

Final Project for the Course “Data and Network Science for Public Policy”

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Final Project

As you advance in the course and refine your applied data science skills, the final project represents an opportunity to demonstrate your expertise. In light of the numerous societal challenges humanity faces today, your mission is to assemble a team of data scientists to address a pressing public policy issue of your choice.

In teams of 3 or 4 people, your task entails identifying and tackling a significant public policy problem using data analysis. You are encouraged to select a problem that resonates with you, and one where data science can make a tangible difference in shaping policy outcomes.

Your project should include comprehensive research, data collection, analysis, and further interpretation. Moreover, it should propose viable solutions or contribute substantively to existing efforts aimed at addressing the chosen problem. Your final products should encompass two main components: (1) a **group presentation** for the class, during which your findings will be examined by other students, and (2) an **individual policy paper**. In this paper, you are tasked with addressing a distinct target audience, explaining your findings and their significance, and providing actionable recommendations for it.

Further Details

Group Formation

Students form groups comprising 3 or 4 members within the initial 3 weeks of the course. Group formation based on **topic preferences** and **background differences** is strongly encouraged. Teams have the freedom to organise their group dynamics and split responsibilities according to their members' preferences and skills.

Choosing Challenging Policy Issue

Students select a public policy problem or challenge within a specific case environment and develop a data science project to address it. The chosen cases will be presented and discussed during Week 4 of the course.

Criteria for Defining a Policy Question:

1. The policy question should be connected with the course content.
2. Students must provide justification demonstrating that data analysis is the most appropriate strategy to address the chosen problem.
3. The relevance of the policy question for society should be clearly explained.

Examples of Policy Challenges:

- *Education*: Analyse educational attainment data from schools in a specific region facing challenges related to educational inequality. Students can investigate factors such as access to resources, socio-economic background, and educational support systems to develop strategies for narrowing the attainment gap and promoting equal opportunities for all students.
- *Environment and Sustainability*: Analyse environmental data from a designated conservation area threatened by habitat loss and biodiversity decline. Students can examine factors contributing to environmental degradation, such as urban development and pollution, to propose conservation measures and land-use policies aimed at preserving the natural ecosystem and promoting sustainable development.
- *Social Welfare*: Analyse social welfare data from a deprived urban neighbourhood facing challenges related to poverty, unemployment, and social exclusion. Students can explore barriers to social mobility, such as access to education, healthcare, and affordable housing, to propose holistic interventions aimed at addressing the root causes of poverty and promoting social inclusion and economic opportunity for all residents.

Authenticity, Sustained Inquiry, Reflection

Before delving into data analysis, it is crucial to dedicate sufficient time to thoroughly investigate the case and relevant literature. This ensures that the project aligns coherently with the real-world situation and facts.

As we progress through different topics week by week, students have the opportunity to develop their projects concurrently, applying learned methods and approaches to their chosen case. This iterative process allows for deeper understanding and refinement of project objectives and methodologies. Moreover, students are encouraged to explore various materials, ranging from course notebooks and presentations to other publicly available sources and research.

Throughout the course, specific sessions are allocated for discussing ongoing progress and receiving feedback from the instructor and other teams. These feedback sessions provide valuable insights and guidance, enabling students to address any challenges and refine their project strategies. Additionally, team reflection is fostered through structured exercises and discussions, encouraging students to critically evaluate their progress, identify areas for improvement, and incorporate reflective insights into their group dynamics and project development process. This reflective practice not only enhances the quality of the project outcomes but also cultivates lifelong learning skills essential for success in data science and beyond. Examples of some team reflections are presented in [Team Reflection Exercises](#).

Final Products

The culmination of the project comprises two main components: a group presentation and an individual policy paper.

The group presentation will take place during the final week of the course (Week 12). It should outline the activities undertaken during the preceding weeks, including data collection and analysis (60% of the presentation), and final findings (40% of the presentation). Depending on the number of groups, each group will have between 10 to 15 minutes to showcase their projects, followed by a 5-minute question and answer session. Alongside the presentation, each group is required to submit a carefully explained notebook detailing their data collection, preprocessing, analysis, and modelling.

The individual policy paper is to be prepared by each group member independently. It should address different target audiences or focus on distinct aspects of the results. Within a 1400-word limit, students are tasked with summarising the policy problem they presented and demonstrating how their project contributes to its resolution, offering actionable recommendations tailored to their target audience. The policy paper is expected to adhere to a specific policy paper format. More details can be found [here](#) ([Political Science Policy Paper Guidelines](#)) or [here](#) ([Law Stanford Policy Paper Guidelines](#)).

Assessment

Group presentation

Assessment and Feedback consist of two parts:

1. Rubric Assessment (1) is shared with the students.
2. After seeing the result, each student needs to complete a short individual self-evaluation report. In this self-evaluation, each member should assess their contributions to the project, reflecting on their strengths, areas for improvement, and the extent of their involvement in each criterion.

30/40 points are based on Rubric (meaning all group members receive the same amount of points) and 10/40 points are based on Individual Self-Assessment.

Policy Paper

Assessment and Feedback solely rely on a Rubric Assessment (2), which is made available to students (20/20 points are allocated based on the Rubric).

Supplementary Materials

Team Reflection Exercises

SWOT Analysis

SWOT Analysis is a versatile method aimed at identifying Strengths, Weaknesses, Opportunities, and Threats. The overarching objective is to enhance team progress. Around Week 8, the following procedure can be implemented:

1. Each group member reflects individually on their contributions to the project, identifying personal strengths and areas for improvement.
2. Subsequently, all group members convene and collectively discuss their reflections, culminating in the identification of team SWOTs.
3. Based on the identified SWOT parameters, the team proposes and further implements an action plan. This action plan should be aimed at capitalising on Strengths, addressing Weaknesses, leveraging Opportunities, and mitigating Threats.

This structured approach facilitates a comprehensive evaluation of the team's dynamics and fosters strategic planning for project advancement.

Scenario Game

Objective: To simulate real-world challenges and develop problem-solving skills within the team.

Instructions: The team is presented with a hypothetical scenario related to their project (e.g., unexpected data loss, stakeholder disagreement, or unforeseen changes in the case). Team members discuss and brainstorm potential solutions to address the scenario, considering various factors such as feasibility, impact, and ethical considerations. After exploring different options, the team reflects on their decision-making process, evaluates the pros and cons of each solution, and identifies key takeaways for future problem-solving and for their project.

Table 1: Rubric Assessment Criteria: Policy Project

Criterion	Fully Completed (5 points)	Partially Completed (3 points)	Needs Improvement (1 point)
<i>Project Relevance to Public Policy</i>	Demonstrates a clear and strong connection between the project topic and its application in public policy.	Shows some relevance to public policy, but lacks depth or clarity in connection.	The connection between the project topic and its relevance to public policy is unclear or absent.
<i>Data Source and Data Collection</i>	Thoroughly identifies relevant data sources and effectively collects data, demonstrating a comprehensive understanding of data collection methods.	Identifies and collects data adequately, but may lack completeness or clarity in source selection or data gathering methods.	Data source identification or collection methods are incomplete or lack clarity, requiring further development.
<i>Data Processing and Preparation</i>	Conducts comprehensive data processing and preparation, demonstrating proficiency in data cleaning, integration, and transformation.	Processes and prepares data adequately, but may lack completeness or effectiveness in cleaning, integration, or transformation.	Data processing and preparation are incomplete or lack effectiveness, requiring additional work for proper analysis.
<i>Data Analysis and Modelling</i>	Conducts thorough data analysis and modelling, providing insightful interpretations and effective utilisation of appropriate techniques and algorithms.	Performs data analysis and modelling to some extent, but lacks depth or effectiveness in interpretation or technique utilisation.	Data analysis and modelling are rudimentary or incomplete, requiring further development for meaningful insights.
<i>Ethical Considerations</i>	Carefully evaluates the ethical implications of the project, demonstrating a thoughtful approach to potential ethical issues and their resolution.	Considers ethical implications to some extent but may lack thoroughness or depth in evaluation.	Ethical considerations are overlooked or insufficiently addressed, requiring a more comprehensive examination.
<i>Presentation Quality</i>	Presents final project in a clear, organised, and engaging manner, effectively communicating key findings and insights.	Presents final project adequately, but may lack coherence or engagement in delivery.	Presentation is unclear, disorganised, or lacks engagement, hindering effective communication of findings.

Table 2: Rubric Assessment Criteria: Policy Paper

Criterion	Fully Completed (5 points)	Partially Completed (3 points)	Needs Improvement (1 point)
<i>Clarity of Policy Objective</i>	Clearly articulates the policy problem, objectives, and target audience, providing a well-defined framework for analysis and recommendations.	Articulates the policy objective adequately, but may lack clarity or specificity in defining objectives or target audience.	Policy objective is unclear or poorly defined, hindering understanding of the problem and proposed solutions.
<i>Analysis of Policy Alternatives</i>	Conducts a comprehensive analysis of policy alternatives, evaluating pros and cons, feasibility, and potential impact, leading to well-grounded recommendations.	Analyses policy alternatives to some extent, but may lack depth or thoroughness in evaluating options or considering feasibility and impact.	Analysis of policy alternatives is limited or superficial, lacking sufficient consideration of feasibility or potential impact, resulting in weak recommendations.
<i>Evidence-Based Recommendations</i>	Provides evidence-based recommendations supported by relevant data, research, or best practices, demonstrating a sound rationale for proposed policy actions.	Offers recommendations based on some evidence or rationale, but may lack robust support or clear linkage to analysis, reducing the persuasiveness of proposed actions.	Recommendations are unsupported by evidence or rationale, lacking clarity or coherence, and failing to demonstrate a clear linkage to analysis, undermining their credibility.
<i>Structure of the Policy Paper</i>	Presents the policy paper in a clear, organised, and coherent manner, effectively communicating key findings, analysis, and recommendations to the target audience.	Presents the policy paper adequately, but may lack coherence or consistency in structure or presentation style, potentially hindering understanding or engagement.	Presentation of the policy paper is unclear, disorganised, or lacks coherence, making it difficult for the reader to follow the analysis or grasp the significance of the recommendations.