Introduction:

This Assignment required students to produce a research proposal to show that students held this experience should we require it in the future. I wrote about the relationship found between video games and cognitive ability, and given the opportunity, how I would go about conducting the research.

From Degenerative to Regenerative: Relationships between Gaming and Cognition

Project Aim:

The aim for this research proposal to see if we can reliably draw a correlation between those amongst us who participate in semi-regular mental exercises, specifically video games, and more specifically competitive video games, and performance in other aspects of life, most importantly taking a specific look at what areas we find the largest differences.

Project Background and Significance:

This research project explores the potential of video games as tools for cognitive and skill-based development, with significant implications for professions requiring precision, quick decision-making, and exceptional hand-eye coordination. Previous studies have shown that individuals who play video games perform better in tasks demanding accuracy and speed compared to non-gamers. Surgical students who played video games for over three hours per week, for example, demonstrated superior results in motor skills and problem-solving. Notably, competitive gamers in the top 10% of their respective games achieved the highest levels of performance, indicating a direct relationship between gaming experience and enhanced capabilities.

The significance of this research lies in its potential to identify video games as an innovative method for skill enhancement and cognitive training. In fields like surgery, aviation, and engineering, where precision and rapid decision-making are critical, video games may serve as supplemental training tools. Beyond professional applications, this research could contribute to understanding how video games support mental acuity and cognitive longevity, offering broader societal benefits, such as strategies to combat cognitive decline in aging populations.

This study will be guided by an examination of existing research on gaming and its impact on cognitive and motor skill development. The investigation will focus on how the interactive and immersive nature of video games provides consistent mental stimulation, fostering improvements in problem-solving, multitasking, and adaptability. By evaluating the performance of individuals with varying levels of gaming experience, the research aims to highlight practical ways video gaming can be integrated into training methodologies for skill-intensive fields.

Ultimately, this research seeks to challenge conventional perceptions of video games as mere entertainment and position them as valuable tools for professional development and lifelong cognitive health. By demonstrating their potential benefits, this study could inspire a reevaluation of gaming in educational and professional contexts, driving innovation in training techniques for the modern workforce

Research Methods:

I would carry this process out in 5 steps over the summer semester:

1. **Recruitment (May)**

   Participants are to be recruited on campus, targeting university students and young professionals with varying levels of gaming experience, from those who don't play or haven't played video games, to those who are very competitive in their respective games.

2. **Questionnaire (May)**

   A survey will be given to collect demographic data, gaming habits such as frequency of play, duration of play, and type of game. We will collect information on professional skills, hand eye coordination, and decision-making skills. This will establish a base of information on participants so we can compare results and conclude.

3. **Skill Assessments (June)**

   Participants will be given a series of standardized tests that will be designed to test cognitive skills such as memory, problem solving, and multitasking. This will be followed by a test that is designed to test motor skills such as reaction time and precision. Tasks will include online assessments and real-world scenarios. Qualitative analysis will be conducted to hear individual participant feedback about their experience and how gaming might have affected their cognitive ability. These tests should supply enough data to compare with our demographics.

4. **Data Analysis (July)**

   The data collected will be analyzed to identify trends and correlations between levels of experience gaming and levels of their skills from the respective skill assessments. Metrics will include reaction time, accuracy rates, and problem-solving ability. We can also compare data to individuals' personal feedback on their experiences found with our qualitative analysis and begin to paint a picture as to what conclusions are to be drawn from the analysis.

5. **Report and Conclusion (August)**

   Findings will be compiled into a detailed report, highlighting key insights and implications. If applicable, a recommendation based on what video games have the strongest correlation to improvement will be given.

Expected Outcome:

The Primary deliverable from this research will be the detailed report summarizing the study's findings and their implications. Should the findings in this report provide interesting

results, the report could be prepared for submission to a scholarly journal in fields such as education, professional development, or even cognitive sciences. A poster presentation could be created to visually convey the results from the research formatted in an accessible manner. These materials provide a comprehensive overview of the study from methods to conclusions, putting a strong emphasis on the implications brought about.

The research aims to provide insight into the connection between gaming and the development of cognitive and motor skills. The study will expand on how variables such as frequency of play, type of game, and level of competitiveness correlate with improvements in areas like problem-solving, multitasking, ability to adapt strategies, or reaction timings. If we can identify a relationship, this research could challenge ideas considered commonplace about videogames and provide a view into their potential roles as training and cognitive enhancement tools.

For the field of study, this project could extend understanding of how interactive and immersive activities like gaming affect cognitive development. The findings may open the floodgates for further exploration, such as applying gaming strategies to improve training methods in fields requiring high levels of precision, adaptability, and decision-making, including medicine, aviation, and engineering.

Within the UCF community, information gained from this research could kickstart conversations about integrating gaming into academic and extra-curricular activities. Such as using gamified/ competitive methods of instruction to enhance student learning outcomes. Furthermore, this could provide a new perspective on gaming as possibly a productive outlet for leisure or improvement.

This project seeks to generate valuable knowledge that might extend the current understanding of how this hobby, or any task that requires one to immerse into the activity, could improve brain function for the near or distant future.

Literature Review:

Boot, Walter. (2011) Do Action Video Games Improve Perception And Cognition. Frontier Psychology https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2011.00226/full

Green, Shawn.(2009) Increasing Speed of Processing With Action Video Games. Sage Journals https://journals.sagepub.com/doi/abs/10.1111/j.1467-8721.2009.01660.x

Green, Shawn. (2015) Video Games and Cognitive Performance. Taylor And Francis Group. https://www.taylorfrancis.com/chapters/edit/10.4324/9781315736495-8/video-games-cognitive-performance-gillian-dale-shawn-green

Rosser, James C. (2007) The Impact of Video Games on Training Surgeons In the 21st Century. JAMA Network. https://jamanetwork.com/journals/jamasurgery/fullarticle/399740

Lynch, Jeremy. (2010) Video Games and Surgical Ability: A Literature Review. Journal of Surgical Education. https://www.sciencedirect.com/science/article/abs/pii/S1931720410000383

Preliminary Work and Experience:

Some of the preliminary work that has already been started is a lot of research into this concept. I have read through the top 4-5 articles that pertain to this topic, gaining a lot of the knowledge that the scientific community has gained up until this point about the subject of video games correlating with cognitive ability. I have a lot of experience with video games and their competitive scene, with many of my close friends and colleagues participating in competitive gaming at the highest levels. I also have taken classes in statistical methodology and mathematics, giving me the experience needed to analyze the data presented.

IRB/IACUC statement:

This research involves surveys and skill assessments with human participants, requiring IRB approval to ensure ethical compliance. The necessary application will be submitted before participant recruitment begins. No animal subjects are involved in this study, so IACUC approval is not required.

Budget:

Budget for this research would be the cost of materials such as paper/pens for demographics, computer use could be public and on campus. Most costs would come from buying the license for the Analytic Software, ranging from $100-$500 dollars. Budget could be comfortably set at $1000 with room to spare.