# Omega Graduate School

# Dissertation Research Prospectus Template (Pre-Proposal)

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Working Title: Differences in Interview Selection Rates Between Traditional and Generative AI Enhanced Resumes Among Diverse STEM Employment Candidates: A Quantitative Quasi-Experimental Study

# Problem Statement

The problem is marginalized groups have been historically excluded from interview selection in STEM fields, and the extent to which the use of Generative AI for resume creation or enhancement affects interview selection rates is unknown (Casad et. al., 2021)

# Purpose Statement

The purpose of this study is to examine differences in interview selection rates among marginalized groups in STEM fields according to the use of Generative AI for resume creation or enhancement.

# Background of the Problem

AI Impact on Workforce Shortfall

A 2021 study was done by Accenture and the Harvard Business School, which showed that 27 million workers are unemployed because applicant tracking systems use artificial intelligence. They are unemployed because the ATS has eliminated their resumes from consideration. (Fuller, 2021, p.3). Additionally, of the more than 2400 companies interviewed worldwide for the Hidden Worker study, the majority understand that their ATSs are eliminating qualified workers from consideration. “They exclude from consideration viable candidates whose resumes do not match the [Applicant tracking system] criteria but who could perform at a high level with training. Most (88%) of employers agree, telling us that qualified high-skills candidates are vetted out of the process because they do not match the exact criteria established by the job description. That number rose to 94% in the case of middle-skills workers.” (Fuller et al., 2021,p.3). Empirical evidence suggests that ATS can eliminate even the most highly qualified candidates. Berin & Associates, a talent management research and consulting firm in Oakland, California, tested an ATS by wring a resume for a clinical scientist position. The firm used knowledge of the job requirements to craft the resume for a theoretical ideal candidate who met 100 percent of the desired qualifications. The ATS ranked this perfect candidate as meeting just 43 percent of the qualifications, a ranking far too low to merit an interview within most companies. In fact, the candidate was rejected as not meeting the minimum educational criteria, simply because of the way advanced degrees were formulated on the resume (Levinson, 2012) (Holderman, 2014)

Applicant Tracking Systems

In 1995, fewer than 300 companies (all major corporations) used applicant tracking software to store, organize and search resumes, according to Training & Development magazine. Today some industry experts estimate that 80 percent of all companies, large and small, rely on computerized ATS as the first reader for every resume received from any source. This evolution in hiring methodology has major implications for clients, since for many candidates the ATS is also the last reader – 75 percent of resumes in any company database are never seen by a human recruiter or hiring manager because they do not meet the employer’s pre-established criteria for a specific position.

The most common criteria ATS uses for screening resumes includes specific years of experience within an industry or job title. Some employers use ATS selective criteria only currently employed candidates, while rejecting all unemployed candidates. Others use the system to select candidates by location (zipcode or area code) and some ask the ATS to identify candidates who have worked for (or are currently working for) specific companies or competitors. (Holderman, 2014). An explainable (X-AI) framework identifies criteria for resume evaluation to be: Education level, number of working years, number of awards obtained, number of skills and previous work positions. (Luo, 2018)

The un- or under-employment of people due to the criteria used for AI-enabled pre-screening of resumes is a world-wide problem. “In February 2020, just before COVID-19 triggered global lockdowns, employers struggled to fill positions as the economy approached “full employment”. The number of unemployed persons per job posting in the United States stood at 0.8, with 7 million positions open in the U.S., while 5.8 million people remained unemployed, and an equal number were underemployed. In the United Kingdom, there were 721,000 job vacancies during the December 2019-February 2020 period, during which there were 1.4 million unemployed people. Similarly, there were 712,000 job vacancies in Germany in February 2020, while 2.3 million people were unemployed (Fuller et al., 2021,p.7). Given these developed countries have significant numbers of people who will be economically insecure, the countries themselves will suffer with economic growth and stability. We can see through history when large segments of the population are denied opportunity it causes instability in the foundational fabric of the societies .

Ensuring that all people qualified for positions are fairly evaluated and considered to fill those positions is foundational to societal economic stability and prosperity. This research evaluates the rate of interview selection as it varies by resume generation method. The two methods are traditional resume development and AI-generated resume development.

Generative AI is potentially a way to create or enhance a persons resume to be favorably viewed by the ATS. Generative AI refers to a type of artificial intelligence that, can create answers to the questions by generating new content. This can be anything from creating images, music, or text to designing new models or concepts. Generative AI uses patterns and structures in the data it has been trained on to produce the most likely next token or pattern to match the scenario it was prompted for. Simply put for text, Generative AI has trained on large volumes of sentence structures so it becomes good at predicting the next words expected in a sentence. Examples of generative AI include models like GPT-3 and GPT-4, which can generate human-like linguistic pattern matching. These models are trained on vast amounts of text data and can generate text based on prompts, sometimes producing surprisingly creative and coherent outputs (Chat GPT-4, 2023). Generative AI models are now a technological tool available to all that can be used create, revise or enhance resumes which are better aligned with specific job descriptions. The ChatGPT-3 model was released to the public in November 2022. This study will measure as AI is used to evaluate resumes using ATS, so too can AI be used to better align resumes with job description text without compromising the accuracy of the candidates qualifications.

# Significance

This study will contribute to the gap in the literature of employment seekers using AI by identifying differences in interview selection rates among marginalized groups use of Generative AI for resume creation or enhancement versus traditional resume generation methods.

# Research Questions

RQ1: What differences exist in interview selection rates between those who use Generative AI for resume creation or enhancement and those who do not among candidates in STEM fields?

RQ2: What differences exist in interview selection rates between racial groups among candidates in STEM fields who use Generative AI for resume creation or enhancement?

RQ3: What differences exist in interview selection rates between racial groups among candidates in STEM fields who do not use Generative AI for resume creation or enhancement?

RQ4: What differences exist in interview selection rates between genders among candidates in STEM fields who do not use Generative AI for resume creation or enhancement? RQ5: What differences exist in interview selection rates between genders among candidates in STEM fields who use Generative AI for resume creation or enhancement?

# RQ6: What differences exist in accuracy of resume content between traditionally generated resumes or those who use Generative AI for creation or enhancement?Research Methodology

This study will utilize a quantitative methodology because hypotheses derived from research questions will be tested using statistical analysis.

# Theoretical/Conceptual Framework

This study is framed by self-determination theory. Self-determination theory is the investigation of people's inherent growth tendencies and innate psychological needs that are the basis for their self-motivation and personality integration and the conditions that foster those positive processes. Inductively, using the empirical process, we have identified three such needs--the needs for competence (Harter, 1978; White, 1963), relatedness (Baumeister & Leary, 1995; Reis, 1994), and autonomy (deCharms, 1968; Deci, 1975)--that appear to be essential for facilitating optimal functioning of the natural propensities for growth and integration, as well as for constructive social development and personal well-being. (Deci et. al, 1985). As social and personal evaluation processes evolve, so too do the natural processes for working within new social settings. Using generative AI to improve ATS relatedness, while describing competence through exercising autonomy increases intrinsic well-being and constructive social development.

# Instrumentation

## This study will utilize a researcher-developed survey instrument comprised of seven questions: two demographic screening questions, four binary (Yes/No) questions, and a single Likert-style question. The instrument will be validated through field testing by a panel of 3-5 subject matter experts (SMEs).Potential SMEs:

1. Tamara Goyea, PhD (Johns Hopkins Applied PhysicsLab)
2. Shawn Blake, MBA (Corporate CIO)
3. Michael Lhodal, PhD (AI and Faith)

# Research Design

Quasi-Experimental: compare differences in a continuous dependent variable between groups split on one or more independent variables from a validated instrument (quantitative, deductive)

This quantitative study will utilize a quasi-experimental design because it will examine interview selection rates for statistically significant differences among job seekers in STEM fields who utilize Generative AI for resume creation or enhancement and those who do not. This study will use chi-square analysis and ANOVA to test hypotheses for statistically significant differences between groups.

# Population and Sampling

The target population for this study will be diverse STEM college or university educated job seekers from socially connected networks.

Snowball sampling will be utilized to encourage broader participation on social media for four weeks. A recruitment request, informed consent, and instrument will be posted to the researcher’s social media platforms (LinkedIn) and relevant social media groups (with permission from the group administrators) with a request for others to share the post. The sample size will be a convenience sample based on the responses received during the recruitment period.

# Hypotheses (Quantitative Only)

Quasi-Experimental:

H01: No statistically significant difference exists in interview selection rates between those who use Generative AI for resume creation or enhancement and those who do not among job seekers in STEM fields (RQ1).

Ha1: A statistically significant difference exists in interview selection rates between those who use Generative AI for resume creation or enhancement and those who do not among job seekers in STEM fields (RQ1).

H02: No statistically significant difference exists in interview selection rates between racial groups among candidates in STEM fields who use Generative AI for resume creation or enhancement (RQ2).

Ha2: A statistically significant difference exists in interview selection rates between racial groups among candidates in STEM fields who use Generative AI for resume creation or enhancement (RQ2).

H03: No statistically significant difference exists in interview selection rates between racial groups among candidates in STEM fields who do not use Generative AI for resume creation or enhancement (RQ3).

Ha3: A statistically significant difference exists in interview selection rates between racial groups among candidates in STEM fields who do not use Generative AI for resume creation or enhancement (RQ3).

H04: No statistically significant difference exists in interview selection rates between genders among candidates in STEM fields who do not use Generative AI for resume creation or enhancement (RQ4).

Ha4: A statistically significant difference exists in interview selection rates between genders among candidates in STEM fields who do not use Generative AI for resume creation or enhancement (RQ4).

H05: No statistically significant difference exists in interview selection rates between genders among candidates in STEM fields who use Generative AI for resume creation or enhancement (RQ5).

Ha5: A statistically significant difference exists in interview selection rates between genders among candidates in STEM fields who use Generative AI for resume creation or enhancement (RQ5).

H06: No statistically significant difference exists in accuracy of resume content between traditionally generated resumes or resumes created or enhanced using Generative AI (RQ6).

Ha6: A statistically significant difference exists in accuracy of resume content between traditionally generated resumes or resumes created or enhanced using Generative AI (RQ6).

# Data Analysis Plan

## Quantitative:

This study will test data for normality and relevant assumptions of appropriate statistical procedures. If data do not meet assumptions for parametric procedures (results apply to the population), nonparametric procedures (results apply only to the sample) will be utilized.

This study will utilize a Chi-Square analysis (H1- and an ANOVA to test the hypotheses for statistically significant differences.

This study will include post-hoc statistical procedures such as power and effect size to aid the interpretation of the results.

Dissertation Outline

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