# Capstone Topic Approval Form

The purpose of this document is to help you clearly explain your capstone topic, project scope, and timeline. Identify each of the following areas so you will have a complete and realistic overview of your project. Your course instructor cannot approve your project topic without this information.

**Student Name:** Robert Kline

**Student ID:** 678052

**Capstone Project Name:** A Damage Output Analysis of Dungeons and Dragons

**Project Topic**: The goal of this project is to identify which of three archetypal Dungeons and Dragons classes can produce the most damage output, while minimizing the overall complexity of playing a character. The classes to be covered will be Barbarian, Ranger, and Warlock

**Research Question:** Which of the classes produces the best damage output results at various levels of complexity?

> **Hypothesis:** Based on the nature of the archetypes, it is presumed that the Wizard will produce the higher overall damage at lower complexity levels, the Barbarian at higher complexity levels, and the Ranger somewhere in between.

**Context:** Dungeons and Dragons contains several hundred spells and abilities for players to choose from, with no information other than the base amount of damage that can be provided and the number of dice to be rolled to get there. However, this does not provide a clear damage calculation. By analyzing the data we will be able to better understand the average effectiveness of each class, how best to build them, and how complex a build must be to reach optimal levels of combat performance.

**Data:** Data exists for each ability, spell, or modifier thereof, within the 5e Player's Handbook. I will need to build a structured table to house and analyze this data. As this is targeted at beginning players, the calculations will be done for characters that are level 10 (which is the highest level to reach in the "Curse of Strahd" beginners campaign).

There is no pre-existing dataset.

The data for this is contained within the Dungeons and Dragons 5e Player's Handbook, which is intellectual property owned by Wizards of the Coast. As this is only a statistical analysis of the data already publicly available, there is no need to make a specific request.

**Data Gathering:** Data will be directly gathered from the 5e Player's Handbook and entered into a table, which will then be stored in a CSV format. Data will be gathered for the spells, abilities, modifiers, and weapons available for a Warrior, Ranger, and Warlock at level 10.

**Data Analytics Tools and Techniques**: Jupyter Notebooks along with the Pandas, NumPy, and Matplotlib libraries will be utilized to extract the values from the CSV and provide a base data average of each ability, spell, and weapon. Each will then be compared

with available modifiers to identify optimal damage output with the available number of modifiers (with each modifier acting as an additional level of complexity).

**Justification of Tools/Techniques:** As each ability, spell, and weapon is a base form of damage, the general calculation of average damage from each is important as a baseline. Each additional modifier to be applied requires more focus from the player to be able to remember to use them. As beginning players may want to play as simply as possible, identifying the amount of complexity involved will help them make an appropriate choice for character build.

**Application Type, if applicable (select one):**

☐ Mobile
☐ Web
☒ Stand-alone

**Programming/Development Language(s), if applicable:** Python

**Operating System(s)/Platform(s), if applicable:** Jupyter Notebooks, Excel

**Database Management System, if applicable:** N/A

**Project Outcomes:** *List the key anticipated project outcomes and deliverables in fewer than 500 words*. A chart will be provided with the highest damage output ranking of each ability, spell, and weapon will be provided for each of the Barbarian, Ranger, and Warlock classes. Additionally, a comparison chart will be provided against the optimal damage output ranking for each class at differing levels of complexity.

**Projected Project End Date:** 7/21/2023

**Sources:** Dungeons and Dragons 5e Player's Handbook

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**Human Subjects or Proprietary Information**
Does your project involve the potential use of human subjects? (Y/N): N
Does your project involve the potential use of proprietary company information? (Y/N): N.

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**STUDENT SIGNATURE**

Robert Lawrence Kline

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**By signing and submitting this form, you acknowledge** that any cost associated with the development and execution of your data analytics solution will be your (the student) responsibility.

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**TO BE FILLED BY A COURSE INSTRUCTOR**

**The capstone topic is approved by a course instructor.**

**COURSE INSTRUCTOR'S NAME AND SIGNATURE:**

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**COURSE INSTRUCTOR APPROVAL DATE:**

**Project Compliance with IRB (Y/N):**