (F, p)*	*t*	*df*	*p*	*MD*	*95% CI (Lower, Upper)*
Mock Interviews	F = 1.50, p = .26	3.55	7	0.01*	2.57	[0.86, 4.28]
Career Center Staff Size	F = 2.59, p = .15	3.22	7	0.02*	3.93	[1.04, 6.81]
Available Rooms	F = 1.41, p = .27	-0.7	7	0.51	-0.79	[-3.46, 1.89]
Career Center Student Size	F = 0.48, p = .51	-0.21	7	0.842	-2467	[-30,713.87, 25,779.58]
Annual Technology Budget	F = 1.07, p = .34	-0.34	7	0.741	-9500	[-74,927.79, 55,927.79]
Foresee Number of HMDs	F = 1.43, p = .27	0.29	7	0.78	0.43	[-3.06, 3.92]

Note. *$p < 0.05$. Levene's test was used to assess the equality of variances. The t-test for equality of means was conducted to compare private and public institutions across program characteristics. For Mock Interviews, the *p*-value (0.01) indicates a statistically significant difference between the institutions, suggesting that private and public institutions differ in this program characteristic. For Career Center Staff Size, the *p*-value (0.02) also shows a significant difference between the institutions, highlighting that staff size varies between private and public institutions. *P* indicates the significance of the results, *MD* represents the mean difference between the groups, and 95% *CI* provides the lower and upper bounds for the confidence interval.

Table 4.9 provides effect sizes for the observed differences, offering a practical interpretation of the variations. The reported Cohen's d values for staff size differences suggest a medium effect, indicating that the disparity in staff size between public and private institutions is substantial enough to impact programmatic outcomes. These effect sizes highlight the importance of human resources in shaping the potential for technology adoption within career centers.

Table 4.9

Effect Sizes for Program Characteristics Across Type of Institution

Characteristic	Cohen's *d*	*PE*	95% *CI* (Lower, Upper)
Mock Interviews	0.9*	2.84	[0.65, 4.94]
Career Center Staff Size	1.52*	2.58	[0.48, 4.59]
Available Rooms	1.41	-0.56	[-2.14, 1.06]
Career Center Student Size	14898.71	-0.17	[-1.73, 1.41]
Annual Technology Budget	34509.83	-0.28	[-1.84, 1.31]
Foresee Number of HMDs	1.84	-0.23	[-1.35, 1.80]

Note. $^*p < 0.05$. Cohen's *d* represents the effect size, indicating the magnitude of the difference between centralized and decentralized career center models across program characteristics. For Mock Interviews, Cohen's *d* (0.9) suggests a medium to large effect size, which aligns with the statistically significant *p*-value (0.01), indicating a notable difference between the models. For Career Center Staff Size, Cohen's *d* (1.52) indicates a large effect size, supporting the statistically significant *p*-value (0.02) and highlighting a substantial difference between the models. Effect sizes for other characteristics, such as Available Rooms, Student Size, Annual Technology Budget, and Foresee Number of HMDs, are not mentioned, as these results were neither significant nor trending toward significance based on the p-values. *PE* represents the point estimate of the effect size, and 95% *CI* provides the confidence interval for the effect size estimate.

Independent Samples T-Test Results for Program Characteristics and Career Center Model

The second independent samples t-test was performed to assess differences in program characteristics between centralized and decentralized career center models. Table 4.10 presents the descriptive statistics for the continuous variables analyzed, including career center staff size, technology budget, number of available rooms, student population served by the career center, and the number of head-mounted displays (HMDs) planned for future use.

Table 4.10

Group Statistics for Program Characteristics Across Career Center Model

Characteristic	CCM	*n*	*M*	*SD*	*SEM*
Mock Interviews	Centralized	6	5.5	1.52	0.62
	Decentralized	3	4	0	0
Career Center Staff Size	Centralized	6	4.67	2.58	1.05
	Decentralized	3	4	1.73	1
Available Rooms	Centralized	6	1.5	1.52	0.62
	Decentralized	3	0.33	0.58	0.33
Career Center Student Size	Centralized	6	9,250	16,871.84	6,887.90
	Decentralized	3	906.67	613.3	354.09
Annual Technology Budget	Centralized	6	4,166.67	4,665.48	1,904.67
	Decentralized	3	33,333.33	57,735.03	33,333.33
Foresee Number of HMDs	Centralized	6	1.83	1.47	0.6
	Decentralized	3	4.33	0.58	0.33

Note. *N* represents the number of institutions in each category (Centralized or Decentralized Career Center Model). *M* represents the average scores for each program characteristic. *SD* reflects the variability within each group, and *SEM* indicates the precision of the mean estimate.

The results of the t-tests for program characteristics across career center models, as presented in Table 4.11, indicated significant differences in both staff size and technology budget, with p-values below 0.05. These findings suggest that the centralized model's resource advantage may position it better for implementing advanced technologies like VR and AI, aligning with the study's goal of understanding the structural impacts on technology adoption.

Table 4.11

Independent Samples T-Test for Program Characteristics Across Career Center Model

Characteristic	Levene's Test *(F, p)*	*t*	*df*	*p*	*MD*	95% *CI* (Lower, Upper)
Mock Interviews	F = 5.72, p = .048	2.423	5	0.06**	1.5	[-0.09, 3.09]
Career Center Staff Size	F = 0.62, p = .456	0.4	7	0.7	0.67	[-3.30, 4.63]
Available Rooms	F = 2.14, p = .187	1.25	7	0.25	1.17	[-1.04, 3.37]
Career Center Student Size	F = 2.45, p = .162	0.83	7	0.44	8,343.33	[-15,505.13, 32,191.79]
Annual Technology Budget	F = 30.35, p < .001	-0.87	2.01	0.47	-29,166.67	[-171,932.08, 113,598.75]
Foresee Number of HMDs	F = 2.66, p = .147	-3.64	6.91	0.01*	-2.5	[-4.64, -0.36]

Note. $*p < 0.05$. $**p < 0.06$. Levene's test was used to assess the equality of variances. The t-test for equality of means was conducted to compare centralized and decentralized career center models across program characteristics. For Mock Interviews, the *p*-value (0.06) suggests a trend toward significance, indicating a potential difference between the models that may warrant further investigation. For the Program Foresee Number of HMDs, the *p*-value (0.008) indicates a statistically significant difference, suggesting that centralized and decentralized career center models differ in this program characteristic. *P* indicates the significance of the results, *MD* represents the mean difference between the groups, and 95% *CI* provides the lower and upper bounds for the confidence interval.

Effect sizes for the differences between centralized and decentralized models, as outlined in Table 4.12, provide context for the magnitude of these variations. The medium to large effect sizes for both staff size and technology budget underscore the practical significance of these findings, suggesting that the observed differences in resource allocation are meaningful and likely to influence the feasibility of technology implementation.

Table 4.12

Effect Sizes for Program Characteristics Across Career Center Model

Characteristic	Cohen's *d*	*PE*	95% *CI* (Lower, Upper)
Mock Interviews	1.28	1.17	[-0.38, 2.65]
Career Center Staff Size	2.37	0.28	[-1.12, 1.67]
Available Rooms	1.32	0.89	[-0.60, 2.32]
Career Center Student Size	14263.08	0.59	[-0.85, 1.98]
Annual Technology Budget	31111.55	-0.94	[-2.38, 0.56]
Foresee Number of HMDs	1.28	-1.95	[-3.62, -0.20]

*Note***.** Cohen's d represents the effect size, indicating the magnitude of the difference between centralized and decentralized career center models across program characteristics. For Mock Interviews, Cohen's d (1.28) suggests a large effect size, aligning with the marginally non-significant *p*-value (0.06), which indicates a trend toward significance and may warrant further investigation. For the Program Foresee Number of HMDs, Cohen's d (1.28) and a *p*-value of 0.008 indicate a significant and large effect, suggesting a substantial difference between the models for this program characteristic. Effect sizes for other characteristics, such as Available Rooms, Student Size, Annual Technology Budget, and Career Center Staff Size, are not mentioned as they were neither significant nor trending toward significance based on the p-values. *PE* represents the point estimate of the effect size, and 95% *CI* provides the lower and upper bounds for the confidence interval.

Spearman Correlation Analysis Results

Table 4.13 displays the Spearman correlation coefficients, examining the connections between programmatic characteristics (e.g., staff size, budget) and the summed scores for acceptability, appropriateness, and expected feasibility.. Given the small sample size of only 9 participants, the results should be interpreted with caution, as the limited sample reduces the statistical power of the findings. This small sample size may also affect the reliability of correlations and the generalizability of the findings.

Table 4.13

Spearman Correlation Matrix for Psychometric Implementation Outcome Measures

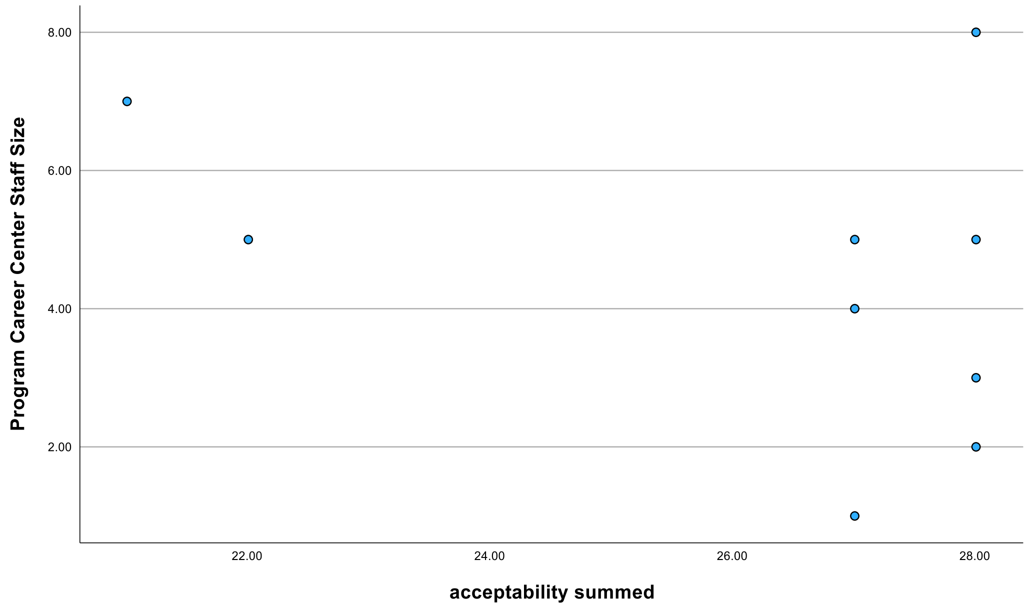
Program Characteristic	Outcome Measure		
	Acceptability	Appropriateness	Expected Feasibility
Current Research-Supported Methods	0.24	-0.33**	-0.19
Job Interview Preparation Training	0.51**	-0.27	-0.44**
Current Satisfaction	0	-0.58**	-0.53**
Current Scalability	0.24	-0.33**	0
Current Immersion	0.55**	0.05	0.11
Mock Interviews	-0.19	-0.28	-0.34**
Career Center Staff Size	-0.20	0.11	0.40**
Available Rooms	-0.27	-0.01	0.31**
Career Center Student Size	-0.74*	-0.15	0.05
Annual Technology Budget	-0.31**	-0.21	0.08
Foresee Number of HMDs	-0.17	0.27	0.35**

Note. ρ (rho) represents the Spearman correlation coefficient, which measures the strength and direction of the monotonic relationship between two ranked variables.* indicates a strong correlation ($|\rho| > 0.7$). A strong correlation means a substantial relationship between the variables, where one variable's increase or decrease significantly corresponds to changes in the other. ** indicates a moderate correlation ($0.3 < |\rho| \leq 0.7$). A moderate correlation reflects a noticeable relationship between variables, though the effect is not as pronounced as a strong correlation. Positive correlations indicate that as one variable increases, the other variable tends to increase as well (e.g., Job Interview Preparation Training and Acceptability, ρ = 0.51**). Negative correlations indicate that as one variable increases, the other variable tends to decrease (e.g., Career Center Student Size and Acceptability, ρ = -0.74*).

Additionally, correlations with magnitudes greater than 0.30 or less than -0.30 were considered meaningful; however, one observed correlation (-0.70) was heavily influenced by two outliers. These outliers significantly affected the distribution and skewed the relationship, suggesting that the correlation may not be fully representative of the population. The presence of outliers highlights the potential for anomalies in the data, which can lead to overestimating or underestimating true relationships. To address this concern, a scatterplot is provided in Figure A1 to visually demonstrate the impact of the outliers.

Figure A1

Scatterplot of outliers for acceptability and program career center staff size.



Note. *The scatterplot illustrates the correlation between the summed acceptability scores and the size of the career center staff. Data points indicate individual observations, with outliers potentially influencing the overall trend. Interpretations should consider these outliers in understanding the relationship.*