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Can Generative Artificial Intelligence Be a Helping Hand for California's Workforce?

Assessing the Impact of Gen AI Usage within the California Workforce

Generative artificial intelligence (Gen AI) is changing the world and can drastically affect the workforce. The World Economic Forum's Future of Jobs Report 2023 stated that Gen AI can widely affect the proportion of total workers tasks. In the upcoming five years, the integration of Gen AI in the workforce will be expedited with more than 75% of companies aiming to adopt these technologies. Although there's fear that over 50% of occupational tasks will be automated leading to job losses, others believe that Gen AI will bring improvements to the workforce (Di Battista, 5, 24). This has led me to the question: In California, do people believe generative artificial intelligence can improve or deteriorate our job quality?

I will analyze the relationship between individuals' usage of Gen AI at work and their job quality, including job satisfaction and commitment to quality work. I conducted a non-random survey, consisting of ten questions focusing on an individual's attitude toward Gen AI, usage of Gen AI, job productivity, and job satisfaction. When analyzing my data, I aim to understand whether there is a positive relationship between the use of Gen AI and job quality.

Significance of Issue

The public release of OpenAI Generative AI service, ChatGPT, sparked a race for companies to step into the Generative AI world. In only its first week, ChatGPT had one million users sign up (Aronoff et al., "Board"). Eventually, it gained 100 million users faster than

popular social media platforms, Tik Tok and Instagram (Zarifhonorvar). This indicates the strong, rapid interest in this new technology. Not only have consumers been interested, but also companies are interested in harnessing Gen AI's potential, like Microsoft investing \$10 billion in OpenAI for Gen AI incorporation for its Bing search engine (Felten, 2). Gen AI separates itself from AI by creating new content, while AI organizes information or makes decisions. For instance, AI could identify dogs in pictures, while Gen AI could create images of dogs based on a prompt (Harris, "Generative").

Recognizing the speed in using and developing Gen AI, the government has also made statements regarding Gen AI development. A couple of months ago, Governor Newsom announced an executive order regarding California's adoption of Gen AI (Newsom, Executive Order N-12-23). Recently, President Biden declared an executive order on establishing safety regulations for the ethical development of Gen AI (Biden, Executive Order 14110). These are important to California because both executive orders focus on the development of safe and ethical Gen AI technology. The hope is that this will decrease the job disparity in Gen AI exposure and provide a way for Gen AI to assist all occupations.

There is a strong prospect that Gen AI can boost the economy. Specifically, it could contribute around \$2.6 trillion to \$4.3 trillion to 63 various economies worldwide. Gen AI has the possibility of providing significant value for businesses. It is estimated that Gen AI could enable productivity percent annual growth of 0.2 to 0.3, and with other technologies, a drastic increase to 3.3 (Chui, 3). This provides relief for companies but not for employees, as Gen AI changes the landscape of the workforce.

With the presence of Gen AI, there are various impacts it could have in society, but the strongest one would be its effect on the workforce. Its impact on occupations is not one-sided.

Some believe it could lead to strong job loss, while others believe it could improve jobs. For instance, in a recent Pew Research Center survey, U.S. workers in highly impacted industries believe that Gen AI will help rather than hurt their jobs (Kochhar, 6).

This varied opinion on the impact of Gen AI in the workforce boils down to the fact that not all jobs will be affected by Gen AI. Jobs that have routines, repeatable tasks, and do not require interpersonal communication will be dominantly affected by Gen AI. This is called routine-biased technological change, where jobs that have routine-led tasks are most affected by technological advancements (Elondou). These job displacements can lead to increased wage inequality in U.S., where workers who earned about \$33 per hour were more exposed to Gen AI than workers who earned about \$20 per hour (Kochhar, 6). There are jobs that will not be impacted by automation. These jobs consist of interpersonal communication. Occupations like educational counsellors were reported with 84% of low chance in automation (Di Battista, 12). Overall, there is a separation between jobs affected by Gen AI which can lead to significant disparities in employment, wages, and income inequality due to Gen AI.

Although Gen AI can disrupt specific jobs, some jobs are created with the adoption of Gen AI. Some of those jobs are interface designers that develop interfaces for the public to harness Gen AI. Next, data curators and trainers check that high-quality data is inputted for proper development. In addition, ethics and government specialists are to guarantee no biased data enters the Gen AI system (Di Battista, 13). Gen AI can lead to job creation when a business utilizes this innovative technology.

Background

Generative AI is a technology that can produce original content. It can examine, develop, and modify information. The most prevalent example of this type of technology is ChatGPT, whose release in November 2022 made Gen AI public to the world (Aronoff et al., “Board”). There is a difference between AI and Gen AI. Gen AI is the result of years of development in the AI space; therefore, Gen AI can generate new information, while AI can classify data (Harris, “Generative”). There are powerful benefits yet dangerous risks when adding Gen AI to the workforce.

There are two ways Gen AI is incorporated into the workforce: automation and augmentation. Automation is the complete independence of Gen AI to execute a task, while augmentation aids the worker in completing a task. Jobs most affected by automation, including their percentage of exposure, are credit authorizers, checkers, and clerks, with the risk (precise 81%) of becoming automated (Di Battista, 10). These jobs that are likely to be automated consist of managing information. Jobs that are susceptible to augmentation with a corresponding exposure percentage are insurance underwriters (100%), bioengineers and biomedical engineers (84%), and mathematicians (80%) (Di Battista, 11). These jobs are typically specialized; therefore, Gen AI can help if it has access to the occupation’s knowledge base. Gen AI does have a varying impact on the job, depending on whether the occupational tasks can be automated or augmented.

Past research has shown that Gen AI and even AI usage can increase job satisfaction for workers. First, research conducted by MIT, Noy and Zhang examined the productivity effects when using Gen AI, specifically ChatGPT, for writing (Noy, Shakked, and Whitney Zhang, 1). After analyzing their experiment results, they found that ChatGPT had significantly improved

people's satisfaction (Noy, Shakked, and Whitney Zhang, 1). The only limitation is that those who used ChatGPT for the experiment had only been using this technology for two weeks, so job satisfaction through ChatGPT was not measured at its full potential (Noy, Shakked, and Whitney Zhang, 11). That is why I believe this research will gain a better picture on Gen AI's impact on a worker's job satisfaction, especially since ChatGPT has been released for a year.

Next, the Organization for Economic Co-operation and Development (OCED), an international organization, conducted a survey asking workers and employers from the manufacturing and finance industries their thoughts on AI's impact on their jobs. The survey discovered that workers reported greater enjoyment in their jobs with the incorporation of AI. Specifically, 63% of manufacturing and finance workers believed they enjoyed their jobs after using AI (Lane, Marguerita, et al., 35). Unfortunately, this study only looked at AI usage in the workforce and not Gen AI usage; therefore, in this research, examining Gen AI usage will be helpful to identify whether it increases job satisfaction compared to AI usage. There are some compelling benefits with businesses adopting AI but also some drawbacks. A survey conducted by the PEW research group studies workers' perspectives on the risk of AI in their occupations. Their study discovered that around 52% of workers in professional, scientific, and technical fields face a strong exposure to AI (Kochhar, 17). Another PEW research survey indicated that workers who are projected to face higher exposure are not concerned about their jobs being displaced and AI's impact on them (Kochhar, 17). Overall, 16% of U.S. adults believed AI will have a positive impact than a negative one in their personal life, while 15% thought the opposite (Kochhar, 17). The split view of AI being an asset or detriment is something this survey in this report hopes to bring more clarity on.

The MIT research and the OCED survey also investigated AI's impact on quality work. First, it was discovered that Gen AI significantly increased productivity for workers (Noy, Shakked, and Whitney Zhang, 11). Furthermore, it improved (decreased) the writing gap for all workers, meaning those who were low-performing in writing (due to the scoring scale in the experiment), when using Gen AI, had an increase in writing quality, and those who were considered high-performers had become more efficient while maintaining their quality (Noy, Shakked, and Whitney Zhang, 12). Next, in the OCED survey, almost 80% of employers and workers using AI in finance and manufacturing reported a boost in work performance (Lane, Marguerita, et al., 32). This is huge because the usage of AI has helped workers produce quality work.

Theory and Argument

My research question is whether Gen AI will improve or deteriorate a California worker's job quality. Job quality is about two concepts: job satisfaction and commitment to producing quality work. My conceptual hypothesis is as Gen AI usage increases at work, one's job satisfaction and commitment to quality work will increase. The causal mechanism of my research report is that a worker's usage of Gen AI will deliver higher efficiency, leading to increased quality of tasks and job satisfaction. Another theory to explain this relationship is that a worker's usage of Gen AI increases their productivity, leading to quality of work and job satisfaction to increase. I decided the first theory to be the causal mechanism because efficiency has a stronger relationship with the dependent variables (quality of work and job satisfaction) than productivity. Then, my operational hypothesis is that as a worker reports high usage of Gen AI tools at work in the past their job satisfaction and commitment to producing quality work will also be reported positively. I collected my data through a survey I conducted on Amazon's survey platform, Mechanical Turk. After receiving 211 responses, I utilized cross-tabulation to

analyze my data through Qualtrics (survey creation platform) and organized my data to create bar charts through Microsoft Excel.

My independent variable is the individual's usage of Gen AI in their jobs. This variable will be measured through the participant's attitude and usage of Gen AI. Specifically for attitude, I focused on understanding the participant's belief in Gen AI improving or hurting their job, and what emotion (variations of fear and excitement) matches how they feel about Gen AI. For Gen AI usage, I targeted how often the participant utilizes Gen AI tools, ranging from multiple times a day to less frequently than monthly, to gain an understanding. These questions help me gather insight on how attitude supports their amount of usage in order and their estimated usage to measure my independent variable.

My dependent variables are the individual's job satisfaction and their commitment to quality work. I aim to measure this variable by designing questions on job satisfaction and commitment to quality work. For job appreciation, I asked the participant's satisfaction for their job and how often they encounter enjoyment, fulfillment, stress, and being overwhelmed. This assists in comprehending how people feel about their job. Next, for quality work, I measured how often the respondent is committed to producing quality work at their job. These questions that measure the dependent variables will allow me to understand the relationship between Gen AI usage at work and job satisfaction and quality work.

A confounding variable that will skew my result is internet access. Without internet access, the survey cannot be completed. This eliminates certain people who do not have internet access. Another factor is that the survey is focusing on those who have jobs. This eliminates everyone who does not have a job, which may narrow down the sample of the survey. In addition, the productivity questions in the survey are based on the participant's opinion.

Therefore, the participant may be biased when assessing their productivity at work, which may skew results. While considering the confounding variables, I hope to understand Californian's impact of Gen AI in their occupations.

Research Design

I tested my hypothesis by conducting an online survey where I received data on California workers' experience with Gen AI tools and the quality of their jobs. The research design is an observational quantitative large-n study, since I conducted a survey that garnered 211 responses. Although I received many responses, this study is non-random and non-representative of California, which could be a limitation to the effectiveness when conducting a large-n study. The unit of analysis for my research is the Californian worker because I ran a survey and examined individual responses as my unit of analysis.

Examining my independent variable, the usage of Gen AI tools at work, I focused on two areas. I measured attitude on Gen AI tools, using a Likert scale to gauge the individual's feelings behind the powerful technology. Specifically, questions four and five are about measuring attitude. Question four asks the respondent if Gen AI tools have helped or hurt their job. Question five asks the respondent to choose the answer choice that best fits their emotion on how they feel about Gen AI tools, starting with most scared up to most excited. Next, I measured and asked about the respondent's usage of Gen AI tools at work. This is related to the independent variable and was measured through a Likert scale, starting at never and moving up to the daily use of Gen AI at work.

When measuring the dependent variables, I first analyzed an individual's job satisfaction. This was measured in the survey through two questions. First, question seven focused on how

satisfied respondents felt about their jobs in the past year, with options on a Likert scale ranging from extremely dissatisfied to extremely satisfied. For question eight I asked respondents how they felt their job was regarding four emotions: enjoyable, overwhelming, stressful, or fulfilling, and whether they never experienced that emotion or experienced it all the time when working. This question is to understand that those who strongly enjoyed or felt their job was fulfilling had a strong job satisfaction, while those who expressed being overwhelmed or stressed had low job satisfaction.

For the second dependent variable, commitment to producing quality work, I examined an individual's personal productivity rating. This was administered in the survey as the final question, asking the respondents how often they were committed to producing quality work in their jobs. Like my previous survey questions, I used a Likert scale where the respondent could decide between choices of never to all the time on their commitment to producing quality work.

After my survey had gained 211 responses, I began to review the results through Qualtrics. Qualtrics is the platform I used to create my survey. When examining my data, I used a feature on Qualtrics called cross-tabulation analysis. Cross-tabulation allows for the examination of two separate variables and their relationship. For example, one variable could be people who eat apples, and the other variable could be those who eat bananas. Using cross-tabulation analysis, a researcher can find those who eat apples and how likely they are to eat a banana based on the responses. For my research, I found this tool extremely valuable because it allowed me to analyze the relationships between my independent and dependent variables. Pairing questions to generate the cross-tabulation based on independent and dependent variables elevated my understanding of the survey results. Then, I began to develop visuals from the cross-

tabulation tables where I examined the response percentage of people that answered a specific question.

Bar charts were the most effective in representing Gen AI usage and job satisfaction and Gen AI usage and commitment to quality work. Bar charts are effective in seeing the response rate to see if there is a positive or negative correlation between the independent and dependent variables. I used Microsoft Excel to develop the bar charts. In addition to measuring my independent variable and two dependent variables, I also measured demographics. I asked respondents about their industry and developed a cross-tabulation of industry and Gen AI usage.

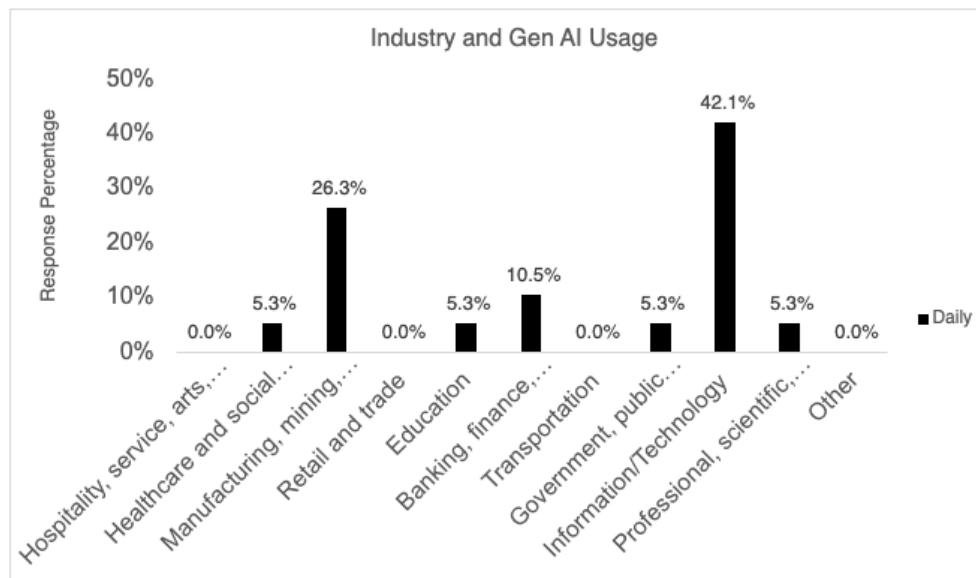


Figure 1: Daily Gen AI Usage based on Respondent Industries

Figure one examines industries that use Gen AI daily for their work. Technology shows the strongest daily usage, but it is also skewed since most responses in the survey were from the technology industry. Most respondents from the technology industry exhibit strong signs of using Gen AI daily because of the significant impact this technology has in their realm of

expertise. The manufacturing industry also exhibited a high response on using Gen AI daily which may revolve around business operations.

For my research, there are some strengths and weaknesses regarding reliability. A weakness with reliability that was presented in my survey was self-reporting. Most of the survey involved respondents self-reporting whether Gen AI made their job easier/harder, their job satisfaction, how much they felt their job was enjoyable, fulfilling, stressful, and overwhelming, and their commitment to quality work. Most of the mentioned questions are used to measure the dependent variables of my research; therefore, receiving the most reliable answers is essential. With self-reporting, there is less reliability because of how much a human's opinion can change due to their day-to-day experiences. This variability is a danger to the reliability of the survey results. A strength is distributing the survey on Amazon's reliable survey platform, Mechanical Turk. This can lead to reliable results due to Amazon's management of the survey platform.

There are also some validity issues and strengths when examining my research. First, an issue with my survey is satisficing. This issue can be highly present in areas where the respondent did not want to put thought into their answer and simply chose the one that seemed the best. For example, in my survey, I asked about job satisfaction, with answers ranging from extremely dissatisfied to extremely satisfied. A respondent who is satisficing would have picked extremely satisfied because it seems to be the best answer. This can be a detriment to self-reporting surveys because of the impact satisficing has on respondents. On the other hand, a strength would be that all individuals who filled the survey out were anonymous, meaning no personal identifiable information linked to their response. This is a strength in validity because it gives respondents the ability to answer the survey without being biased.

Findings

Overall, my hypothesis was partially supported when analyzing the relationship between Gen AI usage and job satisfaction and Gen AI usage and commitment to quality work. At a broader level, there's support that when using Gen AI at work there is a relationship to greater job satisfaction, yet that is not the case for commitment to quality work. Therefore, when assessing if Gen AI improves/deteriorates job quality, based on the data, there is slight support, but it is not clear. The data I received from the survey is not one-sided; there are key details that support and do not support my hypothesis which makes the research even more interesting due to the complexity.

First, Figure two, describes the relationship between job satisfaction and the usage of Gen AI at work. In the visual, the black bars represent being somewhat satisfied while the gray bars represent being extremely satisfied. In addition, there are sections to represent the usages of Gen AI starting with daily usage to never using Gen AI. Having the never used Gen AI response choice acts as the control group to compare to those who use Gen AI (treatment group) and see if there's growth or not from the treatment group.

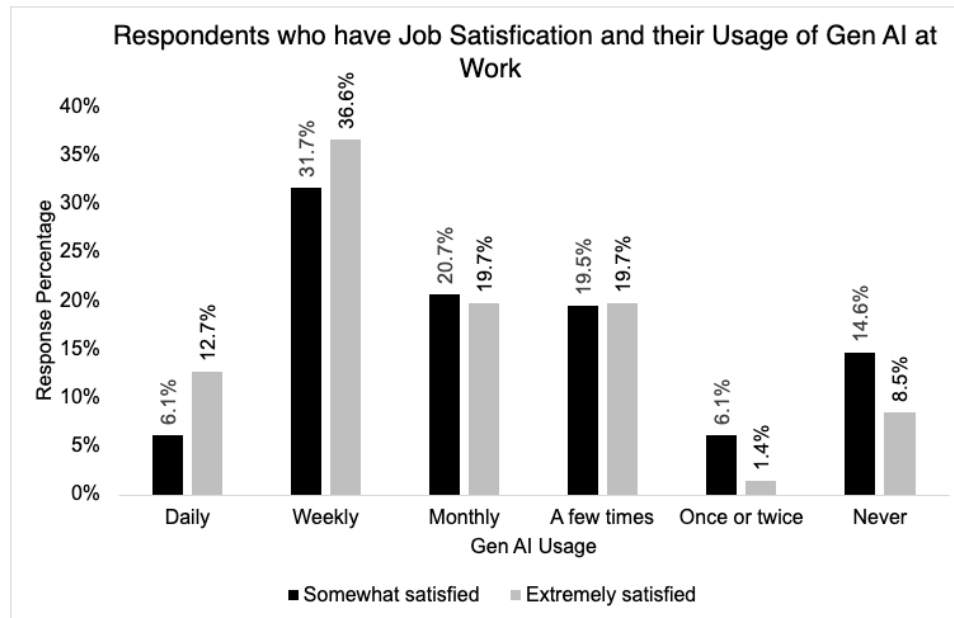


Figure 2: Relationship between Job Satisfaction and Gen AI Usage

Based on Figure two, there is a clear indication that when using Gen AI weekly, respondents exhibited strong job satisfaction. Moving from somewhat satisfied to extremely satisfied, weekly usage was the only category with a greater extreme satisfaction than somewhat satisfaction. This shows how strong the relationship between Gen AI weekly usage and workers' job satisfaction. On the other hand, in Figure two, daily usage exhibits less satisfaction than never using Gen AI. This observation does not support my hypothesis since I believe that as Gen AI usage increases, job satisfaction increases. The sudden drop in satisfaction from weekly to daily usage is interesting, especially when weekly usage received the highest job satisfaction. There is a consistent trend that Gen AI usage, besides daily usage, signifies high job satisfaction.

Next, Figure three examines the relationship between those who are committed to producing quality work all the time and their usage of Gen AI at work. Like Figure two, the bars are separated by Gen AI usage. This visual only focuses on respondents who chose the highest type of commitment to quality work, which is all the time.

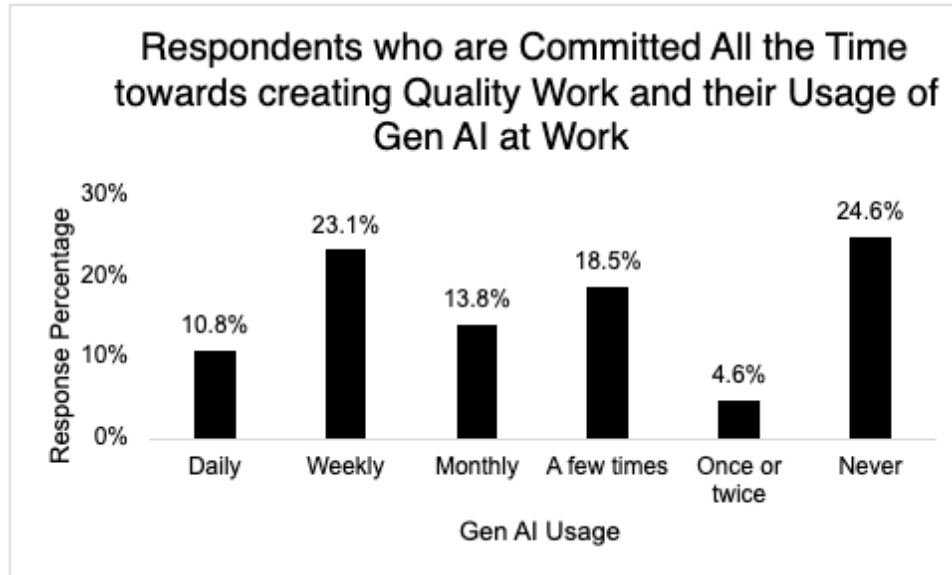


Figure 3: Relationship between Highest Commitment to Creating Quality Work and Gen AI Usage

Looking at Figure three, there is no noticeable pattern, but there are some key takeaways. First, never using Gen AI had the greatest number of respondents who were committed to creating quality work. This clearly refutes half of my hypothesis since I claimed that greater Gen AI usage increased commitment to quality work. Figure three has refuted half of my hypothesis, leading me to investigate why. My thoughts are that those who never use Gen AI tools typically take pride and ownership of their work being theirs; therefore, they are more committed to producing quality work.

Moving to the final visual, Figure four examines the relationship between those who use Gen AI and those who feel stressed at their job and those who enjoy their job all the time. The bars are broken apart by Gen AI usage: the black bars represent an individual's job being enjoyable (all the time), and the gray bars represent an individual's job being stressful (all the time).

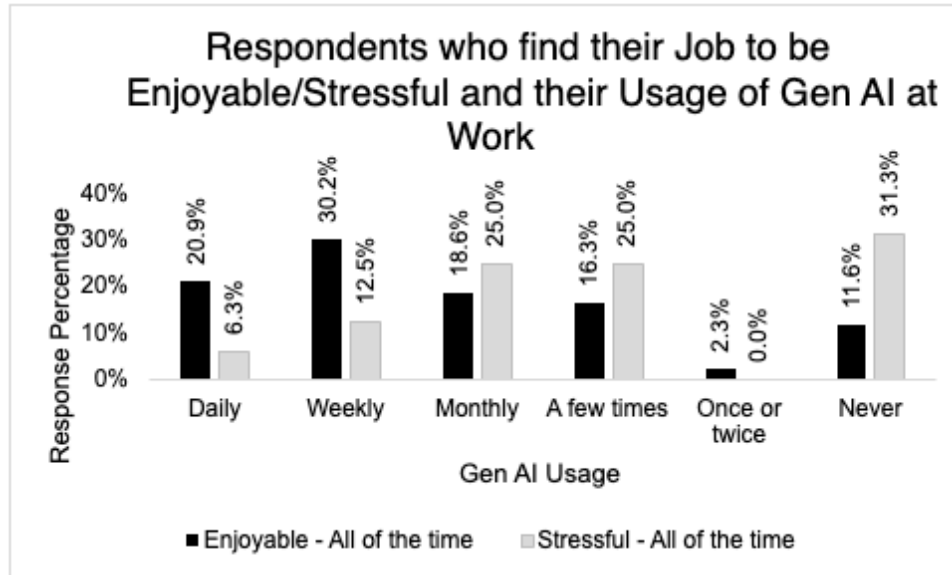


Figure 4: Relationship between finding Job Enjoyable/Stressful and Gen AI Usage

This was the most fascinating visual I had created when analyzing the survey data. There is a clear increase in enjoyment as Gen AI usage increases starting from once or twice to weekly. Another noticeable pattern is the gradual increase in stress as Gen AI usage becomes less. These two trends are indicative of Gen AI usage being a driving factor for less stress and more enjoyment when working. This is a representation of Gen AI usage positively affecting job satisfaction. With signs of Gen AI usage leading to high job satisfaction in Figures two and four, there's support for my hypothesis, but that support is only to a certain extent due to Gen AI usage daily being a consistent trend of not having strong job satisfaction (shown in Figures two and four).

Implications

Based on my findings, some heavy implications will affect our workforce and be critical in policymaking in California. First, understanding how to acknowledge and separate human-produced work and Gen AI-produced work is vital. This is important because, based on Figure

three, those who never used Gen AI responded the most to be highly committed to creating quality work. This indicates that Gen AI use may affect a worker's commitment to produce quality work. If the Gen AI tool is developing a report or presentation for the worker, then the worker becomes more reliant on the Gen AI tool. Therefore, establishing regulations on the type of work Gen AI can do for a worker is critical to institute. Another rule could be having a watermark to identify work produced by Gen AI, as mentioned in Biden's executive order on Gen AI (Biden, Executive Order 14110). This prevents people from claiming Gen AI created work as their own.

Another implication based on my findings is how to effectively use Gen AI. This is highly relevant to Governor Newsom's executive order on Generative AI. He specifically states in EO 5, that the state needs to develop state training on how to prepare the workforce for Gen AI (Newsom, Executive Order N-12-23). Therefore, ensuring that the workforce understands how Gen AI functions and how to effectively use Gen AI tools to gain the most benefit is essential. From the findings, those who use Gen AI daily are not expressing as much satisfaction compared to those who use Gen AI weekly, monthly, or even a few times. This is because of the over reliance of Gen AI tools when executing work which leads to a decrease in productivity. This is why training is even more necessary. When workers understand how to use Gen AI tools properly it can ideally lead to high job satisfaction rates.

Conclusion

Will Gen AI take over the world or will they help us? It is possible that either one could happen, but it is still too early to tell. I was curious about Gen AI's impact on the workforce, specifically whether this technology could improve or deteriorate a Californian worker's job quality? I have defined job quality to signify two concepts: job satisfaction and commitment to

quality work. Based on past research I discovered, I proposed that as a worker's usage of Gen AI increases, their job appreciation and quality work will increase. I then conducted a non-random survey where I received over 200 responses from Californians. I measured four areas that are relevant to my independent and dependent variables, specifically attitude toward Gen AI tools, usage of Gen AI tools, rating of personal productivity, and opinion on personal satisfaction. Based on my findings, my hypothesis was partially supported since Gen AI indicated greater job satisfaction (Figures two and four) while there was no identifiable pattern between quality work and Gen AI usage (Figure three). For future research, I believe understanding what techniques of Gen AI assisting a worker in their tasks best supports the worker's job satisfaction and commitment to quality work. This is important, because there are varying levels of Gen AI incorporation in assistance, I wonder where the ideal worker and Gen AI tool collaboration becomes most beneficial for the worker's job quality. Governor Newsom's step in understanding this impactful technology has motivated me to understand whether generative artificial intelligence can help California's workforce (Newsom, Executive Order N-12-23).

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