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USE OF LARGE LANGUAGE MODELS FOR THE GENERATION OF  
REQUIREMENTS FROM USER STORIES

THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES  
OF  
ATILIM UNIVERSITY

MELİS TUĞBA KARALAR

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THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES  
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MELİS TUĞBA KARALAR

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FOR  
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Approval of the Graduate School of Natural and Applied Sciences, Atilim University.

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I certify that this thesis satisfies all the requirements as a thesis for the degree of **Master of Science of in Software Engineering, Atilim University.**

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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## **ABSTRACT**

### **USE OF LARGE LANGUAGE MODELS FOR THE GENERATION OF REQUIREMENTS FROM USER STORIES**

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Recent advances in artificial intelligence have enabled the application of Large Language Models (LLMs) to complex tasks such as software requirements generation. This thesis explores the impact of structured prompt patterns on the quality of requirements produced by five leading LLMs: ChatGPT, Gemini, DeepSeek, Claude, and Qwen. The evaluation is based on key criteria including ambiguity, completeness, semantic similarity, readability, and textual complexity. Results show that structured prompts significantly improve output quality for models like ChatGPT and Gemini. Qwen shows robust performance even without prompt structuring, whereas DeepSeek requires prompt guidance to maintain semantic consistency but performs better in readability without it. Claude, by contrast, delivers the weakest performance overall. The findings highlight both the effectiveness of prompt engineering and the varying sensitivity of LLMs to structured input.

**Keywords:** User Story, Large Language Model, Requirements Engineering, Prompt Engineering, Ambiguity

## ÖZ

### **KULLANICI HİKAYELERİNDEN GEREKSİNİMLERİN OLUŞTURULMASI İÇİN BÜYÜK DİL MODELLERİNİN KULLANIMI**

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Yapay zekâdaki son gelişmeler, Büyük Dil Modelleri'nin (BDM'ler) yazılım gereksinimi üretimi gibi karmaşık görevlerde kullanılmasını mümkün kılmıştır. Bu tez, yapılandırılmış istem kalıplarının, ChatGPT, Gemini, DeepSeek, Claude ve Qwen olmak üzere beş önde gelen LLM tarafından üretilen gereksinimlerin kalitesi üzerindeki etkisini incelemektedir. Değerlendirme; belirsizlik, tamlık, anlamsal benzerlik, okunabilirlik ve metinsel karmaşıklık gibi temel ölçütlere dayanmaktadır. Sonuçlar, yapılandırılmış istemlerin özellikle ChatGPT ve Gemini gibi modellerde çıktı kalitesini önemli ölçüde artırdığını göstermektedir. Qwen, yapılandırılmış istemler olmadan da güçlü bir performans sergilerken; DeepSeek, anlamsal tutarlılığı korumak için bu tür istemlere ihtiyaç duymakta, ancak okunabilirlik açısından yapılandırılmamış istemlerle daha iyi sonuçlar vermektedir. Öte yandan Claude, genel olarak en zayıf performansı göstermektedir. Bulgular, istem mühendisliğinin etkinliğini ve LLM'lerin yapılandırılmış girdilere olan farklı duyarlılıklarını ortaya koymaktadır.

Anahtar Kelimeler: Kullanıcı Hikayesi, Büyük Dil Modeli, Gereksinim Mühendisliği, İstem Mühendisliği, Belirsizlik



*To everyone I love...*

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## LIST OF SYMBOLS/ABBREVIATIONS

5W1H	Who, What, When, Where, Why, How
CHn.x	ChatGPT Requirement Number (n,x are numbers)
Cn.x	Claude Requirement Number (n,x are numbers)
Dn.x	DeepSeek Requirement Number (n,x are numbers)
F	Functional Requirement
GHn.x	Gemini Requirement Number (n,x are numbers)
LLM	Large Language Models
NF	Non-Functional Requirement
NLP	Natural Language Processing
PE	Prompt Engineering
QA	Question Answering
Qn.x	Qwen Requirement Number (n,x are numbers)
RE	Requirements Engineering
REQ#	Requirement Number
SRS	Software Requirements Specifications
SS	Semantic Similarity
US#	User Story Number
XP	Extreme Programming

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## CHAPTER 1

### INTRODUCTION

The field of software engineering is experiencing unprecedented acceleration in both methodologies and tooling. In parallel, Large Language Models (LLMs) have emerged as a transformative force, leveraging advances in algorithmic architectures, training regimes, and computational resources to achieve remarkable performance across a wide range of natural language processing tasks. OpenAI's ChatGPT and Google's Gemini, DeepSeek, Claude and Qwen models are among the most well-known artificial intelligence models in this field. These models, which can provide sufficient and satisfactory answers to user needs and desires, also increase the quality of software processes. Requirements Engineering (RE) is a foundational part of a software process. In the past, these processes required a lot of manual work and human wisdom and expertise that was tied to the domain, as well as collaboration with all stakeholders to ensure that these requirements were on track and aligned with user needs [1]. LLMs have garnered significant interest and investigation because of their remarkable capabilities in text generation and reasoning [2].

#### 1.1. Problem Statement

User stories, which are descriptions of the functions and features of a system from the user's perspective, are of great importance in the agile software development process. Deriving understandable, acceptable, and comprehensive requirements from these user stories is a very challenging process. The translation from informal, natural language descriptions into formalized requirements is often prone to ambiguity, incompleteness, and inconsistencies issues that can lead to downstream design and implementation flaws.

As software systems grow increasingly complex and user-centered, the demand for clear, complete, and actionable software requirements has never been more critical.

RE continues to face long-standing challenges such as vague terminology, lack of structure, and communication gaps between stakeholders and developers. These issues frequently result in project delays, rework, or outright failure.

In recent years, LLMs have emerged as promising tools to assist in bridging this gap. By processing natural language input and generating well-structured text outputs, LLMs offer potential in automating parts of the RE process, such as transforming user stories into software requirements. However, despite their promising capabilities, there remains a significant gap in our understanding of how effective these models are at producing high-quality, usable requirements.

## **1.2. Aim and Purpose**

This study aims to evaluate the capabilities of five major LLMs, ChatGPT, Gemini, DeepSeek, Claude, Qwen to generate requirements from user stories. The objective of this study is to evaluate the quality of the requirements generated by the models with respect to completeness, ambiguity, functional and non-functional tendency, semantic similarity to the user story and readability. These metrics are chosen to provide a comprehensive and objective evaluation of the outputs, and focus on how effectively and appropriately the models transform these abstract stories into high-quality and carefully crafted requirements. To increase objectivity, this study benefitted from Natural Language Processing (NLP) techniques for calculating the results. Also, this studies purpose is to create a framwork for. At the same time, this study will guide real-life research and create a data set for subsequent studies.

Best to our knowledge, this is the first study in which LLMs generate requirements from user stories and evaluate these generated requirements.

## **1.3. Contribution**

This thesis contributes to the field of RE by introducing a structured and replicable approach to evaluating the effectiveness of LLMs in generating software requirements from user stories. A custom-designed prompting framework was developed to consistently guide LLMs in transforming structured user stories into formalized requirements. This prompt pattern ensures clarity, reduces variability in model

responses, and supports meaningful comparison across models and scenarios. In addition, a novel dataset of generated requirements was constructed as part of this research. By systematically applying the prompt pattern to a curated set of user stories and collecting outputs from multiple LLMs, the study produces a unique resource for further benchmarking and research in LLM-based requirements generation.

To assess the quality of the generated requirements, the thesis proposes a multi-dimensional evaluation framework combining both automated and semi-automated techniques. Ambiguity is assessed using a curated penalty word list designed to flag vague or unclear language. Completeness is evaluated using a hybrid 5W1H (Who, What, When, Where, Why, How) approach, combining natural language processing and Question-Answering (QA) models to detect the presence of critical contextual elements. Compatibility is measured through semantic similarity scoring between user stories and generated requirements, while readability is quantified using the Flesch-Kincaid [3] and Gunning Fog [4] indices. The outputs received are documented in order and stored. The full dataset is available in an external repository [5].

Together, these contributions offer a practical methodology for systematically analyzing LLM outputs, a reusable dataset, and insights into the capabilities and limitations of current language models in agile software development contexts.

#### **1.4. Research Questions**

**RQ1:** How do different large language models (ChatGPT, Gemini, DeepSeek, Claude, Qwen) compare in their ability to generate software requirements from user stories?

**RQ2:** Which large language model (ChatGPT, Gemini, DeepSeek, Claude, Qwen) demonstrates superior performance in generating high-quality requirements based on user stories, as measured by the established metrics?

**RQ3:** To what extent does the use of Single-Shot Role-Based Template Pattern influence the quality of requirements generated by large language models across different evaluation dimensions (e.g., ambiguity, completeness, semantic similarity, readability)?

## 1.5. Threat to Validity

While this study provides valuable insights into the use of LLMs for generating software requirements from user stories, several threats to validity must be acknowledged. Construct validity may be influenced by the selected evaluation criteria. Although the ambiguity penalty word list, 5W1H completeness framework, semantic similarity scoring, and readability indices are grounded in established research, they each have limitations. For example, the penalty word list used to detect ambiguity may be insufficient in capturing more nuanced or context-dependent forms of vagueness, especially when ambiguous phrasing does not include obvious keywords. Similarly, the completeness analysis based on the 5W1H framework was conducted using a hybrid technique, combining NLP and QA models to detect the presence or absence of key contextual elements. While this method enhanced automation and scalability, it may have introduced variability depending on model interpretation and phrasing of the questions.

Internal validity is also influenced by the use of default settings across all LLMs. This ensures consistency and fair comparison but may not represent the models' optimal performance, as tuning or advanced prompting techniques could yield different outcomes. Additionally, this study introduced a custom prompt pattern to guide the LLMs in producing structured requirements. Although applied uniformly, the phrasing and design of the prompt may have influenced the style and content of the generated outputs in ways that differ from real-world usage.

External validity is limited by the nature of the dataset. Only user stories following a structured format where the actor, the goal, and the expected result were explicitly stated were included. This ensured clarity in input and supported consistent evaluation, but may not reflect the variability or informality of user stories encountered in agile development practices. Moreover, while the dataset spans multiple domains, it may not fully capture the complexity of high-assurance, large-scale, or interdisciplinary systems.

Reliability could be impacted by the semi-automated nature of the evaluation process, especially in areas requiring interpretation, such as determining completeness or flagging ambiguous terms. However, consistent evaluation procedures and review practices were applied to reduce inconsistencies. These limitations open avenues for future work, including broader datasets, more robust ambiguity detection methods, prompt optimization, and expert-based validation.

## **1.6. Outline of Thesis**

Chapter 2 presents the background and Chapter 3 presents the literature review while Chapter 4 details the methodology, including the “Single-Shot Role-Based Template Pattern” and the requirements generated by the LLMs. Chapter 5 then presents the calculated results. Finally, Chapter 6 offers analysis, conclusions and closing remarks.

## **CHAPTER 2**

### **BACKGROUND**

#### **2.1. Agile Project Development**

Agile Project Development is a versatile project solution tool. It is a process used to add value to the work done through iterative progress, continuous communication, and collaboration. Its main points are to provide rapid responses to changes by iterations. Agile emphasizes development cycles that integrate processes such as requirement definition, development, testing, and delivery, where each iteration is a structure in itself, ensuring progress, feasibility, and alignment with project goal outcomes [6]. These development cycles not only promote applicability, but also ensure that deliverables remain aligned with users and needs. They also allow for immediate feedback from stakeholders and early detection of issues. Guided by the Agile Manifesto, Agile practices encourage focus on flexibility, responsiveness to change, and customer satisfaction as core principles [7]. These principles form the foundation of Agile in dynamic environments where rapid adjustments are required to meet stakeholder expectations.

Agile places great emphasis on collaboration between stakeholders. Continuous communication ensures transparency and alignment at every stage of the project, and frequent feedback facilitates improvement cycles. Practices such as daily meetings and sprint reviews foster a culture of agility, openness, and transparency, and enable teams to respond more effectively to obstacles or changes they encounter [8].

Agile is a framework that combines frameworks such as Scrum, Extreme Programming (XP), and Kanban for iterative progress, software quality improvement, and optimizing workflow; Scrum focuses on structured roles and time-boxed events, XP focuses on test and pair programming-driven development for team collaboration and quality improvement, and Kanban focuses on visualizing workflows and limiting

work in progress [9]. Agile methodologies are based on effectively integrating ever-evolving and changing requirements through iterative cycles and emphasize processes for aligning these requirements with project goals [8].

## **2.2. Requirements Engineering**

RE is a crucial process of analyzing, documenting and determining the requirements that will be needed throughout the entire lifecycle of a software project, which has emerged organically within software engineering. It forms the foundation of a software and ensures the product effectively meets the user standards. RE plays a major role in managing the complexity and issues that may arise by systematically capturing and refining requirements, removing ambiguities, and aligning stakeholder needs with the project's goals [10]. This process also helps prevent scope creep, ensuring that the project remains functional and aligned with its goals even as requirements change [11]. RE holds great importance in aligning requirements with stakeholder expectations and desires and project goals by utilizing techniques that provide feedback loops for refinement and synchronization among various requirements [12].

User stories serve as the cornerstone of RE in Agile, providing a concise, user-centric approach that emphasizes iterative progress and collaboration between actors [13]. User stories are often written in the format coined by Cohn [14]: 'As a <role>, I want <goal> so that <benefit>', this structure keeps the requirements focused on adding and delivering value to end users. High-quality user stories adhere to certain structured criteria that increase their usefulness and clarity, thus ensuring that requirements are understandable and actionable throughout development [15].

Recent developments in the form of NLP-based tools for developing user story sets have further improved the process by identifying gaps in this area and suggesting improvements to ensure integrity and alignment with project goals [16]. Additionally, AI-powered tools like ChatGPT have been explored to assess the quality of stories and have shown great results in aligning automated assessments with human insights in this area [17]. These types of tools increase the efficiency of the Agile development process by allowing teams to develop user stories collaboratively [18].

### **2.3. Large Language Models**

Large language models, such as OpenAI's ChatGPT and Google's Gemini, are AI models designed to understand text and produce human-like responses based on input called prompts. An LLM is a type of neural network-based language model that is trained using self-supervised learning on vast corpora of unlabelled text and typically consists of billions of parameters [19].

LLMs learn patterns from training data and attempt to predict the next word or phrase in a sequence based on these patterns. LLMs have a complex architecture, fundamentally based on the Transformer model proposed by Vaswani et al. [20]. The Transformer architecture has revolutionized natural language processing by introducing a new attention mechanism into models and this procedure allows the model to capture long-range context more effectively than traditional recurrent neural networks by weighing the importance of different parts of the input sequence [20].

LLMs can be fine-tuned for specific domains and can significantly improve performance in applications specialized in those domains [21]. Although they are very powerful tools in these aspects, they have limitations because they do not have the real understanding and reasoning capacity of a human. They can give wrong and biased outputs. When using these models, it is very important for them to go through certain inspection stages in terms of both security and ethics.

### **2.4. Prompt Engineering**

Prompt engineering (PE) is a technique used to optimize the performance of language models by providing task-specific prompts, without requiring any changes to the underlying model architecture or parameters [22]. PE, a form of practice that utilizes established instructions and prompts to guide LLMs to produce context-specific outputs, is an emerging foundational capability for increasing functionality in AI-enabled applications [23]. PE is a critical system needed to use LLMs. The quality of the input is directly proportional to the quality of the outputs the models will produce, allowing users to clearly communicate their requests. Since LLMs communicate with

their systems through prompts, their knowledge and consistency of the response also depends on them. LLMs are very sensitive to wording and context so even a minimal change of the prompt will change the output drastically. Prompts are basically the native languages LLMs use to understand the user. Effective PE implementation requires careful and thoughtful management of contextual information to guide LLMs, ensuring that the outputs produced are accurate, tailored and relevant to specific tasks [23].

When using an LLM there is a need for standardizing the outputs. That is when prompt patterns are used. Integrating a systematic framework for designing and documenting prompt patterns ensures the applicability and adaptability of these patterns across different domains and different AI applications [23]. Prompt patterns help developers enforce rules that improve software quality, such as separating business logic from side-effecting code, making testing easier and ensures that third-party libraries are abstracted from business logic to avoid tight coupling to external dependencies [23]. The prompt patterns introduced by White et al. [23] constitute a structured taxonomy intended to enhance prompt engineering practices for large language models such as ChatGPT. These patterns are categorized into five primary groups:

- Input Semantics
  - Meta Language Creation: Facilitates clearer communication by defining custom symbolic languages tailored to the model's understanding.
- Output Customization
  - Persona: Assigns a specific identity or role to the language model to influence its tone and behavior.
  - Template: Structures the model's output according to predefined formats to ensure consistency.
  - Recipe: Guides the model through step-by-step instructions for procedural tasks.
  - Output Automater: Automates the formatting and structuring of outputs.

- Visualization Generator: Enables the generation of visual or diagrammatic representations based on model outputs.
- Error Identification
  - Fact Check List: Introduces mechanisms for verifying factual accuracy within the model's responses.
  - Reflection: Encourages the model to self-assess and validate the logic and coherence of its outputs.
- Prompt Improvement
  - Question Refinement: Improves the clarity and precision of user queries.
  - Alternative Approaches: Offers multiple strategies or perspectives for addressing a given prompt.
  - Cognitive Verifier: Assesses the internal consistency and reasoning within the response.
  - Refusal Breaker: Mitigates instances in which the model unjustifiably refuses to respond.
- Interaction Patterns
  - Flipped Interaction: Reverses traditional roles by prompting the model to pose questions or lead the dialogue.
  - Game Play: Incorporates game-like structures to create more engaging interactions.
  - Infinite Generation: Promotes continuous and open-ended content generation for exploratory tasks.

In this thesis, a new pattern was created by taking the Persona and Template Patterns under Output Customization as examples in terms of its suitability for research. These patterns were selected due to their demonstrated effectiveness in guiding language model behavior and structuring outputs, making them particularly suitable for research contexts that require consistency, role definition, and format control.

## CHAPTER 3

### LITERATURE REVIEW

#### 3.1. Related Work

LLMs have a lot of potential to enhance RE. RE can be seen as an area where LLMs are just beginning to be used. They have high potential about transforming RE by automating and enhancing the traditional processes.

Kim [24] provides insights into the capabilities of LLMs by comparing ChatGPT and Bard (Gemini). ChatGPT is a more effective model for handling uncertainty than Bard (Gemini) by generating clearer instructions with correct outputs. ChatGPT also outperforms Bard in context understanding and providing solutions, while Bard focuses on generating detailed code. The study highlights the importance and necessity of human intervention to resolve these inconsistencies.

Cheng et al. [25] conducted a systematic review of 27 studies on generative AI in requirements engineering. They found that large language models were focused on the early requirements engineering stages (elicitation and analysis of requirements), and identified challenges such as persistent challenges in specific domains and readability of outputs produced by the models.

Zhao et al. propose [26] an innovative system that automates natural language-based requirements generation. This approach addresses the inefficiencies in manual requirements elicitation by leveraging UniLM, a language model developed and trained on domain-specific knowledge. It generates high-quality requirements that comply with industry standards by integrating mechanisms to ensure keyword presence and syntactic correctness.

Zhao et al. present a systematic mapping study on NLP for RE by evaluating more than 400 studies published from 1983 to 2019 [27]. The study highlights the increasing attention in the field by focusing on tasks such as language problem detection, domain

concept identification, and traceability linking. Despite 130 tool recommendations and 140 techniques reviewed, it also highlights insufficient industrial adoption. It calls for an enhanced NLP expertise and sharing of RE-specific resources. It suggests bridging the gap between academic advances in developing RE applications and industry (real-world) applications.

Huang et al. examine the application of pre-trained models and LLMs to generative tasks such as requirement and code generation for SE [28]. While the dominance of BERT and GPT-based architectures in the tasks is highlighted, LLMs increase creativity and productivity in SE. However, robust evaluation frameworks are needed for reliability and practical applicability.

Bencheik et al. demonstrated ChatGPT's ability to facilitate requirements gathering, improve documentation, and encourage stakeholder collaboration in their research [29]. ChatGPT, which can be used as a complementary tool in RE, needs to be used in the right context with human expertise to avoid ethical concerns such as inaccuracy and ambiguity. Although this study highlights the potential of LLMs to improve RE workflows, it falls short of systematic analysis of the outputs produced.

Krishna et al. evaluated the use of LLMs, specifically GPT-4 and CodeLlama, in generating and verifying Software Requirements Specifications (SRS) [30]. They showed that GPT-4 produces concise drafts with strong verification capabilities, while CodeLlama produces detailed documents with more detailed but verbose statements. They showed that SRS documents generated by LLMs are of the same quality as those produced by entry-level engineers. In addition, GPT-4 demonstrated superior verification capabilities by identifying and debugging errors in requirements. This work highlights the potential of using LLMs for efficient and cost-effective requirements generation.

Fang et al., in their research, investigate the role of LLMs in various software engineering activities such as coding and design [31]. While emphasizing the transformative potential of LLMs, they also highlight hallucinations and reliability issues. The analysis results show that even if LLM approaches blended with traditional

methods are effective in increasing productivity, robust mechanisms are needed to filter out errors and ensure practical applicability.

Zhang et al. tested the requirements information retrieval (IR) capabilities of ChatGPT in a zero-shot setting [32]. It was observed that ChatGPT achieved high recall by effectively retrieving general requirements information, but showed low precision, and had difficulty extracting data for detailed data. Although ChatGPT's high recall was useful for initial requirements gathering, it highlighted the need for additional tools to increase precision.

Luitel et al. investigated the use of LLMs to increase the completeness of requirements by identifying missing elements in natural language requirements [33]. LLMs can reliably identify missing terminology, balance detection efficiency with the optimal number of predictions and reduce noise, and improve the accuracy of predictions with a machine learning-based filter.

Khan et al. [34] reviewed 35 studies (2023–2024) on LLMs in RE, highlighting improvements in elicitation, analysis, validation, and prioritization. Models like ChatGPT and Bard outperform traditional methods, but gaps in traceability, standardized metrics, and ethics remain. LLMs show great potential for enhancing RE and improving software quality.

### **3.2. Gap Analysis**

LLMs such as ChatGPT, Gemini, DeepSeek, Claude, Qwen have recently been explored as tools to automate various stages of the software development lifecycle, including the generation of software requirements from user stories. While these models demonstrate a strong ability to process and produce natural language, their actual effectiveness in generating clear, complete, compatible, and readable requirements remains an open question.

Recent studies emphasize the potential of LLMs in requirements engineering, particularly in accelerating documentation tasks and supporting stakeholders during requirement specification. For example, Krishna et al. [30] present an empirical evaluation of LLM-generated Software Requirements Specifications (SRS) and

highlight challenges related to completeness and ambiguity. However, the study lacks a detailed analysis of semantic compatibility between generated requirements and the original user stories, and does not utilize objective readability metrics.

Other work, such as by Rahman and Zhu [35], investigates automated generation of user stories and test cases using LLMs, but the discussion of readability and ambiguity is limited to survey-based impressions rather than systematic measurement. Khan et al. [33] identify in their systematic review that while ambiguity is a frequently mentioned issue, quantitative techniques to detect or assess ambiguity are largely absent in the current literature.

Yamani et al. [36] also note issues of incompleteness in generated user stories, but fail to incorporate structured analytical frameworks such as 5W1H to detect missing contextual elements. Similarly, while Hemmat et al. [37] explore the broader research landscape of LLMs in software requirement engineering, their work does not propose automated approaches for assessing alignment or traceability between source stories and generated outputs.

The dimension of readability is notably underrepresented across studies. Although Aydin et al. [38] conducts a literature review that briefly acknowledges readability concerns, the integration of established metrics like Flesch-Kincaid or Gunning Fog Index remains rare. Without these, the accessibility of generated requirements for human stakeholders is not objectively addressed.

## CHAPTER 4

### METHODOLOGY

#### **4.1. Research Design and Data Collection**

This section presents a study to compare the requirements generation capabilities of ChatGPT (GPT-4), Gemini (Gemini 2.0 Flash), DeepSeek (DeepSeek LLM 7B), Claude (Claude 3.7 Sonnet), and Qwen (Qwen2.5-Max) from user stories. As of April 30, 2025, these models were among the newest and most powerful publicly available large language models. These models were selected for their state-of-the-art performance in natural language processing tasks, their broad accessibility, and their strong capabilities in structured text generation. Their inclusion provides a representative and up-to-date comparison of leading LLMs in the context of software requirements generation from user stories. To ensure consistency and fairness across all models, the following generation settings were applied: a temperature of 0.7, a top-p (nucleus sampling) value of 0.9, a maximum token limit of 8,192, and a context window of up to 32,000 tokens. The temperature was set to 0.7 to balance creativity and reliability in the generated outputs, while top-p = 0.9 allowed for controlled diversity by sampling from the most likely tokens. The 8,192-token maximum output length and the 32,000-token context window were chosen based on the upper limits commonly supported by the selected models. These values ensured that the models had sufficient space to process user stories and generate complete, contextually grounded requirements without truncation. This configuration reflects a standardized yet practical approach, aligned with model capabilities and optimized for coherent requirement generation.

This study will evaluate the models based on seven factors: completeness, ambiguity, passive voice analysis, semantic similarity to user story, readability, and the tendency of the models to generate either functional or non-functional requirements during requirements generation.

The experiment begins with the collecting total of 50 user stories. They are created by Fabiano Dalpiaz [39], following the pattern “As a <role>, I want <goal> so that <benefit>,” as recommended by Wauters et al. [40]. Each user story is initially presented to ChatGPT, Gemini, DeepSeek, Claude, Qwen without the use of a prompt pattern in order to determine the optimum number of requirements that can be extracted. Following this step, the mean number of generated requirements is calculated. Subsequently, the same user stories are reintroduced to the models using a predefined prompt pattern. For each user story, the models are instructed to generate a set of requirements.

A hybrid approach was employed to assess completeness, ambiguity, passive voice usage, semantic similarity to the user story, readability, and the correctness of functional versus non-functional classification in the generated requirements, with the aim of maximizing the accuracy of the results. NLP techniques, QA models, and human evaluation were utilized to compare and evaluate the outputs.

## **4.2. Research Overview**

The research presented in this thesis focuses on systematically evaluating the capability of various LLMs in generating software requirements. The process was structured into two main experimental flows, depicted in Figure 3.1 and Figure 3.2, to ensure rigorous analysis and accurate assessment.

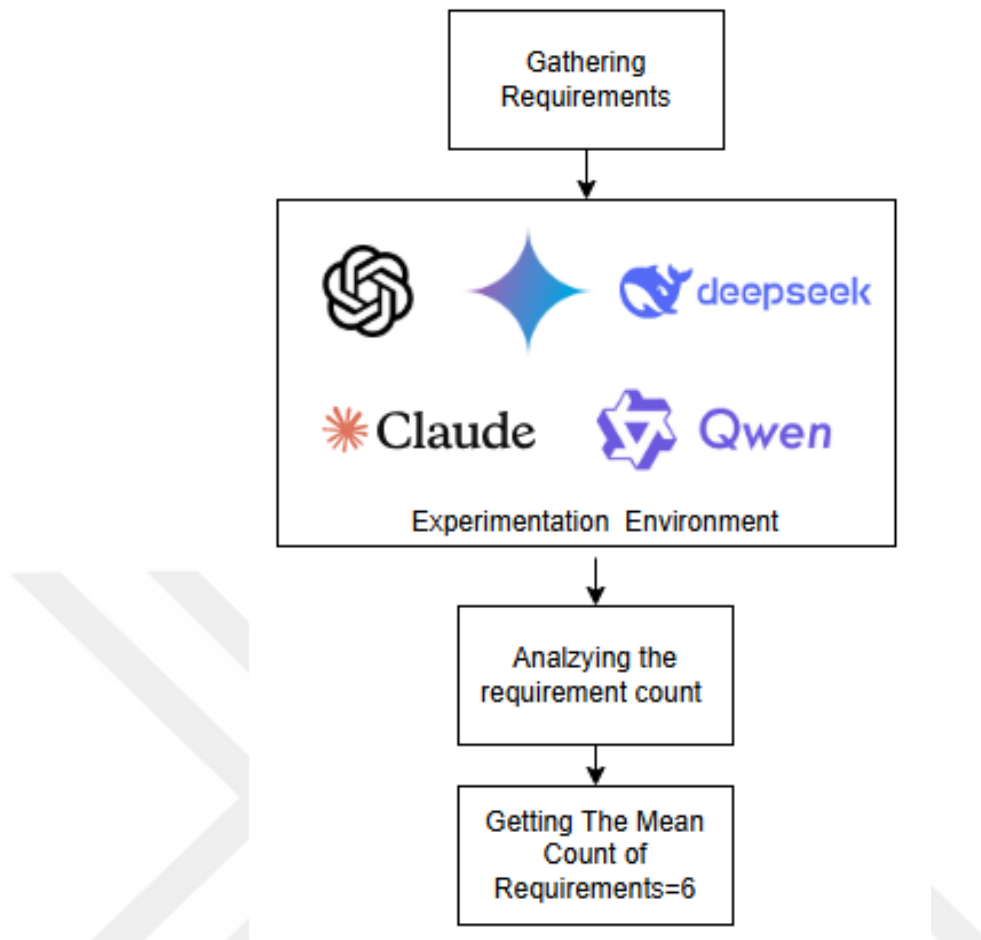


Figure 4.1 Finding the Mean Requirement count

The dataset used in this study initially consisted of a randomly selected set of 50 user stories. As shown in Figure 4.1, the requirements were collected without imposing strict limitations on the number of requirements generated.. The experiment involved employing the selected LLMs within a controlled experimentation environment, with each model independently generating requirements based on predefined input. Following this, the generated data underwent detailed analysis, primarily focusing on counting the number of requirements each model produced. The results from this phase established a baseline, from which the mean requirement count was calculated, arriving at an average of six requirements per generation.

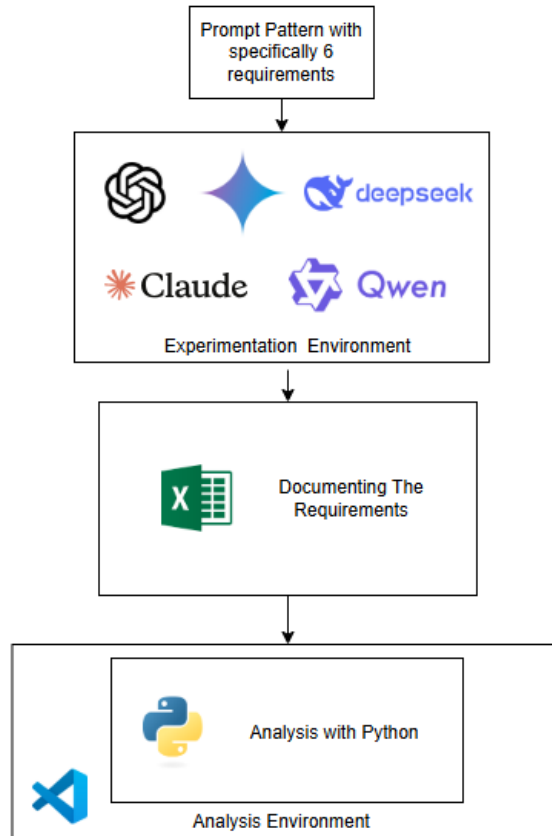


Figure 4.2 Experimentation and Documentation Process of the study

In the following phase, the experimental setup employed a structured prompt pattern that explicitly instructed each model to generate exactly six requirements per user story, as shown in Figure 4.2. This approach aimed to standardize the outputs across all evaluated LLMs, facilitating more straightforward comparative analysis. Generated requirements were systematically documented using Excel for clarity and ease of subsequent processing. Finally, an analytical environment was established, where documented data underwent comprehensive analysis through Python scripting within a Visual Studio Code environment. This structured approach enabled robust, repeatable, and transparent evaluation, enhancing the reliability and validity of the findings presented.

### 4.3. Evaluation Criteria

The evaluation of generated requirements will be performed using several clearly defined criteria to ensure thorough and objective assessment.

Completeness will be evaluated using the 5W1H method, ensuring each requirement fully covers all necessary aspects to be actionable and understandable. This criterion helps verify that requirements comprehensively address essential details.

Semantic similarity to the user story will measure how closely each generated requirement aligns in meaning and intent with the original user story. This assessment is crucial for verifying relevance and accuracy in capturing user needs.

Readability will be assessed using two established metrics. The Flesch-Kincaid readability metrics include the Flesch-Kincaid Grade Level, which calculates readability based on sentence length and syllable count, resulting in a grade-level score indicating reader competence needed to understand the text. Additionally, the Flesch Reading Ease score quantifies readability on a scale of 0 to 100, with higher scores denoting simpler text. The Gunning Fog Index, another readability measure, estimates the number of years of formal education required to understand a passage upon initial reading, emphasizing sentence length and the complexity of words used.

Functional or Non-Functional categorization will distinguish whether each requirement pertains directly to specific functionality (Functional) or attributes like performance, usability, or reliability (Non-Functional). This classification ensures balanced attention to both operational capabilities and quality aspects of the system.

General ambiguity will be assessed by identifying words or phrases that can lead to unclear, vague, or misinterpreted requirements. The ambiguity assessment involves checking for specific penalty words and phrases compiled from authoritative sources such as IEEE 29148-2018 [41], Mavin's EARS [42], Wiegers and Beatty [43], Pohl [44], Young [45], and additional terms explicitly identified as potential sources of confusion. These terms are : Etc., maybe, usually, as appropriate, if possible, normally, soon, later, timely, immediately, eventually, as needed, to the extent possible, minimize, maximize, optimize, adequate, proper, comparable, appropriate, optimal, safe, efficient, user-friendly, reliable, robust, seamless, intuitive, reasonable,

sufficient, simplified, substantial, significant, few, many, various, nominal, as required, where necessary, future-proof, to the greatest extent possible, to the maximum extent feasible, as far as practicable, as determined by, where applicable, if deemed necessary, improved, effective, acceptable, secure, interoperable, responsive, all, real-time.

#### 4.4. Evaluation Techniques

The accuracy of the categories (Functional/Non-Functional) in which the requirements are placed will be verified by analyzing them one by one.

The ambiguity of the requirements is measured using a custom Penalty Word List. Completeness is evaluated through the application of 5W1H questions to each requirement, using a hybrid approach that integrates NLP and QA models. Readability is assessed using the Flesch-Kincaid and Gunning Fog Index, calculated through Python-based functions.

##### 4.4.1. Completeness Semantic Similarity Readability Code Analysis

In this study, two transformer-based QA models were integrated into the requirement analysis pipeline to extract 5W1H elements from each requirement statement. These models were selected based on their architecture diversity, domain applicability, and ease of deployment via Hugging Face's Transformers library.

```
1 qa = pipeline("question-answering", model="deepset/roberta-base-squad2")
2 qa_alt = pipeline("question-answering", model="distilbert-base-cased-distilled-squad")
3 nlp = spacy.load("en_core_web_lg")
4 ...
```

Listing 4.1 Excerpt of models used in Completeness Semantic Similarity and Readability Code

The RoBERTa [46] model fine-tuned by deepset on the SQuAD2.0 [47] dataset which named deepset/roberta-base-squad2 [48] was employed for question answering tasks

comprising context-question-answer triples. A notable feature of SQuAD2.0 is the inclusion of unanswerable questions, which equips the model to identify when no appropriate answer is present. This capability is especially important for handling ambiguous or partially specified requirements. DistilBERT [49] is a smaller, faster, and lighter version of BERT. It is trained using a technique called knowledge distillation, which transfers the knowledge of a larger teacher model BERT to a smaller student model DistilBERT. The variant used in this study is distilbert-base-cased-distilled-squad [50]. It is fine-tuned on the SQuAD1.1 [51] dataset, which contains only answerable questions. In addition to transformer-based QA models, this study employed spaCy's en\_core\_web\_lg [52] model to perform syntactic, dependency, and semantic analysis on requirement sentences.

The function given in Listing 4.2 checks for passive voice constructions in a spaCy-parsed requirement sentence. It identifies three common passive forms: Passive subjects, Past participles with auxiliary passives, and Agent structures introduced by "by". This heuristic approach supports passive voice detection for further clarity analysis.

```
1 def has_passive_voice(doc):
2     for token in doc:
3         if token.dep_ == "nsubjpass":
4             return True
5         if token.tag_ == "VBN" and any(child.dep_ == "auxpass" for
6             child in token.head.children):
7             return True
8         if token.dep_ == "agent" and token.head.dep_ in {"ROOT",
9             "xcomp", "ccomp"}:
10            return True
11    return False
```

Listing 4.2 Excerpt of passive voice finding

The function given in Listing 4.3 computes three standardized readability scores using the textstat library. These metrics are used to quantify how difficult a requirement is to read and interpret.

```

1 def calculate_readability(text):
2     return {
3         "flesch_reading_ease":
4         round(textstat.flesch_reading_ease(text), 2),
5         "flesch_kincaid_grade":
6         round(textstat.flesch_kincaid_grade(text), 2),
7         "gunning_fog_index": round(textstat.gunning_fog(text), 2)
8     }

```

Listing 4.3 Excerpt of Readability metrics

The function given in Listing 4.4 provides a rule-based fallback method to extract 5W1H using spaCy dependency trees. It covers each 5W1H type with heuristic logic tied to specific syntactic roles.

```

1 def extract_structural(doc, wh_type):
2     if wh_type == "Who":
3         for token in doc:
4             if token.dep_ in ["nsubj", "agent", "poss"] and token.pos_
5             in ["NOUN", "PROPN", "PRON"]:
6                 return ' '.join(t.text for t in token.subtree)
7     ...
8     elif wh_type == "How":
9         for token in doc:
10            if token.dep_ in ["obl", "xcomp", "advmod", "acomp",
11            "prep"] and token.head.pos_ == "VERB":
12                return ' '.join(t.text for t in token.subtree)
13    return "Not found"

```

Listing 4.4 Excerpt of Rule Based Completeness checking

The function given in Listing 4.5 performs static QA on requirement sentences using both a primary and alternative transformer model, paired with a rule-based fallback. It provides triple outputs for each 5W1H question, improving interpretability and robustness.

```

1 def analyze_requirement_dual(sentence):
2     questions = {

```

### Listing 4.5 (continued)

```
3
4     "Who": "Who or what is explicitly or implicitly responsible
      for carrying out the main action in this requirement?",
5     "What": "What is the primary task, action, or system behavior
      that is required in this specification?",
6     "When": "Specifically when does this action take place?",
7     "Where": "In where does the described action in this
      requirement take place?",
8     "Why": "What is the intended goal, rationale, or reason for
      performing the described action in this requirement?",
9     "How": "What method, technique, or process is used to implement
      or carry out the described action in this requirement?"
10    }
11    ...
12    for wh, question in questions.items():
13        qa_result = qa(question=question, context=sentence)
14        alt_result = qa_alt(question=question, context=sentence)
15        rule_answer = extract_structural(doc, wh)
16        results[wh] = {
17            "qa_answer": qa_result["answer"],
18            "alt_qa_answer": alt_result["answer"],
19            "rule_answer": rule_answer
20        }
```

### Listing 4.5 Excerpt of QA Model Completeness checking

The function given in Listing 4.6 generates context-specific 5W1H questions using the syntactic structure of the sentence. This enables more semantically accurate question generation compared to static templates. The full code is given in Appendix CA.

```
1 def generate_dynamic_questions(doc):
2     ...
3     return {
4         "Who": f"Who is directly responsible for executing the action
      '{verb}' described in this requirement?" if verb else
```

Listing 4.6 (continued)

```
5         "Who is responsible for carrying out the requirement?",
6         "What": f"What specific task or action must {subject} perform
to achieve the goal of '{verb}' in this requirement?" if verb and obj
else
7         f"What specific task or action is required by this
requirement?",
8         "When": f"When should the action '{verb}' be executed based
on the requirement?" if verb else
9         "Under what condition or timing is the described
action expected to happen?",
10        "Where": f"In which part, interface, or environment of the
system does '{verb}' take place?" if verb else
11        "Where in the system does this requirement take
effect?",
12        "Why": f"Why is the action '{verb}' required in this
requirement?" if verb else
13        "Why is this requirement necessary or important?",
14        "How": f"How does {subject} or {obj} accomplish or execute the
action '{verb}' on '{obj}' in this requirement?" if verb and obj else
15        "What is the method or process described in this
requirement for implementation?"
16    }
```

Listing 4.6 Excerpt of Dynamic Questions Completeness checking

The sample output is given below in Figure 4.3. It illustrates how the WH-question analysis system interprets and evaluates the completeness of a functional requirement. The consistent identification of key elements such as the actor ("The system") and the object ("a comprehensive list of all data types") suggests that the requirement is generally well-structured. However, the failure of the rule-based method to extract the "Why" component highlights limitations in static extraction techniques. The detection of passive voice and moderate-to-high readability complexity indicates potential barriers to clarity.

Requirement 1: The system must provide a comprehensive list of all data types (e.g., text, numbers, dates, images, videos, etc.) that will be produced or collected during its operation.
--

Figure 4.3 (continued)

=== REQUIREMENT WH ANALYSIS ===	
Who:	
-----	
Static QA Answer	: The system must provide a comprehensive list of all data types
Alt Static QA Answer	: all data types
Rule-based Answer	: The system
Dynamic QA Answer	: The system must provide a comprehensive list of all data types
Alt Dynamic QA Answer	: The system
What:	
-----	
Static QA Answer	: The system must provide a comprehensive list of all data types
Alt Static QA Answer	: data types
Rule-based Answer	: provide a comprehensive list of all data types ( e.g. , text , numbers , dates , images , videos , etc .
Dynamic QA Answer	: a comprehensive list of all data types
Alt Dynamic QA Answer	: comprehensive list of all data types
When:	
-----	
Static QA Answer	: during its operation
Alt Static QA Answer	: during its operation
Rule-based Answer	: Not found
Dynamic QA Answer	: a comprehensive list of all data types
Alt Dynamic QA Answer	: during its operation
Where:	
-----	
Static QA Answer	: collected
Alt Static QA Answer	: The system must provide a comprehensive list of all data types
Rule-based Answer	: during its operation
Dynamic QA Answer	: data types
Alt Dynamic QA Answer	: comprehensive list of all data types
Why:	
-----	
Static QA Answer	: a comprehensive list of all data types
Alt Static QA Answer	: provide a comprehensive list of all data types
Rule-based Answer	: Not found
Dynamic QA Answer	: a comprehensive list of all data types
Alt Dynamic QA Answer	: The system must provide a comprehensive list of all data types
How:	
-----	
Static QA Answer	: The system
Alt Static QA Answer	: comprehensive list of all data types
Rule-based Answer	: during its operation
Dynamic QA Answer	: The system must provide a comprehensive list of all data types
Alt Dynamic QA Answer	: provide a comprehensive list of all data types
Passive Voice: Detected	
Flesch Reading Ease: 45.42 (Difficult to read (10th–12th grade))	
Flesch-Kincaid Grade Level: 9.2 (Moderately complex)	

Figure 4.3 (continued)

Gunning Fog Index: 12.49 (Complex (college level or above))
---

Figure 4.3 5W1H Readability output

The correct result was achieved by comparing the static and dynamic responses of two different QA models with the responses of the rule-based NLP mechanism, which were obtained from Listing 4.4, Listing 4.5 and Listing 4.6. The accuracy of the result increases when more than one mechanism gives the same result, and the results have also been evaluated manually.

#### 4.4.2. Semantic Similarity Code Analysis

The `en_core_web_lg` model was utilized for this purpose. The similarity between each user story and its corresponding requirement was calculated using cosine similarity with the script given in Listing 4.7. Requirements with a similarity score greater than or equal to 0.8 were considered highly consistent, whereas those with scores below 0.6 were flagged for further review. The complete code implementation is provided in Appendix CB.

```
1 def compute_consistency(user_story, requirement):
2     story_vec = nlp(user_story).vector.reshape(1, -1)
3     req_vec = nlp(requirement).vector.reshape(1, -1)
4     similarity = cosine_similarity(story_vec, req_vec)[0][0]
5     return round(similarity, 3)
```

Listing 4.7 Excerpt of Semantic Similarity checking

The sample output is given below in Figure 4.4. It presents the results of the semantic similarity analysis conducted between a given user story and its associated requirements. The system assigns a similarity score to each requirement, reflecting how well it aligns with the intent and content of the user story. The results show that four out of six requirements (#1, #3, #4, #5) achieved high similarity scores (above 0.80), indicating strong alignment. In contrast, requirements #2 and #6 received

moderate scores, suggesting partial relevance or weaker semantic connection to the user story.

Consistency Analysis		
=====		
User Story:		
As an IT staff member, I want to know which kind of data types will be produced or collected, so that I can determine what basic support services and functionalities are required.		
=====		
Requirement	Summary	Score
#1	The system must provide a comprehensive list of all ...	0.807 High
#2	The system must specify the format and structure of ...	0.766 Moderate
#3	The system must document the expected size and volum...	0.858 High
#4	The system must ensure that all data types are acces...	0.812 High
#5	The system must ensure that data types are processed...	0.812 High
#6	The system must provide real-time monitoring and ale...	0.786 Moderate

Figure 4.4 Semantic Similarity output

#### 4.4.3. Ambiguity Code Analysis

A custom ambiguity detection script given in Listing 4.8 was developed to identify the presence of words from the Penalty Word List within individual sentences. Each word was searched and marked separately after being isolated from the text. The complete implementation of the code is provided in Appendix CC.

```

6 def check_penalty_words(requirements, penalty_words):
7     print("\nPenalty Word Analysis")
8     print("=" * 60)
9     for idx, req in enumerate(requirements, 1):
10        found = []
11        req_lower = req.lower()
12        for word in penalty_words:
13            pattern = r'\b' + re.escape(word.lower()) + r'\b'
14            if re.search(pattern, req_lower):
15                found.append(word)
16        print(f"\nRequirement {idx}:")
17        print(f"{req}")
18        if found:
19            print(f"Found {len(found)} penalty word(s): {'',
'.join(found)}")

```

Listing 4.8 (continued)

```
20         else:  
21             print("No penalty words found.")
```

Listing 4.8 Excerpt of finding ambiguity code that allows searching for penalty words within sentences

The sample output is given below in Figure 4.5. It displays the results of the penalty word analysis applied to six functional requirements. This analysis aims to detect vague or ambiguous terms that may reduce the clarity or precision of requirements. Among the six requirements, three were flagged for containing such terms. Requirement #1 and #4 were both found to include the penalty word "all", which may overgeneralize and lead to interpretation issues. Requirement #6 includes the term "real-time", a commonly used but imprecise expression unless clearly defined. The remaining requirements (#2, #3, and #5) did not contain any penalty words, suggesting higher linguistic precision. Overall, this output highlights specific areas where ambiguity may exist and underscores the importance of avoiding vague terms to improve requirement quality and interpretability.

Penalty Word Analysis

=====

Requirement 1:

The system must provide a comprehensive list of all data types (e.g., text, numbers, dates, images, videos, etc.) that will be produced or collected during its operation.

Found 1 penalty word(s): all

Requirement 2:

The system must specify the format and structure of each data type (e.g., JSON for structured data, PNG/JPEG for images, MP4 for videos) to ensure compatibility with IT infrastructure and tools.

No penalty words found.

Requirement 3:

The system must document the expected size and volume of data for each data type to help IT staff plan storage and bandwidth requirements.

No penalty words found.

Requirement 4:

The system must ensure that all data types are accessible via standard APIs or export mechanisms (e.g., CSV, XML) to facilitate integration with other systems and tools used by IT staff.

Found 1 penalty word(s): all

Requirement 5:

The system must ensure that data types are processed and stored in compliance with relevant data protection regulations (e.g., GDPR, HIPAA) to avoid legal and security risks.

No penalty words found.

Figure 4.5 (continued)

Requirement 6:  
The system must provide real-time monitoring and alerts for unusual data production or collection patterns (e.g., sudden spikes in data volume) to assist IT staff in maintaining system stability.  
Found 1 penalty word(s): real-time

Figure 4.5 Ambiguity output

#### 4.5. Prompt Design

In the prompt design phase, two distinct prompts were employed. The first prompt specifies the aspects to which the model should attend during requirement generation, while the second provides a structured schema for the model’s output. The design was inspired by The Persona Pattern and The Template Pattern, two of the sixteen prompt patterns proposed by White et al. [23] Based on these, a new pattern referred to as the “Single-Shot Role-Based Template Pattern” was developed for this study. This pattern was designed to produce outputs that are more organized, concise, and internally consistent. The outputs of the LLMs with the prompt pattern are included in Appendices BA-BE and outputs without the prompt pattern are included in Appendices CA-CE.

For this research our prompts are as follows:

**1<sup>st</sup> Prompt:** A well-defined and useful requirement is a clear statement that outlines a desired functional or non-functional aspect of a system or product. To be effective, each requirement must adhere to the principles set forth in the ISO/IEC/IEEE 29148:2018 standard, ensuring it is comprehensive, verifiable, and aligned with business and user needs.

**2<sup>nd</sup> Prompt:** Act as a Requirement Engineer. Provide outputs that a Requirement Engineer would create. I am going to provide a template for your output. Everything in brackets is a placeholder. Anytime that you generate text, strictly try to fit it into the placeholders. Generate the 6 most important requirements according to this User Story and write it in the appropriate place: [User Story will be placed here]

- Requirement 1: [Write Requirement 1 Here]

- Requirement 1: [Functional or Non-Functional]
- Requirement 2: [Write Requirement 2 Here]
  - Requirement 2: [Functional or Non-Functional]
- Requirement 3: [Write Requirement 3 Here]
  - Requirement 3: [Functional or Non-Functional]
- Requirement 4: [Write Requirement 4 Here]
  - Requirement 4: [Functional or Non-Functional]
- Requirement 5: [Write Requirement 5 Here]
  - Requirement 5: [Functional or Non-Functional]
- Requirement 6: [Write Requirement 6 Here]
  - Requirement 6: [Functional or Non-Functional]

#### **4.6 Research Analysis**

This section presents a structured and comprehensive evaluation of the requirements generated by ChatGPT, based on a set of predefined analytical dimensions. Each requirement instance is examined to assess its quality, clarity, and alignment with the originating user story. The evaluation covers classification correctness, ambiguity, completeness, semantic similarity, passive voice usage, and readability.

Throughout the tables, several abbreviations are used for clarity and consistency. US# denotes the User Story Number, while REQ# represents the Requirement Number. F/NF indicates whether the requirement is categorized as Functional (F) or Non-Functional (NF). Correct Categorization refers to whether the generated classification matches the validated ground truth. Ambiguity Score represents the number of ambiguous terms identified within each requirement, based on a predefined penalty word list. SS stands for Semantic Similarity, calculated between each requirement and its corresponding user story. Completeness is assessed according to the inclusion of key contextual elements (5W1H), and the Completeness Score ranges from 0 to 6 depending on how many of these dimensions are addressed.

Specifically, Table 4.1 reports the classification correctness and ambiguity levels. Table 4.2 presents semantic similarity scores, passive voice detection results, and

completeness analyses. Table 4.3 includes the readability metrics, namely Flesch-Kincaid Reading Ease, Flesch-Kincaid Grade Level, and Gunning Fog Index, which collectively measure the complexity and accessibility of the text. Due to space limitations, analysis of the first five user stories generated by ChatGPT are given in Tables 4.1, 4.2 and 4.3. The analysis for the other LLMs are provided in Appendices EA-EO.

Table 4.1 presents the ambiguity analysis and categorization results of the six requirements generated by ChatGPT for the first user story. All requirements were correctly classified as either functional (F) or non-functional (NF), with a full match between the model's initial classification and the manually validated ground truth. Furthermore, each requirement received the highest possible ambiguity score of 10, indicating that no vague or ambiguous terms were detected. The “Ambiguous Terms” column confirms this by remaining empty across all entries. These results suggest that, under the structured prompt pattern, ChatGPT is capable of producing syntactically clear and semantically unambiguous requirements for this specific case. Moreover, the correct classification of both functional and non-functional types indicates a high level of alignment with standard requirement engineering definitions.

Table 4.1 ChatGPT categorization ambiguity analysis

US#	REQ#	F/NF	Correct Categorization	Ambiguity Score (10-0)	Ambiguous Terms
1	CH1.1	F	F	10	-
	CH1.2	F	F	10	-
	CH1.3	F	F	10	-
	CH1.4	F	F	10	-
	CH1.5	NF	NF	10	-
	CH1.6	F	F	10	-

Table 4.2 illustrates the completeness, SS, and passive voice usage of the requirements generated by ChatGPT for User Story 1. Semantic similarity scores for all six requirements fall within a relatively narrow range (0.577 to 0.710), indicating moderate to strong alignment with the content of the user story. In terms of

completeness, none of the requirements fully cover all six 5W1H components, with the highest observed completeness score being 3 out of 6. Most requirements include two or three WH elements, commonly combining “Who” and “What” with an additional component. This partial coverage indicates that while the requirements are relevant, they often lack contextual or explanatory details such as “Why” or “Where,” which are essential for fully informed implementation. Regarding voice structure, passive voice is detected in two of the six requirements (CH1.2 and CH1.5), suggesting that although the model generally favors active constructions, inconsistencies remain. Passive voice, when present, may hinder clarity and obscure the responsible agent in the requirement. Taken together, the results reflect ChatGPT’s ability to generate semantically aligned and moderately complete requirements, though improvements are needed in contextual richness and grammatical consistency to meet comprehensive standards in requirement engineering.

Table 4.2 ChatGPT completeness, semantic score, passive voice analysis

US#	REQ#	SS	Passive Voice	Completeness	Completeness Score (0-6)
1	CH1.1	0.626	no	Who, What, Where	3
	CH1.2	0.710	yes	Who, What, When	3
	CH1.3	0.640	no	Who, What	2
	CH1.4	0.577	yes	What, When, Where	3
	CH1.5	0.702	no	What, How	2
	CH1.6	0.670	no	Who, What, How	3

Table 4.3 presents the readability analysis of the six requirements generated by ChatGPT for User Story 1, based on Flesch-Kincaid Ease, Flesch-Kincaid Grade Level, and Gunning Fog Index. The Flesch-Kincaid Ease scores vary between 17.34 and 57.27, suggesting a wide range in perceived readability. Specifically, requirements such as CH1.4 (18.35) and CH1.6 (17.34) fall into the “very difficult to read” category, typically suited for college-level readers, while CH1.2 (57.27) is more accessible, aligning with an upper high school reading level. The Flesch-Kincaid Grade Level scores support this observation, ranging from 8.8 to 15.8, with several requirements

(CH1.4, CH1.5, CH1.6) exceeding the 13th grade level, which may present challenges for general comprehensibility, particularly in technical communication with mixed audiences. Similarly, Gunning Fog Index values are uniformly high, with most requirements scoring 16.0, indicating that the language complexity corresponds to a level suited for individuals with college education or higher.

Table 4.3 ChatGPT readability analysis

<b>US#</b>	<b>REQ#</b>	<b>Flesch-Kincaid Ease</b>	<b>Flesch-Kincaid Grade Level</b>	<b>Gunning Fog</b>
1	CH1.1	42.72	12.3	14.0
	CH1.2	57.27	8.8	14.17
	CH1.3	51.18	11.1	16.0
	CH1.4	18.35	15.4	16.02
	CH1.5	34.26	13.5	16.0
	CH1.6	17.34	15.8	16.0

## CHAPTER 5

### RESULTS

The empirical findings obtained from the evaluation of requirements generated by five LLMs (ChatGPT, Gemini, DeepSeek, Claude, and Qwen) are presented in this section. Each model was provided with a uniform prompt pattern and tasked with generating exactly six system requirements per user story, using a curated dataset of 50 finalized user stories. The resulting requirements were subjected to a rigorous assessment framework that evaluated multiple dimensions: completeness based on the 5W1H criteria, semantic alignment with the source user story, textual readability (as measured by the Flesch-Kincaid Grade Level, Flesch Reading Ease, and Gunning Fog Index), classification into functional or non-functional categories, and the presence of ambiguous or vague language identified through a predefined list of penalty terms. The findings are organized to enable both quantitative comparison and qualitative insight into each model's strengths and limitations in the context of automated requirement generation. As can be seen in Table 5.1 and Table 5.2, the results were normalized to be in the range of 0-1 for comparison. In the tables, CH stands for ChatGPT, G stands for Gemini, D stands for DeepSeek, C stands for Claude and Q stands for Qwen. Results closer to 1 indicate a greater success rate.

ChatGPT exhibits strong performance under the prompt pattern, achieving high scores in ambiguity resolution (0.982), semantic similarity (0.772), and classification accuracy (0.997), along with relatively low textual complexity. In the absence of a prompt, ambiguity handling remains solid; however, completeness and classification accuracy decline, suggesting reduced consistency and alignment without structured guidance.

Gemini performs well in terms of ambiguity (0.982) and semantic similarity (0.786) when prompted but suffers from lower completeness (0.548) and frequent use of passive constructions. Without the prompt pattern, although readability and similarity

remain acceptable, drops in completeness and classification accuracy indicate reduced coherence in the generated outputs.

DeepSeek benefits considerably from prompt structuring, delivering balanced results across ambiguity (0.966), completeness (0.664), and classification (1.000). Nevertheless, its output remains linguistically dense and less readable. Removal of the prompt improves readability but leads to a decrease in semantic alignment, completeness, and classification accuracy, emphasizing the model's dependence on prompt clarity.

Claude shows moderate capability with the prompt, producing acceptable similarity scores but struggling with completeness, readability, and high passive voice usage. Its performance degrades further without prompt support, particularly in classification and structural consistency, indicating a limited ability to self-organize requirement content.

Qwen stands out for its robustness across both settings. While prompt use enhances classification accuracy (1.000) and reduces passive voice, completeness remains limited. Notably, removal of the prompt improves completeness and readability, though classification accuracy slightly decreases. These results reflect Qwen's relative independence from external structuring, while still benefiting from it in terms of output precision.

Table 5.1 Comparison between LLMs outputs with the prompt pattern

LLM	Mean Ambiguity	Mean Completeness	Semantic Similarity	Flesch-Kincaid Ease	Flesch-Kincaid Grade Level	Gunning Fog	Passive Voice	Classification
CH	<b>0.982</b>	0.656	0.772	0.341	0.278	<b>0.269</b>	0.837	0.997
G	<b>0.982</b>	0.548	<b>0.786</b>	<b>0.367</b>	<b>0.321</b>	0.258	0.870	0.957
D	0.966	<b>0.664</b>	0.706	0.221	0.191	0.151	0.840	<b>1.000</b>
C	0.974	0.594	0.765	0.224	0.153	0.130	<b>0.880</b>	0.997
Q	0.975	0.508	0.776	0.258	0.204	0.175	0.727	<b>1.000</b>

Table 5.2 Comparison between LLMs outputs without the prompt pattern

LLM	Mean Ambiguity	Mean Completeness	Semantic Similarity	Flesch-Kincaid Ease	Flesch-Kincaid Grade Level	Gunning Fog	Passive Voice	Classification
CH	0.958	0.534	0.740	0.381	0.313	0.280	0.583	0.833
G	0.963	0.508	0.750	0.341	0.264	0.249	0.583	<b>0.917</b>
D	<b>0.988</b>	0.426	0.733	<b>0.453</b>	<b>0.412</b>	0.384	0.750	0.750
C	0.979	0.500	<b>0.774</b>	0.258	0.211	0.164	0.500	0.875
Q	0.958	<b>0.650</b>	0.749	0.415	0.327	<b>0.393</b>	<b>0.833</b>	0.875

### 5.1. Findings

The primary objective is to interpret the performance of five LLMs in generating software requirements from user stories, both with and without the use of a structured prompt pattern. The discussion aims to answer the research questions outlined earlier and to explore the implications of prompt engineering on the quality and clarity of LLM generated requirements.

The findings and opinions obtained from the research answered the research questions as follows:

**RQ1:** How do different large language models (ChatGPT, Gemini, DeepSeek, Claude, Qwen) compare in their ability to generate software requirements from user stories?

- LLMs exhibit varying levels of effectiveness in generating software requirements from user stories, depending on the evaluation dimension and model architecture. Overall, the comparison reveals that while all five models are capable of producing requirements with acceptable quality, their strengths differ across specific metrics. ChatGPT stands out for its ability to minimize ambiguity and generate complete, well-structured requirements. Gemini demonstrates strong semantic alignment with user stories but falls short in completeness. DeepSeek performs well in classification accuracy, though it suffers from poor readability and higher ambiguity without guided prompting. Claude maintains a balanced performance across most metrics but does not

lead in any particular area. Qwen offers high semantic similarity and classification scores but presents inconsistencies in completeness. These findings underscore that each model brings distinct advantages and limitations to the task of requirement generation.

**RQ2:** Which large language model (ChatGPT, Gemini, DeepSeek, Claude, Qwen) demonstrates superior performance in generating high-quality requirements based on user stories, as measured by the established metrics?

- Among the evaluated models, a comparative analysis based on established quality metrics reveals that ChatGPT consistently delivers the most effective performance in generating high-quality software requirements. When assessed across key dimensions such as ambiguity reduction, completeness, semantic similarity, readability, and classification accuracy, ChatGPT demonstrates the highest levels of structural clarity and contextual relevance, particularly when the prompt pattern is applied. Although Gemini and Qwen show higher semantic similarity in some instances, their overall performance is less consistent. DeepSeek achieves perfect classification scores with the pattern but lacks readability and completeness. Claude maintains moderate results across all categories but does not surpass ChatGPT in any major area. Therefore, based on a holistic view of performance, ChatGPT demonstrates superior capability in producing high-quality, comprehensive, and analyzable software requirements.

**RQ3:** To what extent does the use of Single-Shot Role-Based Template Pattern influence the quality of requirements generated by large language models across different evaluation dimensions (e.g., ambiguity, completeness, semantic similarity, readability)?

- The implementation of the Single-Shot Role-Based Template Pattern significantly enhances the quality of requirements generated by LLMs across

multiple evaluation criteria. In general, the pattern helps standardize the outputs, resulting in reduced ambiguity, improved completeness, and higher classification accuracy. Models also tend to produce more aligned and semantically coherent requirements when guided by the structured prompt. However, the increase in technical precision and structural complexity sometimes leads to a decline in readability scores, as observed in Flesch-Kincaid and Gunning Fog indices. Despite this trade-off, the pattern proves to be a valuable prompting strategy that systematically improves the overall quality and consistency of requirements produced by diverse language models. Table 6.1 presents the detailed comparative results across all evaluation metrics, highlighting the performance difference for each model when the Single-Shot Role-Based Template Pattern is applied and not applied.

Table 5.3 Comparison LLMs outputs with and without the prompt pattern

	LLM	Mean Ambiguity	Mean Completeness	Semantic Similarity	Flesch-Kincaid Ease	Flesch-Kincaid Grade Level	Gunning Fog	Passive Voice	Classification
With Prompt Pattern	CH	<b>0.982</b>	<b>0.656</b>	<b>0.772</b>	0.341	0.278	0.269	<b>0.837</b>	<b>0.997</b>
	G	<b>0.982</b>	<b>0.548</b>	<b>0.786</b>	<b>0.367</b>	<b>0.321</b>	<b>0.258</b>	<b>0.870</b>	<b>0.957</b>
	D	0.966	<b>0.664</b>	0.706	0.221	0.191	0.151	<b>0.840</b>	<b>1.000</b>
	C	0.974	<b>0.594</b>	0.765	0.224	0.153	0.130	<b>0.880</b>	<b>0.997</b>
	Q	<b>0.975</b>	0.508	<b>0.776</b>	0.258	0.204	0.175	0.727	<b>1.000</b>
Without Prompt Pattern	CH	0.958	0.534	0.740	<b>0.381</b>	<b>0.313</b>	<b>0.280</b>	0.583	0.833
	G	<b>0.963</b>	0.508	0.750	0.341	0.264	0.249	0.583	0.917
	D	<b>0.988</b>	0.426	<b>0.733</b>	<b>0.453</b>	<b>0.412</b>	<b>0.384</b>	0.750	0.750
	C	0.979	0.500	<b>0.774</b>	<b>0.258</b>	<b>0.211</b>	<b>0.164</b>	0.500	0.875
	Q	0.958	<b>0.650</b>	0.749	<b>0.415</b>	<b>0.327</b>	<b>0.393</b>	<b>0.833</b>	0.875

## CHAPTER 6

### CONCLUSION

This thesis examined the influence of structured prompt patterns on the quality of software requirements generated by five advanced LLMs: ChatGPT, Gemini, DeepSeek, Claude, and Qwen. The evaluation focused on several key dimensions, including ambiguity, completeness, semantic similarity, readability, passive voice usage, and classification accuracy. Results showed that the Single-Shot Role-Based Prompt Pattern effectively enhanced the quality and consistency of the generated requirements. ChatGPT and Gemini exhibited notable improvements in clarity, completeness, and semantic alignment when structured prompting was applied. Qwen demonstrated strong performance without the need for structured input, indicating a degree of robustness. DeepSeek, in contrast, benefited from prompt use to manage ambiguity and coherence but showed higher readability without prompts. Claude consistently performed poorly across most metrics, regardless of prompt usage. These findings confirm that prompt engineering is a vital factor in improving the performance of language models and reveal important differences in how each model responds to structured guidance. This research offers valuable insight into optimizing LLM-driven requirement generation in software engineering contexts.

#### **6.1. Contributions To The Field**

This thesis makes several key contributions to the intersection of requirements engineering and LLM evaluation. First, a novel structured prompt pattern was designed specifically for this study to enhance the quality of requirements generated by LLMs. This prompt was applied across five advanced models to evaluate their responsiveness to structured guidance. Second, the study introduces a multi-faceted evaluation framework incorporating 5W1H completeness analysis, ambiguity detection using a penalty word list, semantic similarity measurement, readability metrics (Flesch-Kincaid and Gunning Fog), passive voice detection, and

functional/non-functional classification. Third, only the requirements generated with the structured prompt pattern were systematically compiled into a structured dataset, offering a reusable resource for future research on automated requirement generation and model benchmarking. Through the development of an original prompt pattern, objective evaluation methods, and a curated dataset, this thesis contributes practical tools and insights to support the advancement of prompt engineering and automated requirements generation in software engineering.

## **6.2. Future Works**

In the next stages of this study, the "Single-Shot Role-Based Template Pattern" that we developed can be fine-tuned to maximize ambiguity scores and requirement categorization. In addition, a model that will be developed specifically for generating requirements from user stories will be very suitable for this. With a model that can make predictions with word meanings, contexts and situations via tokens, the RE field can develop much more with artificial intelligence technology.

## **6.3. Final Thoughts**

This study has demonstrated the growing potential of Large Language Models (LLMs) in automating software requirements generation when supported by carefully designed prompt structures. The findings show that prompt engineering is not merely a technical enhancement but a critical factor in shaping the clarity, completeness, and consistency of outputs produced by advanced language models. While the study highlights notable differences in how models respond to structured input, it also affirms the feasibility of developing reproducible and evaluable requirement generation workflows. As LLMs continue to evolve, their integration into requirements engineering processes will likely become more refined and widespread. The insights and tools developed in this thesis—particularly the structured prompt pattern and evaluation framework—serve as a foundation for future work in improving the reliability and quality of AI-assisted requirement engineering practices.

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## APPENDIX AA

### 5W1H PASSIVE VOICE READABILITY CODE

```
from transformers import pipeline
import spacy
import textstat
from difflib import SequenceMatcher
import numpy as np
qa = pipeline("question-answering", model="deepset/roberta-base-squad2")
qa_alt = pipeline("question-answering", model="distilbert-base-cased-distilled-
squad")
nlp = spacy.load("en_core_web_lg")

def analyze_requirement_dual(sentence):
    questions = {
        "Who": "Who or what is explicitly or implicitly responsible for carrying out the
main action in this requirement?",
        "What": "What is the primary task, action, or system behavior that is required in
this specification?",
        "When": "Specifically when does this action take place?",
        "Where": "In where does the described action in this requirement take place?",
        "Why": "What is the intended goal, rationale, or reason for performing the
described action in this requirement?",
        "How": "What method, technique, or process is used to implement or carry out
the described action in this requirement?"
    }

    doc = nlp(sentence)
    results = {}

    for wh, question in questions.items():
        qa_result = qa(question=question, context=sentence)
        alt_result = qa_alt(question=question, context=sentence)
        rule_answer = extract_structural(doc, wh)

        results[wh] = {
            "qa_answer": qa_result["answer"],
            "alt_qa_answer": alt_result["answer"],
            "rule_answer": rule_answer
        }

    return results

def generate_dynamic_questions(doc):
```

```

root = next((t for t in doc if t.dep_ == "ROOT"), None)
subj = next((t for t in doc if t.dep_ in ["nsubj", "agent"]), None)
dobj = next((t for t in doc if t.dep_ in ["dobj", "attr", "xcomp", "ccomp"]), None)

verb = root.lemma_ if root else None
subject = subj.text if subj else "the system"
obj = dobj.text if dobj else None

return {
    "Who": f"Who is directly responsible for executing the action '{verb}' described
in this requirement?" if verb else
    "Who is responsible for carrying out the requirement?",
    "What": f"What specific task or action must {subject} perform to achieve the goal
of '{verb}' in this requirement?" if verb and obj else
    f"What specific task or action is required by this requirement?",
    "When": f"When should the action '{verb}' be executed based on the
requirement?" if verb else
    "Under what condition or timing is the described action expected to
happen?",
    "Where": f"In which part, interface, or environment of the system does '{verb}'
take place?" if verb else
    "Where in the system does this requirement take effect?",
    "Why": f"Why is the action '{verb}' required in this requirement?" if verb else
    "Why is this requirement necessary or important?",
    "How": f"How does {subject} or {obj} accomplish or execute the action '{verb}'
on '{obj}' in this requirement?" if verb and obj else
    "What is the method or process described in this requirement for
implementation?"
}

def analyze_requirement_dynamic(sentence):
    doc = nlp(sentence)
    dynamic_questions = generate_dynamic_questions(doc)
    results = {"requirement": sentence}

    for wh, question in dynamic_questions.items():
        qa_result = qa(question=question, context=sentence)
        alt_result = qa_alt(question=question, context=sentence)

        results[wh] = {
            "dynamic_question": question,
            "dynamic_qa_answer": qa_result["answer"],
            "alt_dynamic_qa_answer": alt_result["answer"]
        }

    results["passive_voice"] = has_passive_voice(doc)

```

```

    results.update(calculate_readability(sentence))
    results.update(check_singularity(doc))
    return results
def batch_analyze_6_requirements(requirements):

    for idx, sentence in enumerate(requirements, 1):
        print("\n" + "=" * 100)
        print(f"Requirement {idx}:")
        print(f" {sentence}\n")

        static_results = analyze_requirement_dual(sentence)
        dynamic_results = analyze_requirement_dynamic(sentence)

        print_comparison_results(static_results, dynamic_results)

def print_comparison_results(static_results, dynamic_results):
    fre = dynamic_results["flesch_reading_ease"]
    fkgl = dynamic_results["flesch_kincaid_grade"]
    gfi = dynamic_results["gunning_fog_index"]
    ease_desc, grade_desc, fog_desc = interpret_readability_scores(fre, fkgl, gfi)

    print("=== REQUIREMENT WH ANALYSIS ===")
    for wh in static_results:
        print(f"\n{wh}:\n" + "-"*40)
        print(f"Static QA Answer      : {static_results[wh]['qa_answer']}")
        print(f"Alt Static QA Answer   : {static_results[wh]['alt_qa_answer']}")
        print(f"Rule-based Answer      : {static_results[wh]['rule_answer']}")
        print(f"Dynamic      QA      Answer      :
{dynamic_results[wh]['dynamic_qa_answer']}")
        print(f"Alt      Dynamic      QA      Answer      :
{dynamic_results[wh]['alt_dynamic_qa_answer']}")
        print("\nPassive Voice:", " Detected" if dynamic_results["passive_voice"] else "
Not Detected")
        print(f"\nFlesch Reading Ease: {fre} ({ease_desc})")
        print(f"Flesch-Kincaid Grade Level: {fkgl} ({grade_desc})")
        print(f"Gunning Fog Index: {gfi} ({fog_desc})")
if __name__ == "__main__":
    requirements =[
]
    batch_analyze_6_requirements(requirements)

```

## APPENDIX AB

### SEMANTIC SIMILARITY CODE

```
import spacy
from sklearn.metrics.pairwise import cosine_similarity
nlp = spacy.load("en_core_web_lg")
def compute_consistency(user_story, requirement):
    story_vec = nlp(user_story).vector.reshape(1, -1)
    req_vec = nlp(requirement).vector.reshape(1, -1)
    similarity = cosine_similarity(story_vec, req_vec)[0][0]
    return round(similarity, 3)
def compute_consistency_batch(user_story, requirements):
    if len(requirements) != 6:
        print("Please provide exactly 6 requirements.")
        return
    print("\nConsistency Analysis")
    print("=" * 60)
    print(f"User Story:\n{user_story}")
    print("=" * 60)
    print("{:<14} {:<55} {:<10}".format("Requirement", "Summary", "Score"))
    for idx, requirement in enumerate(requirements, 1):
        score = compute_consistency(user_story, requirement)
        if score >= 0.8:
            status = "High"
        elif score >= 0.6:
            status = "Moderate"
        else:
            status = "Low"
        short_req = requirement.replace("Requirement " + str(idx) + ": ", "")
        short_req = (short_req[:52] + "...") if len(short_req) > 55 else short_req
        print("{:<14} {:<55} {:<10}".format(f"#{idx}", short_req, f"{score:.3f}"
        {status}"))
if __name__ == "__main__":
    user_story = ""
    requirements = []
    compute_consistency_batch(user_story, requirements)
```

## APPENDIX AC

### AMBIGUITY CODE

```
import re
penalty_words = [
    "etc.", "maybe", "usually", "as appropriate", "if possible",
    "normally", "soon", "later", "timely", "immediately", "eventually",
    "as needed", "to the extent possible", "minimize", "maximize", "optimize",
    "adequate", "proper", "comparable", "appropriate", "optimal", "safe",
    "efficient", "user-friendly", "reliable", "robust", "seamless", "intuitive",
    "reasonable", "sufficient", "simplified", "substantial", "significant",
    "few", "many", "various", "nominal", "as required", "where necessary",
    "future-proof", "to the greatest extent possible", "to the maximum extent feasible",
    "as far as practicable", "as determined by", "where applicable",
    "if deemed necessary", "improved", "effective", "acceptable", "secure",
    "interoperable", "responsive", "all", "real-time",
    "promptly", "at your earliest convenience", "as early as practicable",
    "in a timely manner", "without undue delay", "always", "never",
    "every effort", "best effort", "safely", "quickly", "gracefully",
    "seamlessly", "ideally", "if practical", "to the extent necessary",
    "if appropriate", "extendable", "scalable", "maintainable",
    "affordable", "compliant"
]
def check_penalty_words(requirements, penalty_words):
    print("\nPenalty Word Analysis")
    print("=" * 60)
    for idx, req in enumerate(requirements, 1):
        found = []
        req_lower = req.lower()
        for word in penalty_words:
            pattern = r'\b' + re.escape(word.lower()) + r'\b'
            if re.search(pattern, req_lower):
                found.append(word)
        print(f"\n Requirement {idx}:")
        print(f"{req}")
        if found:
            print(f"Found {len(found)} penalty word(s): {' '.join(found)}")
        else:
            print("No penalty words found.")
```

## APPENDIX BA

### CHATGPT TEST RESULTS WITH PROMPT PATTERN

In this section, ChatGPT will convert the given prompt patterns and user stories into requirements.

**User Story 1:** As an Agency user, I want to accurately see who created a submission, so that I'm not confused about who last updated a submission.

#### Requirements:

- Requirement 1: The system shall display the full name of the user who originally created the submission on the submission detail page
  - o Requirement 1: Functional
- Requirement 2: The system shall log the username and timestamp when a new submission is created.
  - o Requirement 2: Functional
- Requirement 3: The system shall display the full name of the user who last updated the submission separately from the creator's name
  - o Requirement 3: Functional
- Requirement 4: The system shall ensure that user identification information is displayed within 2 seconds of accessing the submission detail page
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure that displayed user information is accurate and pulled in real time from the authoritative user database
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall restrict the visibility of user identification fields to authorized agency users only, based on their access rights.
  - o Requirement 6: Functional

**User Story 2:** As an Agency user, I want the header information box to show updated date AND time, so that I know when it was updated.

**Requirements:**

- Requirement 1: The system shall display the date of the last update in the header information box in the format MM/DD/YYYY
  - o Requirement 1: Functional
- Requirement 2: The system shall display the time of the last update in the header information box in the format HH:MM AM/PM.
  - o Requirement 2: Functional
- Requirement 3: The system shall combine the date and time of the last update into a single visible field within the header information box.
  - o Requirement 3: Functional
- Requirement 4: The system shall ensure that the displayed date and time are updated immediately after a user saves any change to the submission.
  - o Requirement 4: Functional
- Requirement 5: The system shall present the updated date and time information within 2 seconds of page load.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall format the updated date and time based on the Agency user's configured timezone settings.
  - o Requirement 6: Non-Functional

**User Story 3:** As a Plan Review Staff member, I want to successfully Conduct a Plan Review Meeting with the Applicant and record the outcome, so that I can listen to it again.

**Requirements:**

- Requirement 1: The system shall allow Plan Review Staff to initiate a Plan Review Meeting session with the Applicant through the application interface.
  - o Requirement 1: Functional

- Requirement 2: The system shall provide functionality to record audio of the Plan Review Meeting session.
  - Requirement 2: Functional
- Requirement 3: The system shall automatically save the recorded meeting audio securely upon completion of the session
  - Requirement 3: Functional
- Requirement 4: The system shall allow Plan Review Staff to playback recorded meeting audio within the application
  - Requirement 4: Functional
- Requirement 5: The system shall ensure recorded audio files are stored in an encrypted format to protect sensitive information
  - Requirement 5: Non-Functional
- Requirement 6: The system shall ensure audio playback begins within 3 seconds of selecting a recorded session
  - Requirement 6: Non-Functional

**User Story 4:** As a Public User, I want to Search for Information, so that I can obtain publicly available information concerning properties, County services, processes and other general information.

**Requirements:**

- Requirement 1: The system shall provide a search functionality that allows Public Users to enter keywords related to properties, County services, processes, and general information.
  - Requirement 1: Functional
- Requirement 2: The system shall return relevant publicly available search results within 3 seconds after a query is submitted.
  - Requirement 2: Non-Functional
- Requirement 3: The system shall allow Public Users to filter search results by category, such as properties, County services, and processes.
  - Requirement 3: Functional

- Requirement 4: The system shall ensure that only information designated as publicly available is included in search results.
  - Requirement 4: Functional
- Requirement 5: The system shall display search results ranked by relevance to the entered keywords.
  - Requirement 5: Functional
- Requirement 6: The system shall maintain 99% uptime availability for the public search functionality
  - Requirement 6: Non-Functional

**User Story 5:** As a user, I want to view user documentation for the website, so that I know how to use the web app.

**Requirements:**

- Requirement 1: The system shall provide access to user documentation through a clearly labeled "Help" or "Documentation" link on the website.
  - Requirement 1: Functional
- Requirement 2: The system shall ensure that user documentation covers key functionalities, navigation, and common troubleshooting steps for the web app.
  - Requirement 2: Functional
- Requirement 3 The system shall display user documentation content in a searchable, organized format with categories and subcategories.
  - Requirement 3: Functional
- Requirement 4: The system shall ensure that user documentation is accessible without requiring user login or special permissions.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that user documentation pages load within 2 seconds under standard network conditions.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall ensure that the documentation is reviewed and updated at least once every 6 months to maintain accuracy.
  - Requirement 6: Non-Functional

**User Story 6:** As an admin, I want to be able to block specific users based on IP address, so that I can prevent spamming on the websites.

**Requirements:**

- Requirement 1: The system shall allow administrators to manually enter and block specific IP addresses through an admin interface
  - o Requirement 1: Functional
- Requirement 2: The system shall automatically deny access to users attempting to access the website from blocked IP addresses.
  - o Requirement 2: Functional
- Requirement 3: The system shall display a customizable error message to users whose IP addresses have been blocked.
  - o Requirement 3: Functional
- Requirement 4: The system shall log all IP blocking actions, including the IP address, admin user, and timestamp, for auditing purposes.
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure that IP blocking actions take effect within 1 minute of being configured by an admin.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall support blocking both individual IP addresses and IP address ranges using CIDR notation.
  - o Requirement 6: Functional

**User Story 7:** As an Inspector, I want to Conduct Inspections, so that I can validate Customer compliance with code and regulations and provide results of the inspection to the Customer.

**Requirements:**

- Requirement 1: The system shall allow Inspectors to schedule, initiate, and record inspection activities through a digital interface.
  - o Requirement 1: Functional

- Requirement 2: The system shall provide Inspectors with a checklist aligned with applicable codes and regulations during inspections.
  - o Requirement 2: Functional
- Requirement 3: The system shall allow Inspectors to enter pass, fail, or conditional results for each inspection item in real time.
  - o Requirement 3: Functional
- Requirement 4: The system shall automatically generate a summary report of the inspection results for delivery to the Customer.
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure inspection reports are generated and available for Customer access within 5 minutes after inspection completion.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall secure all inspection data using encryption to maintain confidentiality and integrity.
  - o Requirement 6: Non-Functional

**User Story 8:** As an admin, I want to be able to communicate directly with facilities, so that I can keep them updated about features we have on our website.

**Requirements:**

- Requirement 1: The system shall allow administrators to compose and send messages directly to designated facility contacts through the application interface
  - o Requirement 1: Functional
- Requirement 2: The system shall allow administrators to send updates to multiple facilities at once using group messaging functionality.
  - o Requirement 2: Functional
- Requirement 3: The system shall maintain a history of all communications sent to facilities, including timestamps and message content.
  - o Requirement 3: Functional
- Requirement 4: The system shall provide a notification mechanism to alert facility users when a new message from an administrator has been received.

- Requirement 4: Functional
- Requirement 5: The system shall ensure that messages are delivered to facilities within 1 minute after being sent by the administrator.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall encrypt all communications between administrators and facilities to protect sensitive information.
  - Requirement 6: Non-Functional

**User Story 9:** As a Data Consuming User, I want to be able to search any dataset published and publicly accessible by their title and metadata, So that I can find the datasets I'm interested in.

**Requirements:**

- Requirement 1: The system shall allow Data Consuming Users to perform keyword searches on dataset titles
  - Requirement 1: Functional
- Requirement 2: The system shall allow Data Consuming Users to perform keyword searches on dataset metadata fields.
  - Requirement 2: Functional
- Requirement 3: The system shall ensure that search results are returned within 3 seconds after the user submits a query.
  - Requirement 3: Non-Functional
- Requirement 4: The system shall allow Data Consuming Users to filter search results based on metadata categories such as publication date, dataset owner, and topic
  - Requirement 4: Functional
- Requirement 5: The system shall display a minimum of the dataset title, a short description, and publication date in each search result listing
  - Requirement 5: Functional
- Requirement 6: The system shall ensure the search functionality is available with 99% uptime over a rolling 30-day period.
  - Requirement 6: Non-Functional

**User Story 10:** As a Platform administrator, I want to be able to translate the data types hierarchies of the Viewer while in embed mode, So that my users can understand the interface in their native language.

**Requirements:**

- Requirement 1: The system shall allow Platform Administrators to configure translations for data type hierarchy labels within the Viewer when in embed mode.
  - o Requirement 1: Functional
- Requirement 2: The system shall support multiple language options for translating data type hierarchies based on a predefined language list.
  - o Requirement 2: Functional
- Requirement 3: The system shall automatically display the translated data type hierarchies based on the end user's browser language settings when in embed mode.
  - o Requirement 3: Functional
- Requirement 4: The system shall allow Platform Administrators to manually upload and manage language translation files for the Viewer.
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure that translations are applied within 2 seconds after loading the Viewer in embed mode.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall ensure that all translation files are securely stored and version-controlled to prevent unauthorized modifications.
  - o Requirement 6: Non-Functional

**User Story 11:** As a Data Consuming User, I want to be able to filter, sort and aggregate data by multiple dimensions and measures, So that I can get more granular views on the data.

### **Requirements:**

- Requirement 1: The system shall allow Data Consuming Users to filter datasets based on multiple dimensions, such as date ranges, categories, or geographic regions.
  - Requirement 1: Functional
- Requirement 2: The system shall allow Data Consuming Users to sort data by any selected dimension or measure in ascending or descending order.
  - Requirement 2: Functional
- Requirement 3: The system shall provide aggregation options such as sum, average, minimum, and maximum for selected measures.
  - Requirement 3: Functional
- Requirement 4: The system shall allow multiple filters and sorting criteria to be applied simultaneously without performance degradation
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that filter, sort, and aggregation operations return results within 5 seconds for datasets up to 1 million records.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall provide visual indicators to show which filters, sorts, and aggregations are currently active.
  - Requirement 6: Functional

**User Story 12:** As a Publisher, I want to embed an interactive preview of my data on my site, so that users can be encouraged that this is the correct data for them.

### **Requirements:**

- Requirement 1: The system shall allow Publishers to generate embeddable code snippets for interactive data previews
  - Requirement 1: Functional
- Requirement 2: The system shall ensure that the interactive preview includes basic data visualization features such as tables, charts, or maps, depending on the dataset type.
  - Requirement 2: Functional

- Requirement 3: The system shall allow users interacting with the embedded preview to filter and search within the displayed dataset.
  - o Requirement 3: Functional
- Requirement 4: The system shall ensure that embedded data previews dynamically update if the source dataset is modified, without requiring re-embedding.
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure that embedded previews load within 3 seconds under standard network conditions.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall maintain responsive design standards so that embedded previews display correctly on mobile and desktop devices.
  - o Requirement 6: Non-Functional

**User Story 13:** As a Publisher, I want to know how many users have previewed a dataset, so that I know how interest in a dataset relates to its actual download numbers.

**Requirements:**

- Requirement 1: The system shall track and record each time a user previews a dataset.
  - o Requirement 1: Functional
- Requirement 2: The system shall provide Publishers with access to preview count metrics through an analytics dashboard.
  - o Requirement 2: Functional
- Requirement 3: The system shall allow Publishers to view preview counts over selectable time periods, such as daily, weekly, and monthly.
  - o Requirement 3: Functional
- Requirement 4: The system shall correlate preview counts with dataset download counts in the analytics dashboard for comparison.
  - o Requirement 4: Functional
- Requirement 5: The system shall update preview count metrics in real time or within 5 minutes of a dataset being previewed.

- Requirement 5: Non-Functional
- Requirement 6: The system shall ensure that user privacy is maintained by anonymizing any personally identifiable information related to dataset previews.
  - Requirement 6: Non-Functional

**User Story 14:** As a site editor, I want to assign priority numbers to news items, so that I can indicate which articles I want featured most prominently on the site.

**Requirements:**

- Requirement 1: The system shall allow Site Editors to assign a numerical priority value to each news item during creation or editing
  - Requirement 1: Functional
- Requirement 2: The system shall display news items on the site based on their assigned priority numbers, with lower numbers indicating higher prominence.
  - Requirement 2: Functional
- Requirement 3: The system shall allow Site Editors to update the priority numbers of existing news items at any time.
  - Requirement 3: Functional
- Requirement 4: The system shall ensure that news items with the same priority number are ordered by their publication date, with the most recent displayed first.
  - Requirement 4: Functional
- Requirement 5: The system shall update the news item display order within 1 minute after a priority change is made.
  - Requirement 5: Non- Functional
- Requirement 6: The system shall provide a visual indicator in the news management interface showing the current priority of each news item.
  - Requirement 6: Non-Functional

**User Story 15:** As a trainer, I want to update one of my existing courses or events, so that it reflects accurate information.

### **Requirements:**

- Requirement 1: The system shall allow Trainers to access a list of their existing courses and events through a management interface.
  - Requirement 1: Functional
- Requirement 2: The system shall allow Trainers to edit the title, description, date, time, and location fields of existing courses or events.
  - Requirement 2: Functional
- Requirement 3: The system shall provide a version history that tracks changes made to course or event details, including timestamps and user information
  - Requirement 3: Functional
- Requirement 4: The system shall require Trainers to confirm changes before saving updates to an existing course or event.
  - Requirement 4: Functional
- Requirement 5: The system shall apply updates to courses or events within 2 minutes of confirmation to ensure accurate public display.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall ensure that all updated course or event information is reflected in any associated public listings automatically.
  - Requirement 6: Functional

**User Story 16:** As a site visitor, I want to have an advanced search option that lets me fill in a form of search criteria, so that I can quickly find what I am looking for.

### **Requirements:**

- Requirement 1: The system shall provide an advanced search option accessible from the main search interface.
  - Requirement 1: Functional
- Requirement 2: The system shall display a form in the advanced search interface allowing users to specify multiple criteria such as keywords, categories, date ranges, and tags.
  - Requirement 2: Functional

- Requirement 3: The system shall allow users to apply multiple filters simultaneously in the advanced search form.
  - Requirement 3: Functional
- Requirement 4: The system shall return search results that exactly match the criteria entered in the advanced search form
  - Requirement 4: Functional
- Requirement 5: The system shall ensure advanced search results are displayed within 3 seconds after submission.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall provide a "Clear Form" option to reset all advanced search criteria fields with a single action.
  - Requirement 6: Functional

**User Story 17:** As a recruiter, I want to be able to extend an ad for another 30 days by

**Requirements:**

- Requirement 1: The system shall allow Recruiters to access their existing ads through a secure login and management interface.
  - Requirement 1: Functional
- Requirement 2: The system shall provide an option for Recruiters to extend an ad's expiration date by 30 days with a single update action
  - Requirement 2: Functional
- Requirement 3: The system shall automatically update the ad's expiration date immediately after the extension is confirmed by the Recruiter
  - Requirement 3: Functional
- Requirement 4: The system shall send a confirmation notification to the Recruiter upon successful extension of the ad.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that extended ads remain visible on the site within 1 minute after the update action is completed.
  - Requirement 5: Non-Functional

- Requirement 6: The system shall log all ad extension activities with timestamps and user identifiers for audit purposes.
  - o Requirement 6: Non-Functional

**User Story 18:** As a user researcher, I want to test the user research plan, so that I make sure the in-person interviews are effective and capturing the right information.

**Requirements:**

- Requirement 1: The system shall allow User Researchers to upload and store a user research plan document within the platform.
  - o Requirement 1: Functional
- Requirement 2: The system shall provide functionality for User Researchers to create and manage a checklist to verify the effectiveness of each research plan component before interviews.
  - o Requirement 2: Functional
- Requirement 3: The system shall allow User Researchers to conduct pilot tests of the research plan with sample participants and record feedback.
  - o Requirement 3: Functional
- Requirement 4: The system shall enable User Researchers to analyze pilot test feedback to identify gaps or improvement areas in the research plan.
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure that feedback and test results from pilot sessions are stored securely and accessible only to authorized researchers.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall allow version control of research plans, enabling researchers to track changes between initial and revised plans.
  - o Requirement 6: Functional

**User Story 19:** As a data manager, I want to have the description of collected data sets that are used or updated throughout the project lifecycle, so that I can ensure the descriptions are current and add detail as the study proceeds.

**Requirements:**

- Requirement 1: The system shall allow Data Managers to create and maintain detailed descriptions for each dataset collected during the project lifecycle.
  - Requirement 1: Functional
- Requirement 2: The system shall provide version control for dataset descriptions to track changes made over time
  - Requirement 2: Functional
- Requirement 3 The system shall allow Data Managers to edit and update dataset descriptions at any stage of the project lifecycle.
  - Requirement 3: Functional
- Requirement 4: The system shall timestamp each update to dataset descriptions and log the user responsible for the update.
  - Requirement 4: Functiona
- Requirement 5: The system shall ensure that dataset descriptions are accessible within 2 seconds of user request under standard network conditions.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall enforce user authentication to restrict editing of dataset descriptions to authorized Data Managers.
  - Requirement 6: Non-Functional

**User Story 20:** As an IT staff member, I want to know which kind of data types will be produced or collected, so that I can determine what basic support services and functionalities are required.

**Requirements:**

- Requirement 1: The system shall provide IT Staff with a catalog listing all data types expected to be produced or collected during the project.
  - Requirement 1: Functional
- Requirement 2: The system shall allow IT Staff to view metadata attributes for each data type, including format, size estimates, and sensitivity classification.
  - Requirement 2: Functional

- Requirement 3: The system shall provide real-time updates to the data type catalog whenever new types are added or existing types are modified.
  - o Requirement 3: Functional
- Requirement 4: The system shall allow IT Staff to download a report summarizing all current and expected data types for infrastructure planning purposes.
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure that access to the data type catalog is secured through authentication and role-based permissions.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall ensure that the data type catalog is available 99% of the time during business hours to support IT planning activities.
  - o Requirement 6: Non-Functional

**User Story 21:** As a depositor, I want to deposit the files that I have, so that I don't have to spend a lot of time finding the right version and converting to the right format.

**Requirements:**

- Requirement 1: The system shall allow Depositors to upload files in a variety of commonly used formats without requiring manual conversion.
  - o Requirement 1: Functional
- Requirement 2: The system shall automatically detect the format of deposited files and validate their compatibility with repository standards.
  - o Requirement 2: Functional
- Requirement 3: The system shall allow Depositors to upload multiple files at once through a bulk upload feature.
  - o Requirement 3: Functional
- Requirement 4: The system shall provide immediate feedback to Depositors if a file is incompatible, including suggestions for acceptable formats.
  - o Requirement 4: Functional
- Requirement 5: The system shall complete file upload processing within 2 minutes for files up to 500MB in size under normal network conditions.

- Requirement 5: Non-Functional
- Requirement 6: The system shall store all deposited files securely with version control to manage multiple submissions of the same document.
  - Requirement 6: Non-Functional

**User Story 22:** As a Research Information manager, I want to track citation counts for published datasets, so that impact of datasets within academia can be demonstrated.

**Requirements:**

- Requirement 1: The system shall track citation counts for each published dataset by integrating with citation indexing services.
  - Requirement 1: Functional
- Requirement 2: The system shall display current citation counts alongside each published dataset's metadata record.
  - Requirement 2: Functional
- Requirement 3: The system shall update citation counts automatically on a scheduled basis, at least once every 24 hours.
  - Requirement 3: Functional
- Requirement 4: The system shall allow Research Information Managers to export citation count reports for individual datasets or groups of datasets.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that citation tracking operates with 99% accuracy, accounting for dataset DOIs and metadata consistency.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall store historical citation counts to allow tracking of growth trends over time.
  - Requirement 6: Functional

**User Story 23:** As a legal officer, I want to know about data sensitivity, so that I can establish sharing options.

### **Requirements:**

- Requirement 1: The system shall allow Legal Officers to view sensitivity classifications assigned to each dataset (e.g., public, restricted, confidential).
  - Requirement 1: Functional
- Requirement 2: The system shall provide metadata fields for datasets that include sensitivity level and rationale for classification.
  - Requirement 2: Functional
- Requirement 3: The system shall allow Legal Officers to generate reports listing datasets grouped by sensitivity level.
  - Requirement 3: Functional
- Requirement 4: The system shall enforce role-based access control to ensure only authorized users can view or edit sensitivity classifications.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall display sensitivity information within 2 seconds of accessing dataset metadata.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall log all changes to dataset sensitivity classifications for auditing purposes.
  - Requirement 6: Functional

**User Story 24:** As a data manager, I want to plan the anonymization of data, so that we protect the privacy of the people participating in the research as good as possible and still ensure reusability of data.

### **Requirements:**

- Requirement 1: The system shall allow Data Managers to define an anonymization plan for each dataset before publication or sharing.
  - Requirement 1: Functional
- Requirement 2: The system shall provide options for different anonymization techniques, such as pseudonymization, data masking, and generalization.
  - Requirement 2: Functional

- Requirement 3: The system shall allow Data Managers to document the specific fields and methods applied during anonymization for future reference.
  - o Requirement 3: Functional
- Requirement 4: The system shall enforce a review and approval step before anonymized datasets are released for reuse.
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure that anonymization processes maintain a balance between privacy protection and data utility, with compliance thresholds configurable by administrators.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall log all anonymization actions and maintain an audit trail for compliance verification.
  - o Requirement 6: Non-Functional

**User Story 25:** As a sponsor, I want to personalize my sponsorship page, so that I can promote my brand.

**Requirements:**

- Requirement 1: The system shall allow Sponsors to upload a company logo and display it prominently on their sponsorship page.
  - o Requirement 1: Functional
- Requirement 2: The system shall allow Sponsors to customize the sponsorship page header, tagline, and description text.
  - o Requirement 2: Functional
- Requirement 3: The system shall allow Sponsors to select and apply a color scheme that aligns with their brand guidelines.
  - o Requirement 3: Functional
- Requirement 4: The system shall enable Sponsors to add links to their official website and social media accounts on the sponsorship page.
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure that all personalized sponsorship pages load completely within 3 seconds under normal network conditions.

- Requirement 5: Non-Functional
- Requirement 6: The system shall store all branding assets securely and maintain high image resolution across different devices and screen sizes.
  - Requirement 6: Non-Functional

**User Story 26:** As a UI designer, I want to redesign the Resources page, so that it matches the new Broker design styles.

**Requirements:**

- Requirement 1: The system shall allow UI Designers to edit the layout, typography, and color scheme of the Resources page to match the new Broker design styles.
  - Requirement 1: Functional
- Requirement 2: The system shall enforce consistency by providing a style guide reference linked to the Broker design standards.
  - Requirement 2: Functional
- Requirement 3: The system shall allow UI Designers to preview changes to the Resources page before publishing them live.
  - Requirement 3: Functional
- Requirement 4: The system shall ensure that the redesigned Resources page maintains full responsiveness across desktop, tablet, and mobile devices.
  - Requirement 4: Functional
- Requirement 5: The system shall load all visual elements of the redesigned Resources page within 2 seconds under normal network conditions.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall provide version control functionality to allow rollback to previous designs if needed.
  - Requirement 6: Non-Functional

**User Story 27:** As a Developer , I want to clarify to users what exactly is triggering the CFDA error code in each case.

**Requirements:**

- Requirement 1: The system shall display a specific error message next to each CFDA error code explaining the exact cause of the error.
  - o Requirement 1: Functional
- Requirement 2: The system shall provide a detailed tooltip or pop-up explanation when users hover over or click the CFDA error code.
  - o Requirement 2: Functional
- Requirement 3: The system shall maintain a centralized error code library that maps each CFDA error code to its corresponding cause and explanation.
  - o Requirement 3: Functional
- Requirement 4: The system shall allow Developers to update or add new error explanations without requiring a full system release.
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure that error explanations load within 1 second when triggered by user interaction.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall ensure that all CFDA error messages and explanations are written in clear, non-technical language understandable by general users.
  - o Requirement 6: Non-Functional

**User Story 28:** As a broker team member, I want to make some updates to the SQL codes for clarity

**Requirements:**

- Requirement 1: The system shall allow Broker Team Members to access and edit existing SQL code scripts stored in the system repository.
  - o Requirement 1: Functional
- Requirement 2: The system shall provide version control to track and document changes made to SQL scripts for clarity improvements.
  - o Requirement 2: Functional

- Requirement 3: The system shall allow Broker Team Members to add comments within SQL scripts to explain query logic and decision points.
  - o Requirement 3: Functional
- Requirement 4: The system shall require validation checks to ensure edited SQL scripts maintain syntactic and execution integrity before they are saved.
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure that updates to SQL code are reflected in the environment within 5 minutes after successful validation and save.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall maintain secure access controls to limit SQL script editing to authorized Broker Team Members only.
  - o Requirement 6: Non-Functional

**User Story 29:** As a Staff member, I want to Schedule a Meeting, so that I can bring the required parties together at a specific date/time to address an issue.

**Requirements:**

- Requirement 1: The system shall allow Staff Members to create a meeting invitation specifying the date, time, location, and purpose.
  - o Requirement 1: Functional
- Requirement 2: The system shall allow Staff Members to select and invite required participants from an internal directory.
  - o Requirement 2: Functional
- Requirement 3: The system shall send automated email notifications to all invited participants once a meeting is scheduled.
  - o Requirement 3: Functional
- Requirement 4: The system shall allow Staff Members to view, update, or cancel scheduled meetings through a calendar interface.
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure meeting invitations are delivered to participants within 1 minute after scheduling.
  - o Requirement 5: Non-Functional

- Requirement 6: The system shall maintain secure access to scheduling features to prevent unauthorized users from creating or modifying meetings.
  - o Requirement 6: Non-Functional

**User Story 30:** As a Staff member, I want to Manage Hearing Calendars, so that I can track hearing-related activities and due dates

**Requirements:**

- Requirement 1: The system shall allow staff members to create new hearing calendar entries with fields for date, time, case number, location, and participants.
  - o Requirement 1: Functional
- Requirement 2: The system shall send automated reminders to staff members 24 hours and 1 hour before each scheduled hearing.
  - o Requirement 2: Functional
- Requirement 3: The system shall allow staff members to view, edit, or delete hearing calendar entries based on their user permissions.
  - o Requirement 3: Functional
- Requirement 4: The system shall display a monthly calendar view with color-coded indicators for different hearing statuses (e.g., upcoming, completed, canceled).
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure calendar data is synchronized across all devices within 5 seconds of any update.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall log all calendar modifications for audit purposes, including timestamp and user ID.
  - o Requirement 6: Non-Functional

**User Story 31:** As a Development Staff member, I want to Issue a Development-related Permit, so that I can grant the request to the Applicant to begin work.

### **Requirements:**

- Requirement 1: The system shall allow Development Staff Members to review and approve permit applications submitted by Applicants.
  - Requirement 1: Functional
- Requirement 2: The system shall allow Development Staff Members to issue a development-related permit upon approval, linking it to the specific application.
  - Requirement 2: Functional
- Requirement 3: The system shall generate a unique permit number and official document for each issued permit.
  - Requirement 3: Functional
- Requirement 4: The system shall send an automated notification to the Applicant once the permit is issued and available for download.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that permits are issued and available to Applicants within 5 minutes of staff approval.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall maintain secure storage and audit logs of all issued permits for compliance and record-keeping purposes.
  - Requirement 6: Non-Functional

**User Story 32:** As an Enforcement Staff member, I want to Issue a Notice of Violation, so that I can provide formal communication to the responsible party.

### **Requirements:**

- Requirement 1: The system shall allow Enforcement Staff Members to create and issue a formal Notice of Violation to a responsible party.
  - Requirement 1: Functional

- Requirement 2: The system shall allow Enforcement Staff Members to input violation details, including violation type, description, and corrective actions required.
  - Requirement 2: Functional
- Requirement 3: The system shall generate a unique notice number for each issued Notice of Violation.
  - Requirement 3: Functional
- Requirement 4: The system shall automatically send a copy of the issued Notice of Violation to the responsible party via email or physical mail, based on contact preferences.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that the Notice of Violation document is generated and sent within 5 minutes of submission.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall store all issued Notices of Violation securely and maintain a full audit trail for compliance and legal reference.
  - Requirement 6: Non-Functional

**User Story 33:** As an API User, I want to be able to persistently store visualisation state in the database, So that such can be shared more easily and contribute to a visualisation gallery.

**Requirements:**

- Requirement 1: The system shall allow API Users to save the current visualization state, including filters, layouts, and selections, into the database.
  - Requirement 1: Functional
- Requirement 2: The system shall assign a unique identifier to each saved visualization state for future retrieval and sharing.
  - Requirement 2: Functional
- Requirement 3: The system shall allow API Users to retrieve and load previously saved visualization states using the assigned identifier.
  - Requirement 3: Functional

- Requirement 4: The system shall provide functionality for API Users to optionally publish saved visualization states to a public visualization gallery.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that saving or retrieving visualization states completes within 3 seconds under normal conditions.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall secure stored visualization states using appropriate access controls to protect private or unpublished visualizations.
  - Requirement 6: Non-Functional

**User Story 34:** As a Data Publishing User, I want to be able to Hide a dataset that I have already added as Public, So that I can fix my mistakes or have a dataset primarily for my own use.

**Requirements:**

- Requirement 1: The system shall allow Data Publishing Users to change the visibility status of a dataset from Public to Private through the dataset management interface.
  - Requirement 1: Functional
- Requirement 2: The system shall immediately remove a dataset from public search results and listings once its visibility is changed to Private.
  - Requirement 2: Functional
- Requirement 3: The system shall allow Data Publishing Users to edit metadata and contents of hidden datasets without restrictions.
  - Requirement 3: Functional
- Requirement 4: The system shall display a confirmation prompt before finalizing the action to hide a dataset.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that changes to dataset visibility status take effect within 2 minutes of user action.
  - Requirement 5: Non-Functional

- Requirement 6: The system shall maintain an audit log recording who changed a dataset's visibility and when the change occurred.
  - o Requirement 6: Non-Functional

**User Story 35:** As a Data Publishing User, I want to have a view on all the datasets I have published, So that I can perform management actions on my own datasets.

**Requirements:**

- Requirement 1: The system shall provide Data Publishing Users with a personalized dashboard listing all datasets they have published.
  - o Requirement 1: Functional
- Requirement 2: The system shall display key dataset attributes in the dashboard, including title, publication date, visibility status, and last modified date.
  - o Requirement 2: Functional
- Requirement 3: The system shall allow Data Publishing Users to filter and sort their list of datasets by attributes such as date, title, or status.
  - o Requirement 3: Functional
- Requirement 4: The system shall allow Data Publishing Users to perform management actions such as edit, hide, delete, or update metadata directly from the dashboard.
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure that the dataset dashboard loads and displays all relevant information within 3 seconds under normal conditions.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall protect access to each user's dataset dashboard through authentication to ensure users can only manage their own datasets.
  - o Requirement 6: Non-Functional

**User Story 36:** As an API user, I want to be able to change the colors of the embedded visualisations in my own platform, So that I can customize the visualisations.

### **Requirements:**

- Requirement 1: The system shall allow API Users to specify custom color schemes for embedded visualizations through API parameters or configuration settings.
  - Requirement 1: Functional
- Requirement 2: The system shall support color customization for chart elements such as bars, lines, backgrounds, and labels.
  - Requirement 2: Functional
- Requirement 3: The system shall apply the specified color scheme dynamically when the visualization is loaded on the user's platform.
  - Requirement 3: Functional
- Requirement 4: The system shall provide a default color scheme if no custom colors are specified by the API User.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that applying custom colors does not increase the visualization's load time by more than 1 second.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall validate color input formats (e.g., HEX, RGB) to ensure proper rendering of custom colors.
  - Requirement 6: Non-Functional

**User Story 37:** As a site visitor, I want to read a new article on the front page about once a week, so that I am up on all the latest happenings.

### **Requirements:**

- Requirement 1: The system shall display newly published articles prominently on the front page.
  - Requirement 1: Functional
- Requirement 2: The system shall ensure that at least one new article is published and featured on the front page every week.
  - Requirement 2: Functional

- Requirement 3: The system shall provide automatic archiving of older articles while keeping the most recent content visible on the front page.
  - Requirement 3: Functional
- Requirement 4: The system shall timestamp each article to show its publication date to the site visitors.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that the front page loads all featured articles within 3 seconds under normal network conditions.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall maintain high availability (99.9% uptime) to ensure site visitors can access the latest articles at any time.
  - Requirement 6: Non-Functional

**User Story 38:** As a site visitor, I want to do a full-text search of article body, title, and author name, so that I can find what I want.

**Requirements:**

- Requirement 1: The system shall allow site visitors to perform full-text search queries across article body content, titles, and author names.
  - Requirement 1: Functional
- Requirement 2: The system shall return search results ranked by relevance to the user's query.
  - Requirement 2: Functional
- Requirement 3: The system shall highlight matching keywords in the search results for better visibility
  - Requirement 3: Functional
- Requirement 4: The system shall provide filters to refine search results by publication date, category, or author.
  - Requirement 4: Functional
- Requirement 5: The system shall return search results within 2 seconds for queries under normal load conditions.
  - Requirement 5: Non-Functional

- Requirement 6: The system shall support typo-tolerance to account for minor spelling errors in user search queries.
  - o Requirement 6: Non-Functional

**User Story 39:** As a site editor, I want to edit the content of the email automatically sent to new Certified Scrum Masters and Product Owners, so that I don't need to involve a programmer on simple email edits.

**Requirements:**

- Requirement 1: The system shall allow Site Editors to access and edit the email templates used for communication with newly certified Scrum Masters and Product Owners.
  - o Requirement 1: Functional
- Requirement 2: The system shall provide a rich-text editor to modify email content, including text formatting, links, and placeholders for dynamic fields (e.g., name, certification date).
  - o Requirement 2: Functional
- Requirement 3: The system shall allow Site Editors to preview the email before saving and activating changes.
  - o Requirement 3: Functional
- Requirement 4: The system shall automatically apply the updated email content without requiring programming or backend deployment.
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure that email content changes are reflected in outgoing communications within 5 minutes of being saved.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall maintain version history for all email template edits to allow rollback if necessary.
  - o Requirement 6: Non-Functional

**User Story 40:** As a moderator, I want to export a transcript of a game as a HTML file, so that I can save the stories and estimates locally.

### **Requirements:**

- Requirement 1: The system shall allow Moderators to export the full transcript of a game session, including stories and estimates, into an HTML file format.
  - o Requirement 1: Functional
- Requirement 2: The system shall provide an option to customize the file name and download location when exporting the HTML file.
  - o Requirement 2: Functional
- Requirement 3: The system shall ensure that the exported HTML file preserves the structure and formatting of the game transcript.
  - o Requirement 3: Functional
- Requirement 4: The system shall allow Moderators to include optional metadata (e.g., game date, participant list) in the exported file.
  - o Requirement 4: Functional
- Requirement 5: The system shall complete the export process and make the HTML file available for download within 10 seconds for standard session sizes.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall ensure that the exported HTML file is compatible with major web browsers for easy local viewing.
  - o Requirement 6: Non-Functional

**User Story 41:** As an estimator, I want to see all items we will try to estimate this session, so that I have a feel for the sizes of the various items.

### **Requirements:**

- Requirement 1: The system shall display a list of all items scheduled for estimation at the beginning of each session.
  - o Requirement 1: Functional
- Requirement 2: The system shall present key details for each item, including title, description, and any available supporting information.
  - o Requirement 2: Functional

- Requirement 3: The system shall allow Estimators to view the list of items in a scrollable and searchable format.
  - o Requirement 3: Functional
- Requirement 4: The system shall allow Estimators to sort or group items by categories such as priority, complexity, or topic.
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure the complete list of items loads within 3 seconds after session start.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall maintain session state so that Estimators can revisit the item list at any point during the session without data loss.
  - o Requirement 6: Non-Functional

**User Story 42:** As a participant, I want to always have the cards in the same order across multiple draws, so that it's easy to compare estimates.

**Requirements:**

- Requirement 1: The system shall present the set of estimation cards in a consistent, predefined order across multiple draws during a session.
  - o Requirement 1: Functional
- Requirement 2: The system shall store the initial card order at the start of the session and use it for all subsequent draws.
  - o Requirement 2: Functional
- Requirement 3: The system shall allow Administrators to define or modify the default card order before the session begins.
  - o Requirement 3: Functional
- Requirement 4: The system shall ensure that all participants in the same session see the cards displayed in identical order.
  - o Requirement 4: Functional
- Requirement 5: The system shall maintain consistent card order performance without additional load time, ensuring rendering within 2 seconds.
  - o Requirement 5: Non-Functional

- Requirement 6: The system shall log any changes to card order settings for traceability and auditing purposes.
  - o Requirement 6: Non-Functional

**User Story 43:** As a collection curator, I want to lift an embargo for an object in a simple way.

**Requirements:**

- Requirement 1: The system shall allow Collection Curators to view a list of objects currently under embargo.
  - o Requirement 1: Functional
- Requirement 2: The system shall provide a simple user interface option, such as a button or toggle, to lift the embargo on a selected object.
  - o Requirement 2: Functional
- Requirement 3: The system shall require a confirmation step before permanently lifting an embargo to prevent accidental actions.
  - o Requirement 3: Functional
- Requirement 4: The system shall automatically update the object's status to "Public" immediately after the embargo is lifted.
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure that lifting an embargo takes effect within 1 minute after confirmation.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall log embargo lift actions with timestamps and curator user information for auditing purposes.
  - o Requirement 6: Non-Functional

**User Story 44:** As a repoadmin, I want to have the license be recorded in metadata and displayed alongside the item.

### **Requirements:**

- Requirement 1: The system shall allow Repo Administrators to record a license selection as part of an item's metadata during upload or editing.
  - Requirement 1: Functional
- Requirement 2: The system shall support multiple standardized license types, including but not limited to Creative Commons and Open Data licenses.
  - Requirement 2: Functional
- Requirement 3: The system shall display the recorded license information prominently alongside the item's title and description on the item detail page.
  - Requirement 3: Functional
- Requirement 4: The system shall allow users to click on the license name to view the full license text or external license terms.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that license metadata is saved and retrievable within 2 seconds after submission.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall validate license metadata against an approved list to ensure data consistency and prevent errors.
  - Requirement 6: Non-Functional

**User Story 45:** As a collection curator, I want to have a tool to perform author authority control.

### **Requirements:**

- Requirement 1: The system shall provide a tool that allows Collection Curators to view and manage author names and related authority records.
  - Requirement 1: Functional
- Requirement 2: The system shall allow Collection Curators to merge duplicate author records based on predefined matching criteria (e.g., name, date of birth).
  - Requirement 2: Functional
- Requirement 3: The system shall provide an option for Collection Curators to manually edit author records to correct inaccuracies or incomplete information.

- Requirement 3: Functional
- Requirement 4: The system shall integrate with external authority control databases (e.g., VIAF, ISNI) to automatically validate and update author records.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that changes to author records are logged with timestamps and curator user identifiers for audit and tracking purposes.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall provide a search feature to quickly locate authors and their associated records by name, identifier, or other metadata fields.
  - Requirement 6: Functional

**User Story 46:** As a depositor, I want to get feedback post-ingest alerting me if files I submitted do not conform to their format specifications, if they are not valid, or if they are not wellformed.

**Requirements:**

- Requirement 1: The system shall send a feedback notification to the Depositor after file ingestion, detailing any issues related to format specification, file validity, or structure.
  - Requirement 1: Functional
- Requirement 2: The system shall include specific error messages in the feedback notification that describe the nature of any issues found in the submitted files (e.g., incorrect format, invalid content, or malformed structure).
  - Requirement 2: Functional
- Requirement 3: The system shall allow Depositors to access a detailed report outlining the specific areas of non-conformance or errors in the submitted files.
  - Requirement 3: Functional

- Requirement 4: The system shall provide an option for Depositors to receive feedback alerts via email, SMS, or within the system interface based on their preference.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that the feedback notification is sent within 5 minutes of file ingestion processing completion.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall log all issues related to file submissions for auditing and troubleshooting purposes, including timestamps and error details.
  - Requirement 6: Non-Functional

**User Story 47:** As a user, I want to revert to an older version of an uploaded file.

**Requirements:**

- Requirement 1: The system shall allow users to view a history of all previously uploaded versions of a file.
  - Requirement 1: Functional
- Requirement 2: The system shall allow users to select and revert to any previous version of an uploaded file with a single action.
  - Requirement 2: Functional
- Requirement 3: The system shall notify users upon successful reversion to an older file version and provide details of the change.
  - Requirement 3: Functional
- Requirement 4: The system shall ensure that reverted versions are immediately accessible and replace the current version for future use.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that reverting to a previous version does not overwrite or permanently delete the original file version unless explicitly confirmed by the user.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall maintain a versioning log to track each file change, including version numbers, timestamps, and user identifiers.

- Requirement 6: Non-Functional

**User Story 48:** As a user, I want to filter the files I get from search results based on their type.

**Requirements:**

- Requirement 1: The system shall provide a filter option that allows users to select file types (e.g., PDF, DOCX, CSV) from search results.
  - Requirement 1: Functional
- Requirement 2: The system shall apply the selected file type filter dynamically to refine search results based on user preferences.
  - Requirement 2: Functional
- Requirement 3: The system shall allow users to apply multiple filters, including file type, date, and size, simultaneously for more granular search results.
  - Requirement 3: Functional
- Requirement 4: The system shall display the available file types in a dropdown or checkbox list, making it easy for users to select their desired filter.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that filtered search results are displayed within 2 seconds after the user applies the filter.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall allow users to reset all filters to the default state with a single action to easily start a new search.
  - Requirement 6: Non-Functional

**User Story 49:** As a researcher, I want to upload files prior to having them attached to a log book page.

**Requirements:**

- Requirement 1: The system shall allow researchers to upload files without requiring them to immediately attach the files to a log book page.
  - Requirement 1: Functional

- Requirement 2: The system shall store uploaded files in a temporary holding area, pending attachment to a log book page.
  - Requirement 2: Functional
- Requirement 3: The system shall allow researchers to review and edit file details (e.g., name, description) before attaching the files to a log book page.
  - Requirement 3: Functional
- Requirement 4: The system shall allow researchers to attach uploaded files to a log book page at any time after the upload.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that uploaded files are stored securely and comply with privacy and data protection standards.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall allow researchers to view a list of all uploaded files and their status (e.g., pending, attached) from the upload interface.
  - Requirement 6: Functional

**User Story 50:** As a researcher, I want to have the ability to locate and access data that colleagues want to share.

**Requirements:**

- Requirement 1: The system shall allow researchers to search for data shared by colleagues using keywords, categories, or other metadata.
  - Requirement 1: Functional
- Requirement 2: The system shall display search results in an organized and easy-to-navigate format, including metadata details (e.g., title, author, date shared).
  - Requirement 2: Functional
- Requirement 3: The system shall allow researchers to filter search results based on parameters such as data type, date range, or sharing permissions.
  - Requirement 3: Functional
- Requirement 4: The system shall ensure that shared data is accessible to authorized researchers based on their permissions and roles.

- Requirement 4: Functional
- Requirement 5: The system shall notify researchers when new data is shared by colleagues, with a link to the shared data.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall ensure that shared data is available for access within 1 minute of being uploaded by colleagues.
  - Requirement 6: Non-Functional



## APPENDIX BB

### GEMINI TEST RESULTS WITH PROMPT PATTERN

In this section, Gemini will convert the given prompt patterns and user stories into requirements.

**User Story 1:** As an Agency user, I want to accurately see who created a submission, so that I'm not confused about who last updated a submission.

#### Requirements:

- Requirement 1: The system shall display the username of the user who initially created the submission.
  - o Requirement 1: Functional
- Requirement 2: The creation timestamp shall be recorded and associated with each submission.
  - o Requirement 2: Functional
- Requirement 3: The system shall present the creator's username in a clear and easily identifiable manner within the submission details view.
  - o Requirement 3: Non-Functional
- Requirement 4: The displayed creator information shall be consistently presented across all relevant views where submission details are shown to Agency users.
  - o Requirement 4: Non-Functional
- Requirement 5: The system shall ensure that the creator information is accurately associated with the submission and remains unchanged throughout the submission lifecycle.
  - o Requirement 5: Non-Functional
- Requirement 6: Agency users shall be able to readily locate the creator's username without requiring additional navigation or complex actions within the user interface.

- Requirement 6: Non-Functional

**User Story 2:** As an Agency user, I want the header information box to show updated date AND time, so that I know when it was updated.

**Requirements:**

- Requirement 1: The header information box shall display the date of the last update to the submission.
  - Requirement 1: Functional
- Requirement 2: The header information box shall display the time of the last update to the submission.
  - Requirement 2: Functional
- Requirement 3: The date and time of the last update shall be automatically updated whenever a modification is made to the submission.
  - Requirement 3: Functional
- Requirement 4: The format of the displayed date and time shall be consistent across all submissions viewed by Agency users.
  - Requirement 4: Non-Functional
- Requirement 5: The updated date and time shall be clearly visible within the header information box without requiring any user interaction (e.g., hovering or clicking).
  - Requirement 5: Non-Functional
- Requirement 6: The system shall accurately record and present the timestamp of the last update with a granularity down to the minute.
  - Requirement 6: Non-Functional

**User Story 3:** As a Plan Review Staff member, I want to successfully Conduct a Plan Review Meeting with the Applicant and record the outcome, so that I can listen to it again.

### **Requirements:**

- Requirement 1: The system shall provide functionality for Plan Review Staff to initiate and conduct a Plan Review Meeting with an Applicant.
  - o Requirement 1: Functional
- Requirement 2: The system shall allow Plan Review Staff to record the audio of the Plan Review Meeting.
  - o Requirement 2: Functional
- Requirement 3: The recorded audio of the Plan Review Meeting shall be stored and associated with the specific plan review record.
  - o Requirement 3: Functional
- Requirement 4: Plan Review Staff shall be able to access and play back the recorded audio of the Plan Review Meeting at a later time.
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure the recorded audio is of sufficient quality to clearly capture the discussion during the Plan Review Meeting.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall provide secure storage of the recorded audio, accessible only to authorized Plan Review Staff associated with the relevant plan review.
  - o Requirement 6: Non-Functional

**User Story 4:** As a Public User, I want to Search for Information, so that I can obtain publicly available information concerning properties, County services, processes and other general information.

### **Requirements:**

- Requirement 1: The system shall provide a search interface that allows Public Users to enter search terms.
  - o Requirement 1: Functional
- Requirement 2: The system shall retrieve and display publicly available information relevant to the Public User's search query.
  - o Requirement 2: Functional

- Requirement 3: The search functionality shall support keyword-based searches across various categories of public information (properties, services, processes, general information).
  - o Requirement 3: Functional
- Requirement 4: The system shall present search results in a clear, organized, and easily navigable format for Public Users.
  - o Requirement 4: Non-Functional
- Requirement 5: The search functionality shall provide a reasonable response time, ensuring Public Users can quickly access the desired information.
  - o Requirement 5: Non- Functional
- Requirement 6: The system shall ensure that only publicly available information is accessible through the search functionality for Public Users.
  - o Requirement 6: Non-Functional

**User Story 5:** As a user, I want to view user documentation for the website, so that I know how to use the web app.

**Requirements:**

- Requirement 1: The system shall provide a clearly labeled link or section for accessing user documentation.
  - o Requirement 1: Functional
- Requirement 2: The user documentation shall provide comprehensive information on the features and functionality of the web application.
  - o Requirement 2: Functional
- Requirement 3: The user documentation shall be easily navigable, allowing users to quickly find the information they need.
  - o Requirement 3: Non-Functional
- Requirement 4: The user documentation shall be accessible to all users of the web application.
  - o Requirement 4: Non-Functional
- Requirement 5: The user documentation shall be regularly updated to reflect any changes or additions to the web application's functionality.

- Requirement 5: Non-Functional
- Requirement 5: The user documentation shall be presented in a clear, concise, and easy-to-understand language.
  - Requirement 5: Non-Functional

**User Story 6:** As an admin, I want to be able to block specific users based on IP address, so that I can prevent spamming on the websites.

**Requirements:**

- Requirement 1: The system shall allow administrators to input and store a list of IP addresses to be blocked.
  - Requirement 1: Functional
- Requirement 2: The system shall prevent users with IP addresses on the block list from performing actions that could be considered spamming (e.g., posting comments, submitting forms).
  - Requirement 2: Functional
- Requirement 3: The system shall provide administrators with a clear interface to view, add, and remove IP addresses from the block list.
  - Requirement 3: Functional
- Requirement 4: The system shall maintain the block list persistently.
  - Requirement 4: Functional
- Requirement 5: The system's blocking mechanism should have minimal impact on the performance and responsiveness for non-blocked users.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall provide administrators with a log or audit trail of when IP addresses were added or removed from the block list.
  - Requirement 6: Non-Functional

**User Story 7:** As an Inspector, I want to Conduct Inspections, so that I can validate Customer compliance with code and regulations and provide results of the inspection to the Customer.

### **Requirements:**

- Requirement 1: The system shall allow Inspectors to record details of an inspection, including the date, time, location, and applicable codes/regulations.
  - o Requirement 1: Functional
- Requirement 2: The system shall enable Inspectors to document findings and observations related to compliance during an inspection.
  - o Requirement 2: Functional
- Requirement 3: The system shall allow Inspectors to record the overall compliance status (e.g., compliant, non-compliant) for a given inspection.
  - o Requirement 3: Functional
- Requirement 4: The system shall generate an inspection report that can be provided to the Customer, summarizing the findings and compliance status.
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure that inspection data and reports are securely stored and accessible to authorized Inspectors and Customers.
  - o Requirement 5: Non-Functional
- Requirement 6: The system should allow Inspectors to easily associate specific findings with the relevant code or regulation being inspected.
  - o Requirement 6: Functional

**User Story 8:** As an admin, I want to be able to communicate directly with facilities, so that I can keep them updated about features we have on our website.

### **Requirements:**

- Requirement 1: The system shall provide administrators with the ability to send messages to specific facilities.
  - o Requirement 1: Functional
- Requirement 2: The system shall allow administrators to send broadcast messages to multiple or all facilities.
  - o Requirement 2: Functional
- Requirement 3: The system shall record and store all communications sent by administrators to facilities

- Requirement 3: Functional
- Requirement 4: The system shall provide a mechanism for administrators to view the communication history with each facility.
  - Requirement 4: Functional
- Requirement 5: The communication system shall ensure reliable delivery of messages to the intended facilities.
  - Requirement 5: Non-Functional
- Requirement 6: The system should provide administrators with options for formatting messages (e.g., plain text, basic styling).
  - Requirement 6: Functional

**User Story 9:** As a Data Consuming User, I want to be able to search any dataset published and publicly accessible by their title and metadata, So that I can find the datasets I'm interested in.

**Requirements:**

- Requirement 1: The system shall provide a search interface for Data Consuming Users to input search terms.
  - Requirement 1: Functional
- Requirement 2: The system shall allow searching of dataset titles
  - Requirement 2: Functional
- Requirement 3: The system shall allow searching of dataset metadata.
  - Requirement 3: Functional
- Requirement 4: The system shall display a list of publicly accessible datasets that match the Data Consuming User's search criteria.
  - Requirement 4: Functional
- Requirement 5: The search functionality shall provide a reasonable response time for displaying search results.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall ensure that only published and publicly accessible datasets are included in the search results for Data Consuming Users.

- Requirement 6: Non-Functional

**User Story 10:** As a Platform administrator, I want to be able to translate the data types hierarchies of the Viewer while in embed mode, So that my users can understand the interface in their native language.

**Requirements:**

- Requirement 1: The system shall provide Platform administrators with an interface to input translations for data type labels within the embedded Viewer.
  - Requirement 1: Functional
- Requirement 2: The system shall allow Platform administrators to specify translations for the hierarchical structure of data types in the embedded Viewer.
  - Requirement 2: Functional
- Requirement 3: The embedded Viewer shall detect the user's preferred language (if available) and display the translated data type hierarchies accordingly.
  - Requirement 3: Functional
- Requirement 4: Platform administrators shall be able to manage translations for multiple languages within the system.
  - Requirement 4: Non-Functional
- Requirement 5: The translation process should not negatively impact the performance or loading time of the embedded Viewer.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall ensure that the translations of the data type hierarchies are accurately and consistently applied within the embedded Viewer interface.
  - Requirement 6: Functional

**User Story 11:** As a Data Consuming User, I want to be able to filter, sort and aggregate data by multiple dimensions and measures, So that I can get more granular views on the data.

### **Requirements:**

- Requirement 1: The system shall allow Data Consuming Users to apply filters to data based on multiple selected dimensions and measures.
  - Requirement 1: Functional
- Requirement 2: The system shall enable Data Consuming Users to sort data based on multiple selected dimensions and measures in ascending or descending order.
  - Requirement 2: Functional
- Requirement 3: The system shall provide functionality for Data Consuming Users to aggregate data using various functions (e.g., sum, average, count, min, max) across multiple selected dimensions and measures.
  - Requirement 3: Functional
- Requirement 4: The system shall present the filtered, sorted, and aggregated data in a clear and understandable format (e.g., tables, charts).
  - Requirement 4: Non-Functional
- Requirement 5: The system should provide a responsive performance when filtering, sorting, and aggregating data, even with large datasets.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall allow Data Consuming Users to combine filtering, sorting, and aggregation operations simultaneously on the data.
  - Requirement 6: Functional

**User Story 12:** As a Publisher, I want to embed an interactive preview of my data on my site, so that users can be encouraged that this is the correct data for them.

### **Requirements:**

- Requirement 1: The system shall allow Publishers to generate an embeddable code snippet for a data preview.
  - Requirement 1: Functional
- Requirement 2: The embedded data preview shall display a subset or summary of the complete dataset.
  - Requirement 2: Functional

- Requirement 3: The embedded data preview shall allow for basic user interaction (e.g., filtering, sorting, basic visualization).
  - Requirement 3: Functional
- Requirement 4: The embedded data preview should be visually appealing and consistent with the Publisher's website design.
  - Requirement 4: Non-Functional
- Requirement 5: The loading time of the embedded data preview should be minimal to ensure a good user experience.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall ensure that the embedded preview clearly indicates that it is a preview and not the full dataset, with a clear pathway to access the complete data.
  - Requirement 6: Non-Functional

**User Story 13:** As a Publisher, I want to know how many users have previewed a dataset, so that I know how interest in a dataset relates to its actual download numbers.

**Requirements:**

- Requirement 1: The system shall track and record each instance of a dataset preview being viewed by a user.
  - Requirement 1: Functional
- Requirement 2: The system shall provide Publishers with a view displaying the total number of unique users who have previewed each of their datasets.
  - Requirement 2: Functional
- Requirement 3: The system shall present the preview count for each dataset in a clear and easily accessible manner within the Publisher's dashboard or data management interface.
  - Requirement 3: Non-Functional
- Requirement 4: The system shall ensure that preview counts are updated in near real-time or within a defined acceptable delay.
  - Requirement 4: Non-Functional

- Requirement 5: The system shall differentiate between unique previews, ensuring that multiple views of the same preview by the same user are only counted once.
  - Requirement 5: Functional
- Requirement 6: The system should allow Publishers to view the preview counts for a specified time period (e.g., last week, last month, all time).
  - Requirement 5: Functional

**User Story 14:** As a site editor, I want to assign priority numbers to news items, so that I can indicate which articles I want featured most prominently on the site.

**Requirements:**

- Requirement 1: The system shall allow site editors to assign a numerical priority value to each news item.
  - Requirement 1: Functional
- Requirement 2: The system shall store the assigned priority number for each news item.
  - Requirement 2: Functional
- Requirement 3: The system shall display news items on the site based on their assigned priority number, with lower numbers indicating higher priority.
  - Requirement 3: Functional
- Requirement 4: The site editor interface shall provide a clear and intuitive way to view and modify the priority number of news items.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall ensure that the priority assignment mechanism is applied consistently across all relevant sections of the website where news items are featured.
  - Requirement 5: Non-Functional
- Requirement 6: The system should allow site editors to define the range of acceptable priority numbers (e.g., 1 to 10, with 1 being the highest).
  - Requirement 6: Functional

**User Story 15:** As a trainer, I want to update one of my existing courses or events, so that it reflects accurate information.

**Requirements:**

- Requirement 1: The system shall allow trainers to modify the details of their existing courses or events.
  - o Requirement 1: Functional
- Requirement 2: The system shall provide trainers with an interface to edit various attributes of a course or event (e.g., title, description, schedule, content).
  - o Requirement 2: Functional
- Requirement 3: The system shall save the changes made by the trainer to the course or event information.
  - o Requirement 3: Functional
- Requirement 4: The system shall ensure that only authorized trainers can update their own courses or events.
  - o Requirement 4: Non-Functional
- Requirement 5: The system should provide a mechanism to track the history of updates made to a course or event.
  - o Requirement 5: Functional
- Requirement 6: The system should provide trainers with a preview of the updated course or event information before it is made live.
  - o Requirement 6: Functional

**User Story 16:** As a site visitor, I want to have an advanced search option that lets me fill in a form of search criteria, so that I can quickly find what I am looking for.

**Requirements:**

- Requirement 1: The system shall provide a clearly labeled "Advanced Search" option accessible to site visitors.
  - o Requirement 1: Functional

- Requirement 2: The advanced search option shall present a form with multiple fields allowing site visitors to specify various search criteria.
  - o Requirement 2: Functional
- Requirement 3: The system shall support searching based on a combination of the criteria provided in the advanced search form.
  - o Requirement 3: Functional
- Requirement 4: The advanced search form shall include relevant and commonly used search criteria for the website's content.
  - o Requirement 4: Functional
- Requirement 5: The system shall display the results of the advanced search in a clear and organized manner.
  - o Requirement 5: Non-Functional
- Requirement 6: The advanced search functionality shall provide a reasonable response time, even when multiple search criteria are specified.
  - o Requirement 6: Non-Functional

**User Story 17:** As a recruiter, I want to be able to extend an ad for another 30 days by visiting the site and updating the posting, so that my ad remains active.

shall ensure that the extended job ad is displayed correctly on the job board.

**Requirements:**

- Requirement 1: The system shall allow recruiters to access and modify their existing job advertisements.
  - o Requirement 1: Functional
- Requirement 2: The system shall provide a functionality for recruiters to extend the expiration date of a job advertisement by 30 days.
  - o Requirement 2: Functional
- Requirement 3: Upon extending an advertisement, the system shall update the advertisement's expiration date accordingly.
  - o Requirement 3: Functional
- Requirement 4: The system shall clearly indicate the current expiration date of each job advertisement to the recruiter.

- Requirement 4: Non-Functional
- Requirement 5: The system should allow recruiters to extend an advertisement multiple times, each extension adding 30 days to the current expiration date.
  - Requirement 5: Functional
- Requirement 6: The system should provide a confirmation message to the recruiter upon successfully extending the advertisement's duration.
  - Requirement 6: Non-Functional

**User Story 18:** As a user researcher, I want to test the user research plan, so that I make sure the in-person interviews are effective and capturing the right information.

**Requirements:**

- Requirement 1: The system shall allow user researchers to document a user research plan, including interview questions and protocols.
  - Requirement 1: Functional
- Requirement 2: The system shall provide a mechanism for user researchers to simulate or conduct pilot interviews based on the documented plan.
  - Requirement 2: Functional
- Requirement 3: The system shall allow user researchers to record observations and feedback during the testing of the user research plan.
  - Requirement 3: Functional
- Requirement 4: The system shall enable user researchers to analyze the data gathered during the testing phase to identify areas for improvement in the plan.
  - Requirement 4: Functional
- Requirement 5: The system should allow user researchers to iterate on the user research plan based on the testing results.
  - Requirement 5: Functional
- Requirement 6: The system should provide a structured format for documenting the user research plan, testing process, and resulting insights.
  - Requirement 6: Non-Functional

**User Story 19:** As a data manager, I want to have the description of collected data sets that are used or updated throughout the project lifecycle, so that I can ensure the descriptions are current and add detail as the study proceeds.

**Requirements:**

- Requirement 1: The system shall allow data managers to create and store descriptions for each collected dataset.
  - o Requirement 1: Functional
- Requirement 2: The system shall enable data managers to update the descriptions of datasets at any point during the project lifecycle.
  - o Requirement 2: Functional
- Requirement 3: The system shall provide a rich text editor or similar functionality for data managers to add detailed information to the dataset descriptions.
  - o Requirement 3: Functional
- Requirement 4: The system shall associate each dataset description with the corresponding dataset throughout the project lifecycle.
  - o Requirement 4: Functional
- Requirement 5: The system shall maintain a history of changes made to the dataset descriptions, including timestamps and the user who made the changes.
  - o Requirement 5: Functional
- Requirement 6: The system shall ensure that the dataset descriptions are easily accessible to data managers and other authorized users involved in the project.
  - o Requirement 6: Non-Functional

**User Story 20:** As an IT staff member, I want to know which kind of data types will be produced or collected, so that I can determine what basic support services and functionalities are required.

**Requirements:**

- Requirement 1: The system shall document all data types that will be produced by the system.

- Requirement 1: Functional
- Requirement 2: The system shall document all data types that will be collected by the system.
  - Requirement 2: Functional
- Requirement 3: The documentation of data types shall include a description of each data type, its format, and any constraints.
  - Requirement 3: Non-Functional
- Requirement 4: The system shall provide IT staff with easy access to the documented data types.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall ensure that the data type documentation is kept up-to-date throughout the project lifecycle.
  - Requirement 5: Non-Functional
- Requirement 6: The data type documentation should clearly indicate the source of produced data and the destination of collected data.
  - Requirement 6: Functional

**User Story 21:** As a depositor, I want to deposit the files that I have, so that I don't have to spend a lot of time finding the right version and converting to the right format.

**Requirements:**

- Requirement 1: The system shall allow depositors to upload multiple files for deposit.
  - Requirement 1: Functional
- Requirement 2: The system shall identify and store the version of each deposited file.
  - Requirement 2: Functional
- Requirement 3: The system shall accept common file formats for deposit.
  - Requirement 3: Functional
- Requirement 4: The system should automatically identify the format of each uploaded file.
  - Requirement 4: Functional

- Requirement 5: The system should provide depositors with clear guidance on supported file formats.
  - o Requirement 5: Non-Functional
- Requirement 6: The system should aim to minimize the need for depositors to manually convert files to specific formats prior to deposit.
  - o Requirement 6: Non-Functional

**User Story 22:** As a Research Information manager, I want to track citation counts for published datasets, so that impact of datasets within academia can be demonstrated.

**Requirements:**

- Requirement 1: The system shall automatically or allow manual input of citation information for published datasets.
  - o Requirement 1: Functional
- Requirement 2: The system shall maintain a count of citations for each published dataset.
  - o Requirement 2: Functional
- Requirement 3: The system shall display the citation count for each dataset in a clear and accessible manner to Research Information managers.
  - o Requirement 3: Non-Functional
- Requirement 4: The system should provide the ability to link to or reference the source of each citation (e.g., publication title, DOI).
  - o Requirement 4: Functional
- Requirement 5: The system should allow Research Information managers to generate reports on dataset citation metrics over specified time periods.
  - o Requirement 5: Functional
- Requirement 6: The system should periodically check for new citations of published datasets from relevant scholarly databases or sources.
  - o Requirement 6: Functional

**User Story 23:** As a legal officer, I want to know about data sensitivity, so that I can establish sharing options.

### **Requirements:**

- Requirement 1: The system shall classify each dataset based on its level of sensitivity (e.g., public, confidential, restricted).
  - o Requirement 1: Functional
- Requirement 2: The system shall clearly display the data sensitivity classification for each dataset to legal officers.
  - o Requirement 2: Non-Functional
- Requirement 3: The system shall provide a description or definition for each data sensitivity level.
  - o Requirement 3: Non-Functional
- Requirement 4: The system shall document the rules and regulations associated with sharing data at each sensitivity level.
  - o Requirement 4: Functional
- Requirement 5: The system should allow legal officers to easily access and review the data sensitivity classification and associated sharing rules for any dataset.
  - o Requirement 5: Non-Functional
- Requirement 6: The system should provide an audit trail of changes made to the data sensitivity classifications.
  - o Requirement 6: Functional

**User Story 24:** As a data manager, I want to plan the anonymization of data, so that we protect the privacy of the people participating in the research as good as possible and still ensure reusability of data.

### **Requirements:**

- Requirement 1: The system shall allow data managers to define anonymization techniques to be applied to specific data fields.
  - o Requirement 1: Functional
- Requirement 2: The system shall support various anonymization methods (e.g., pseudonymization, data masking, aggregation, suppression).
  - o Requirement 2: Functional

- Requirement 3: The system shall enable data managers to document the planned anonymization process for each dataset.
  - Requirement 3: Functional
- Requirement 4: The system should provide tools to assess the potential privacy risks and data utility implications of the planned anonymization techniques.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that the planned anonymization methods comply with relevant privacy regulations and ethical guidelines.
  - Requirement 5: Non-Functional
- Requirement 6: The system should allow data managers to preview the effect of the planned anonymization on a sample of the data.
  - Requirement 6: Functional

**User Story 25:** As a sponsor, I want to personalize my sponsorship page, so that I can promote my brand.

**Requirements:**

- Requirement 1: The system shall allow sponsors to upload their brand logo for display on their sponsorship page.
  - Requirement 1: Functional
- Requirement 2: The system shall allow sponsors to customize the text content of their sponsorship page (e.g., company description, mission statement).
  - Requirement 2: Functional
- Requirement 3: The system shall provide sponsors with options to customize the visual elements of their sponsorship page (e.g., brand colors, background images).
  - Requirement 3: Functional
- Requirement 4: The system shall allow sponsors to include links to their external websites or social media profiles on their sponsorship page.
  - Requirement 4: Functional
- Requirement 5: The system should provide sponsors with a preview of their personalized sponsorship page before it is made public.

- Requirement 5: Non-Functional
- Requirement 6: The system shall ensure that the personalization options are user-friendly and do not require advanced technical skills from the sponsors.
  - Requirement 6: Non-Functional

**User Story 26:** As a UI designer, I want to redesign the Resources page, so that it matches the new Broker design styles.

**Requirements:**

- Requirement 1: The redesigned Resources page shall visually align with the established Broker design style guide.
  - Requirement 1: Non-Functional
- Requirement 2: All user interface elements on the Resources page (e.g., buttons, forms, typography) shall be updated to reflect the Broker design system.
  - Requirement 2: Non-Functional
- Requirement 3: The layout and structure of the Resources page shall be reviewed and updated to improve user experience while adhering to Broker design principles.
  - Requirement 3: Non-Functional
- Requirement 4: The redesigned Resources page shall maintain all existing functionalities of the current page.
  - Requirement 4: Functional
- Requirement 5: The UI designer shall create mockups or prototypes of the redesigned Resources page for review and approval.
  - Requirement 5: Functional
- Requirement 6: The implementation of the redesigned Resources page shall ensure consistency with the Broker design across different screen sizes and devices.
  - Requirement 6: Non-Functional

**User Story 27:** As a Developer , I want to clarify to users what exactly is triggering the CFDA error code in each case.

### **Requirements:**

- Requirement 1: The system shall provide specific and actionable information about the cause of each CFDA error code.
  - Requirement 1: Non-Functional
- Requirement 2: For each CFDA error code, the system shall display a clear description of the triggering condition.
  - Requirement 2: Non-Functional
- Requirement 3: The error messages associated with CFDA error codes shall be presented in a user-friendly language, avoiding technical jargon.
  - Requirement 3: Non-Functional
- Requirement 4: The system should provide guidance or suggestions on how users can resolve the issue causing the CFDA error code.
  - Requirement 4: Non-Functional
- Requirement 5: The detailed explanation of the CFDA error code should be readily accessible to the user when the error occurs.
  - Requirement 5: Non-Functional
- Requirement 6: Developers shall document the specific triggers and resolutions for all CFDA error codes within the system.
  - Requirement 6: Functional

**User Story 28:** As a broker team member, I want to make some updates to the SQL codes for clarity

### **Requirements:**

- Requirement 1: The system shall allow authorized broker team members to access and modify existing SQL code.
  - Requirement 1: Functional
- Requirement 2: The system shall provide a suitable environment or interface for editing SQL code.
  - Requirement 2: Non-Functional
- Requirement 3: The updated SQL code shall maintain the existing functionality of the original code.

- Requirement 3: Functional
- Requirement 4: The system should support features that aid in code clarity, such as syntax highlighting and formatting.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall track changes made to the SQL code, including the user and timestamp of the modifications.
  - Requirement 5: Functional
- Requirement 6: The system should allow broker team members to test the updated SQL code to ensure it functions as expected.
  - Requirement 6: Functional

**User Story 29:** As a Staff member, I want to Schedule a Meeting, so that I can bring the required parties together at a specific date/time to address an issue.

**Requirements:**

- Requirement 1: The system shall allow staff members to propose a date and time for a meeting.
  - Requirement 1: Functional
- Requirement 2: The system shall allow staff members to invite other users to a scheduled meeting.
  - Requirement 2: Functional
- Requirement 3: The system shall notify invited users about the proposed meeting details (date, time, and purpose).
  - Requirement 3: Functional
- Requirement 4: The system shall allow invited users to accept or decline a meeting invitation.
  - Requirement 4: Functional
- Requirement 5: The system should provide staff members with a view of the attendees' responses to the meeting invitation.
  - Requirement 5: Functional
- Requirement 6: The system should allow staff members to specify a location or platform (e.g., physical room, video conference link) for the meeting.

- Requirement 6: Functional

**User Story 30:** As a Staff member, I want to Manage Hearing Calendars, so that I can track hearing-related activities and due dates

**Requirements:**

- Requirement 1: The system shall allow staff members to create and view hearing calendars.
  - Requirement 1: Functional
- Requirement 2: The system shall allow staff members to add hearing-related activities (e.g., scheduling, notifications, document submissions) to the calendar.
  - Requirement 2: Functional
- Requirement 3: The system shall allow staff members to set and track due dates for hearing-related activities.
  - Requirement 3: Functional
- Requirement 4: The system shall provide staff members with different calendar views (e.g., daily, weekly, monthly).
  - Requirement 4: Functional
- Requirement 5: The system should provide notifications or reminders for upcoming hearing-related activities and due dates.
  - Requirement 5: Functional
- Requirement 6: The system should allow staff members to associate specific hearings or cases with entries in the hearing calendar.
  - Requirement 6: Functional

**User Story 31:** As a Development Staff member, I want to Issue a Development-related Permit, so that I can grant the request to the Applicant to begin work.

**Requirements:**

- Requirement 1: The system shall allow Development Staff to initiate the process of issuing a development-related permit.

- Requirement 1: Functional
- Requirement 2: The system shall require Development Staff to input necessary details for the permit (e.g., applicant information, project address, permit type, conditions).
  - Requirement 2: Functional
- Requirement 3: The system shall generate a unique permit document upon successful issuance.
  - Requirement 3: Functional
- Requirement 4: The system shall record the issuance of the permit, including the issuing staff member, date, and associated application.
  - Requirement 4: Functional
- Requirement 5: The system should allow Development Staff to specify an effective date and expiration date for the issued permit.
  - Requirement 5: Functional
- Requirement 6: The system should provide a mechanism for the Applicant to access or receive the issued permit.
  - Requirement 6: Functional

**User Story 32:** As an Enforcement Staff member, I want to Issue a Notice of Violation, so that I can provide formal communication to the responsible party.

**Requirements:**

- Requirement 1: The system shall allow Enforcement Staff to initiate the process of issuing a Notice of Violation.
  - Requirement 1: Functional
- Requirement 2: The system shall require Enforcement Staff to record details of the violation, including the date, location, specific code violated, and description.
  - Requirement 2: Functional
- Requirement 3: The system shall allow Enforcement Staff to identify and associate the responsible party with the Notice of Violation.
  - Requirement 3: Functional

- Requirement 4: The system shall generate a formal Notice of Violation document containing the recorded violation details and responsible party information.
  - Requirement 4: Functional
- Requirement 5: The system should allow Enforcement Staff to specify a compliance date or required action within the Notice of Violation.
  - Requirement 5: Functional
- Requirement 6: The system should record the issuance of the Notice of Violation, including the issuing staff member and date of issuance.
  - Requirement 6: Functional

**User Story 33:** As an API User, I want to be able to persistently store visualisation state in the database, So that such can be shared more easily and contribute to a visualisation gallery.

**Requirements:**

- Requirement 1: The API shall provide an endpoint to save the current state of a visualisation to the database.
  - Requirement 1: Functional
- Requirement 2: The API request to save visualisation state shall include all necessary parameters to reconstruct the visualisation (e.g., data filters, selected layers, zoom level, applied styling).
  - Requirement 2: Functional
- Requirement 3: The system shall generate a unique identifier for each saved visualisation state.
  - Requirement 3: Functional
- Requirement 4: The API shall provide an endpoint to retrieve a saved visualisation state from the database using its unique identifier.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall ensure that saved visualisation states are stored persistently in the database.
  - Requirement 5: Functional

- Requirement 6: The API should provide mechanisms to associate metadata (e.g., title, description, tags) with each saved visualisation state to facilitate sharing and gallery contribution.
  - o Requirement 6: Functional

**User Story 34:** As a Data Publishing User, I want to be able to Hide a dataset that I have already added as Public, So that I can fix my mistakes or have a dataset primarily for my own use.

**Requirements:**

- Requirement 1: The system shall allow Data Publishing Users to change the visibility status of their publicly published datasets to "Hidden" or a similar non-public designation.
  - o Requirement 1: Functional
- Requirement 2: When a dataset is hidden, it shall no longer be accessible to general Public Users through search or browsing.
  - o Requirement 2: Functional
- Requirement 3: Data Publishing Users shall retain the ability to access and manage their hidden datasets.
  - o Requirement 3: Functional
- Requirement 4: The system shall clearly indicate the current visibility status (e.g., Public, Hidden) of each dataset to the Data Publishing User.
  - o Requirement 4: Non-Functional
- Requirement 5: The system should provide a mechanism for Data Publishing Users to make a hidden dataset public again.
  - o Requirement 5: Functional
- Requirement 6: The system should maintain an audit log of changes to dataset visibility, including the user and timestamp of the change.
  - o Requirement 6: Functional

**User Story 35:** As a Data Publishing User, I want to have a view on all the datasets I have published, So that I can perform management actions on my own datasets.

### **Requirements:**

- Requirement 1: The system shall provide a dedicated view listing all datasets published by the currently logged-in Data Publishing User.
  - Requirement 1: Functional
- Requirement 2: This view shall display key information for each published dataset (e.g., title, publication date, current status).
  - Requirement 2: Non-Functional
- Requirement 3: The system shall provide Data Publishing Users with the ability to perform management actions on their datasets directly from this view.
  - Requirement 3: Functional
- Requirement 4: The view should be sortable and filterable based on relevant dataset attributes (e.g., title, publication date, status).
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that only the datasets published by the logged-in Data Publishing User are displayed in this view.
  - Requirement 5: Non-Functional
- Requirement 6: The user interface for this view should be intuitive and easy for Data Publishing Users to navigate and understand.
  - Requirement 6: Non-Functional

**User Story 36:** As an API user, I want to be able to change the colors of the embedded visualisations in my own platform, So that I can customize the visualisations.

### **Requirements:**

- Requirement 1: The API shall provide parameters or methods to control the color properties of the embedded visualisations.
  - Requirement 1: Functional
- Requirement 2: The API shall allow API users to specify colors for different elements within the visualisations (e.g., data series, labels, axes).
  - Requirement 2: Functional
- Requirement 3: The API shall support standard color formats (e.g., Hex codes, RGB values).

- Requirement 3: Functional
- Requirement 4: The API should allow API users to persistently apply their color customizations to the embedded visualisations.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that color customizations applied via the API do not negatively impact the performance or functionality of the embedded visualisations.
  - Requirement 5: Non-Functional
- Requirement 6: The API documentation shall clearly describe the available color customization options and their usage.
  - Requirement 6: Non-Functional

**User Story 37:** As a site visitor, I want to read a new article on the front page about once a week, so that I am up on all the latest happenings.

**Requirements:**

- Requirement 1: The system shall ensure that at least one new article is published and displayed on the front page on a weekly basis.
  - Requirement 1: Functional
- Requirement 2: The front page design shall have a dedicated section to prominently feature new articles
  - Requirement 2: Non-Functional
- Requirement 3: The system shall clearly indicate the publication date of each article displayed on the front page.
  - Requirement 3: Non-Functional
- Requirement 4: The system should automatically order the articles on the front page to prioritize the newest content.
  - Requirement 4: Functional
- Requirement 5: The system should allow site editors to easily designate which newly published articles will appear on the front page.
  - Requirement 5: Functional

- Requirement 6: The system should ensure that the display of new articles on the front page is visually distinct from older content.
  - o Requirement 6: Non-Functional

**User Story 38:** As a site visitor, I want to do a full-text search of article body, title, and author name, so that I can find what I want.

**Requirements:**

- Requirement 1: The system shall provide a search input field accessible to site visitors.
  - o Requirement 1: Functional
- Requirement 2: The search functionality shall perform a full-text search across the body content of all articles.
  - o Requirement 2: Functional
- Requirement 3: The search functionality shall include the titles of all articles in the search scope.
  - o Requirement 3: Functional
- Requirement 4: The search functionality shall include the names of the authors of all articles in the search scope.
  - o Requirement 4: Functional
- Requirement 5: The system shall display search results that are relevant to the site visitor's search query, highlighting the matching terms where possible.
  - o Requirement 5: Non-Functional
- Requirement 6: The search functionality shall provide a reasonable response time for displaying search results.
  - o Requirement 6: Non-Functional

**User Story 39:** As a site editor, I want to edit the content of the email automatically sent to new Certified Scrum Masters and Product Owners, so that I don't need to involve a programmer on simple email edits.

### **Requirements:**

- Requirement 1: The system shall provide site editors with an interface to modify the content of the automated welcome email for new Certified Scrum Masters.
  - Requirement 1: Functional
- Requirement 2: The system shall provide site editors with an interface to modify the content of the automated welcome email for new Certified Product Owners.
  - Requirement 2: Functional
- Requirement 3: The editing interface shall allow site editors to modify the email body text, subject line, and sender information.
  - Requirement 3: Functional
- Requirement 4: The editing interface should provide basic formatting options for the email content (e.g., bold, italics, bullet points, links).
  - Requirement 4: Non-Functional
- Requirement 5: The system shall allow site editors to preview the edited email content before saving the changes.
  - Requirement 5: Functional
- Requirement 6: Changes made to the email content by site editors shall be saved and applied to all subsequent automated emails sent to new Certified Scrum Masters and Product Owners.
  - Requirement 6: Functional

**User Story 40:** As a moderator, I want to export a transcript of a game as a HTML file, so that I can save the stories and estimates locally.

### **Requirements:**

- Requirement 1: The system shall allow moderators to initiate the export of a game transcript.
  - Requirement 1: Functional
- Requirement 2: The system shall generate an HTML file containing the complete transcript of the selected game.

- Requirement 2: Functional
- Requirement 3: The exported HTML file shall include all stories discussed during the game.
  - Requirement 3: Functional
- Requirement 4: The exported HTML file shall include the final estimates recorded for each story.
  - Requirement 4: Functional
- Requirement 5: The exported HTML file should be formatted in a clear and readable manner.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall provide moderators with a means to download the generated HTML transcript file.
  - Requirement 6: Functional

**User Story 41:** As an estimator, I want to see all items we will try to estimate this session, so that I have a feel for the sizes of the various items.

**Requirements:**

- Requirement 1: The system shall display a list of all items scheduled for estimation in the current session to the estimator.
  - Requirement 1: Functional
- Requirement 2: The list of items shall be presented to the estimator before the actual estimation process begins for each item.
  - Requirement 2: Functional
- Requirement 3: The displayed list shall include the title or a brief description of each item to be estimated.
  - Requirement 3: Non-Functional
- Requirement 4: The system should allow the estimator to view the list of items in a clear and easily readable format.
  - Requirement 4: Non-Functional
- Requirement 5: The system should provide a mechanism for the estimator to navigate through the list of items.

- Requirement 5: Functional
- Requirement 6: The system should ensure that the estimator can view all items without requiring them to start the estimation process for each individual item.
  - Requirement 6: Functional

**User Story 42:** As a participant, I want to always have the cards in the same order across multiple draws, so that it's easy to compare estimates.

**Requirements:**

- Requirement 1: The system shall present the estimation cards to each participant in a consistent and predetermined order for every draw within the same estimation session.
  - Requirement 1: Functional
- Requirement 2: The order of the estimation cards shall remain the same for a participant regardless of the number of times cards are drawn during a session.
  - Requirement 2: Functional
- Requirement 3: The system shall ensure that the card order is consistent across all participants within the same estimation session.
  - Requirement 3: Functional
- Requirement 4: The predetermined order of the estimation cards shall be established at the beginning of the estimation session.
  - Requirement 4: Functional
- Requirement 5: The system should visually display the estimation cards to the participant in the fixed order.
  - Requirement 5: Non-Functional
- Requirement 6: The system should not re-shuffle or alter the order of the estimation cards between draws for any participant within a single session.
  - Requirement 6: Functional

**User Story 43:** As a collection curator, I want to lift an embargo for an object in a simple way.

### **Requirements:**

- Requirement 1: The system shall allow collection curators to view the current embargo status of a collection object.
  - Requirement 1: Functional
- Requirement 2: The system shall provide a clear and easily accessible option for collection curators to remove an existing embargo from a collection object.
  - Requirement 2: Functional
- Requirement 3: The action to lift an embargo should require minimal steps or data input from the collection curator.
  - Requirement 3: Non-Functional
- Requirement 4: Upon lifting an embargo, the system shall update the embargo status of the object to indicate that it is no longer under embargo.
  - Requirement 4: Functional
- Requirement 5: The system should provide a confirmation message to the collection curator upon successfully lifting the embargo.
  - Requirement 5: Non-Functional
- Requirement 6: The system should record the history of embargo changes, including when an embargo was lifted and by whom.
  - Requirement 6: Functional

**User Story 44:** As a repoadmin, I want to have the license be recorded in metadata and displayed alongside the item.

### **Requirements:**

- Requirement 1: The system shall allow repoadmins to input and store the license information as metadata for each item.
  - Requirement 1: Functional
- Requirement 2: The system shall store the license information persistently associated with the corresponding item's metadata.
  - Requirement 2: Non-Functional
- Requirement 3: The system shall display the recorded license information alongside the item when it is viewed.

- Requirement 3: Functional
- Requirement 4: The displayed license information shall be clearly visible and easily understandable to users viewing the item.
  - Requirement 4: Non-Functional
- Requirement 5: The system should support the recording and display of various types of licenses (e.g., Creative Commons, proprietary).
  - Requirement 5: Functional
- Requirement 6: The system should allow repoadmins to update or modify the license information associated with an item.
  - Requirement 6: Functional

**User Story 45:** As a collection curator, I want to have a tool to perform author authority control.

**Requirements:**

- Requirement 1: The system shall provide a tool for collection curators to search and identify existing author records.
  - Requirement 1: Functional
- Requirement 2: The tool shall allow collection curators to standardize author names across different collection objects.
  - Requirement 2: Functional
- Requirement 3: The system shall enable collection curators to merge duplicate author records into a single, authoritative record.
  - Requirement 3: Functional
- Requirement 4: The tool should allow collection curators to link variant forms of an author's name to the authoritative record.
  - Requirement 4: Functional
- Requirement 5: The system shall ensure that changes made through the author authority control tool are consistently applied to all relevant collection objects.
  - Requirement 5: Non-Functional
- Requirement 6: The tool should provide collection curators with a clear audit trail of changes made to author records.

- Requirement 6: Functional

**User Story 46:** As a depositor, I want to get feedback post-ingest alerting me if files I submitted do not conform to their format specifications, if they are not valid, or if they are not wellformed.

**Requirements:**

- Requirement 1: The system shall validate deposited files against their expected format specifications after ingestion.
  - Requirement 1: Functional
- Requirement 2: The system shall perform validation checks to determine if deposited files are valid according to their file type.
  - Requirement 2: Functional
- Requirement 3: The system shall perform checks to ensure deposited files are well-formed according to their file structure.
  - Requirement 3: Functional
- Requirement 4: The system shall notify the depositor if any of their ingested files fail format conformance, validity, or well-formedness checks
  - Requirement 4: Functional
- Requirement 5: The feedback provided to the depositor shall clearly indicate which files failed the checks and the specific reason for the failure.
  - Requirement 5: Non-Functional
- Requirement 6: The system should provide the depositor with guidance or resources on how to correct the identified issues with their files.
  - Requirement 6: Non-Functional

**User Story 47:** As a user, I want to revert to an older version of an uploaded file.

**Requirements:**

- Requirement 1: The system shall maintain a version history for all uploaded files.
  - Requirement 1: Functional

- Requirement 2: The system shall allow users to view the version history of an uploaded file, including timestamps and potentially the user who uploaded each version.
  - Requirement 2: Functional
- Requirement 3: The system shall provide users with the ability to select and revert to a specific older version of an uploaded file.
  - Requirement 3: Functional
- Requirement 4: Upon reverting to an older version, the system shall make the selected version the current active version of the file.
  - Requirement 4: Functional
- Requirement 5: The system should provide a clear visual indication of the current version and the available older versions.
  - Requirement 5: Non-Functional
- Requirement 6: The system should retain all previous versions of the file even after a reversion, allowing users to revert to a different version if needed.
  - Requirement 6: Functional

**User Story 48:** As a user, I want to filter the files I get from search results based on their type.

**Requirements:**

- Requirement 1: The system shall provide users with a mechanism to filter search results by file type.
  - Requirement 1: Functional
- Requirement 2: The system shall display the available file types as filtering options.
  - Requirement 2: Functional
- Requirement 3: Users shall be able to select one or multiple file types to apply as filters to the search results.
  - Requirement 3: Functional
- Requirement 4: The system shall update the displayed search results to only include files matching the selected file type(s).

- Requirement 4: Functional
- Requirement 5: The system should clearly indicate which file type filters are currently applied.
  - Requirement 5: Non-Functional
- Requirement 6: The system should support filtering by common file types relevant to the content being searched.
  - Requirement 6: Functional

**User Story 49:** As a researcher, I want to upload files prior to having them attached to a log book page.

**Requirements:**

- Requirement 1: The system shall allow researchers to upload files independently of creating or editing a log book page.
  - Requirement 1: Functional
- Requirement 2: The system shall store the uploaded files in a temporary or staging area accessible to the researcher.
  - Requirement 2: Functional
- Requirement 3: The system shall provide researchers with a mechanism to view and manage their pre-uploaded files.
  - Requirement 3: Functional
- Requirement 4: The system shall allow researchers to select and attach one or more of their pre-uploaded files to a specific log book page.
  - Requirement 4: Functional
- Requirement 5: The system should retain the pre-uploaded files until the researcher explicitly attaches them to a log book page or deletes them.
  - Requirement 5: Functional
- Requirement 6: The system should indicate the status of pre-uploaded files (e.g., uploaded, attached to a page).
  - Requirement 6: Non-Functional

**User Story 50:** As a researcher, I want to have the ability to locate and access data that colleagues want to share.

## Requirements:

- Requirement 1: The system shall provide a search functionality that allows researchers to find shared data.
  - Requirement 1: Functional
- Requirement 2: Researchers shall be able to search for shared data based on metadata (e.g., title, description, author, keywords).
  - Requirement 2: Functional
- Requirement 3: The system shall display a list of shared datasets that match the researcher's search criteria.
  - Requirement 3: Functional
- Requirement 4: The system shall allow researchers to access the shared data based on the sharing permissions set by their colleagues.
  - Requirement 4: Functional
- Requirement 5: The system should clearly indicate which datasets have been shared and by whom.
  - Requirement 5: Non-Functional
- Requirement 6: The system should provide a mechanism for researchers to browse or discover shared data beyond keyword searching.
  - Requirement 6: Functional

## APPENDIX BC

### DEEPSEEK TEST RESULTS WITH PROMPT PATTERN

In this section, DeepSeek will convert the given prompt patterns and user stories into requirements.

**User Story 1:** As an Agency user, I want to accurately see who created a submission, so that I'm not confused about who last updated a submission.

#### Requirements:

- Requirement 1: The system shall display the full name and unique identifier (e.g., user ID) of the user who created a submission in the submission details view.
  - o Requirement 1: Functional
- Requirement 2: The system shall record and store the timestamp of submission creation in UTC format, visible alongside the creator's information.
  - o Requirement 2: Functional
- Requirement 3: The system shall distinguish between the "created by" user and "last modified by" user (if different) in the submission metadata.
  - o Requirement 3: Functional
- Requirement 4: The creator's information shall be immutable after submission creation to prevent tampering or misattribution.
  - o Requirement 4: Non-Functional
- Requirement 5: The system shall load creator information within 1 second for 99% of requests under normal operating conditions.
  - o Requirement 5: Non-Functional
- Requirement 6: Creator metadata shall be accessible via the system API for integration with external audit/logging tools.
  - o Requirement 6: Functional

**User Story 2:** As an Agency user, I want the header information box to show updated date AND time, so that I know when it was updated.

**Requirements:**

- Requirement 1: The system shall display the last updated date and time in the header information box for every submission.
  - o Requirement 1: Functional
- Requirement 2: The date and time shall be displayed in the user's local timezone, with an option to toggle to UTC if needed.
  - o Requirement 2: Functional
- Requirement 3: The timestamp shall update automatically in real-time whenever the submission is modified, without requiring a page refresh.
  - o Requirement 3: Functional
- Requirement 4: The timestamp shall be recorded with millisecond precision in the backend database to ensure audit accuracy.
  - o Requirement 4: Non-Functional
- Requirement 5: The updated timestamp shall be visible within 0.5 seconds of the modification event under normal system load.
  - o Requirement 5: Non-Functional
- Requirement 6: The timestamp display format shall follow ISO 8601 standards (e.g., "YYYY-MM-DD HH:MM:SS") unless the user selects a custom format in their profile settings.
  - o Requirement 6: Functional

**User Story 3:** As a Plan Review Staff member, I want to successfully Conduct a Plan Review Meeting with the Applicant and record the outcome, so that I can listen to it again.

**Requirements:**

- Requirement 1: The system shall provide functionality to record audio of the entire Plan Review Meeting, including all participant voices with clear audio quality.

- Requirement 1: Functional
- Requirement 2: The system shall automatically save the recording in a secure, searchable database with metadata including meeting date, time, participants, and project ID.
  - Requirement 2: Functional
- Requirement 3: Recordings shall be accessible for playback by authorized staff members within 24 hours of the meeting conclusion.
  - Requirement 3: Non-Functional
- Requirement 4: The system shall generate a written transcript of the meeting within 48 hours, with at least 90% accuracy for search and reference purposes.
  - Requirement 4: Functional
- Requirement 5: All recordings and transcripts shall be retained for a minimum of 7 years to comply with regulatory requirements.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall provide tools to bookmark and annotate specific timestamps in recordings for future reference.
  - Requirement 6: Functional

**User Story 4:** As a Public User, I want to Search for Information, so that I can obtain publicly available information concerning properties, County services, processes and other general information.

**Requirements:**

- Requirement 1: The system shall provide a search interface that allows users to search by keywords, property address, parcel ID, or service type.
  - Requirement 1: Functional
- Requirement 2: Search results shall be returned within 2 seconds for 95% of queries under normal system load.
  - Requirement 2: Non-Functional

- Requirement 3: The system shall categorize search results by type (e.g., property records, service information, process documentation) and rank them by relevance.
  - Requirement 3: Functional
- Requirement 4: All displayed information shall be current and updated within 24 hours of any changes in the official records.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall provide filters to narrow search results by date range, document type, or department.
  - Requirement 5: Functional
- Requirement 6: The search functionality shall be accessible without requiring user login or account creation.
  - Requirement 6: Non-Functional

**User Story 5:** As a user, I want to view user documentation for the website, so that I know how to use the web app.

**Requirements:**

- Requirement 1: The system shall provide a dedicated "Help" or "Documentation" section accessible from all pages via a persistent link in the header or footer.
  - Requirement 1: Functional
- Requirement 2: Documentation shall include step-by-step guides with screenshots for all major features and common workflows.
  - Requirement 2: Functional
- Requirement 3: The documentation interface shall load completely within 3 seconds for 99% of users under normal network conditions.
  - Requirement 3: Non-Functional
- Requirement 4: Documentation content shall be searchable by keywords and filterable by topic or feature category.
  - Requirement 4: Functional

- Requirement 5: The system shall maintain version control of documentation, clearly indicating when content was last updated and which app version it applies to.
  - Requirement 5: Non-Functional
- Requirement 6: Documentation shall be accessible without requiring login credentials and comply with WCAG 2.1 AA accessibility standards.
  - Requirement 6: Non-Functional

**User Story 6:** As an admin, I want to be able to block specific users based on IP address, so that I can prevent spamming on the websites.

**Requirements:**

- Requirement 1: The system shall provide an admin interface to manually enter and block specific IP addresses or IP ranges.
  - Requirement 1: Functional
- Requirement 2: Blocked IP addresses shall be prevented from accessing any website functionality within 1 minute of being added to the blacklist.
  - Requirement 2: Non-Functional
- Requirement 3: The system shall maintain a secure log of all blocked IPs, including timestamp, admin who initiated the block, and reason for blocking.
  - Requirement 3: Non-Functional
- Requirement 4: The admin interface shall display warning messages when attempting to block IP ranges that could affect legitimate users (e.g., entire ISP ranges).
  - Requirement 4: Functional
- Requirement 5: Blocked users shall receive a customizable message explaining their access restriction when attempting to visit the site.
  - Requirement 5: Functional
- Requirement 6: The blacklist shall persist through system reboots and maintain integrity during database migrations or updates.
  - Requirement 6: Non-Functional

**User Story 7:** As an Inspector, I want to Conduct Inspections, so that I can validate Customer compliance with code and regulations and provide results of the inspection to the Customer.

**Requirements:**

- Requirement 1: The system shall provide a digital checklist of all applicable codes and regulations for each inspection type, with the ability to mark items as compliant/non-compliant.
  - o Requirement 1: Functional
- Requirement 2: The system shall allow inspectors to upload photos, videos, and notes as evidence for each inspection finding.
  - o Requirement 2: Functional
- Requirement 3: Inspection reports shall be generated automatically upon completion and made available to customers within 1 business day.
  - o Requirement 3: Non-Functional
- Requirement 4: The system shall maintain a complete audit trail of all inspection activities, including inspector ID, timestamps, and any modifications to findings.
  - o Requirement 4: Non-Functional
- Requirement 5: Inspectors shall be able to access all relevant property records, permit history, and previous inspection reports while conducting an inspection.
  - o Requirement 5: Functional
- Requirement 6: The system shall provide real-time synchronization of inspection data between mobile devices in the field and central databases, with offline capability for areas with poor connectivity.
  - o Requirement 6: Non-Functional

**User Story 8:** As an admin, I want to be able to communicate directly with facilities, so that I can keep them updated about features we have on our website.

## Requirements:

- Requirement 1: The system shall provide a dedicated messaging interface where admins can compose and send messages to individual facilities or facility groups.
  - Requirement 1: Functional
- Requirement 2: The system shall support multiple communication channels (email, in-app notifications, and SMS) with the ability to select preferred channel per facility.
  - Requirement 2: Functional
- Requirement 3: Messages shall be delivered to facilities within 5 minutes of being sent under normal system conditions.
  - Requirement 3: Non-Functional
- Requirement 4: The system shall maintain a searchable message history with filters by date, facility, and message type.
  - Requirement 4: Functional
- Requirement 5: Admins shall be able to attach website feature documentation, screenshots, or tutorial links to messages.
  - Requirement 5: Functional
- Requirement 6: The system shall provide read receipts and confirmation of message delivery for all communication channels.
  - Requirement 6: Non-Functional

**User Story 9:** As a Data Consuming User, I want to be able to search any dataset published and publicly accessible by their title and metadata, So that I can find the datasets I'm interested in.

## Requirements:

- Requirement 1: The system shall provide a search interface that allows users to query datasets by title, description, keywords, or metadata fields (e.g., author, publication date).
  - Requirement 1: Functional

- Requirement 2: Search results shall be returned within 3 seconds for 95% of queries under normal system load.
  - o Requirement 2: Non-Functional
- Requirement 3: The system shall display search results with relevant metadata (e.g., title, author, last updated date, file format) and a brief description for each dataset.
  - o Requirement 3: Functional
- Requirement 4: Users shall be able to filter search results by publication date range, file format, license type, or other available metadata attributes.
  - o Requirement 4: Functional
- Requirement 5: The search functionality shall support fuzzy matching and partial queries to accommodate typographical errors or incomplete information.
  - o Requirement 5: Functional
- Requirement 6: All searchable datasets and their metadata shall be indexed and updated within 1 hour of publication or modification.
  - o Requirement 6: Non-Functional

**User Story 10:** As a Platform administrator, I want to be able to translate the data types hierarchies of the Viewer while in embed mode, So that my users can understand the interface in their native language.

**Requirements:**

- Requirement 1: The system shall provide an admin interface to upload and manage translated labels for all data type hierarchies displayed in the embedded Viewer.
  - o Requirement 1: Functional
- Requirement 2: Translated labels shall be applied dynamically without requiring Viewer restart or page refresh when language settings are changed.
  - o Requirement 2: Functional
- Requirement 3: The system shall support UTF-8 encoding to ensure proper display of special characters and non-Latin scripts (e.g., Chinese, Arabic).

- Requirement 3: Non-Functional
- Requirement 4: Default fallback language (English) shall be displayed when specific translations are unavailable.
  - Requirement 4: Non-Functional
- Requirement 5: Translation files shall maintain version control and allow rollback to previous versions if needed.
  - Requirement 5: Non-Functional
- Requirement 6: The Viewer shall detect and apply user browser language preferences automatically when embed mode configuration allows it.
  - Requirement 6: Functional

**User Story 11:** As a Data Consuming User, I want to be able to filter, sort and aggregate data by multiple dimensions and measures, So that I can get more granular views on the data.

**Requirements:**

- Requirement 1: The system shall allow users to apply multiple concurrent filters on any combination of dimensions (e.g., time periods, categories, regions) with AND/OR logical operators.
  - Requirement 1: Functional
- Requirement 2: Users shall be able to sort data by any measure (numerical field) in ascending or descending order, with secondary sort capabilities.
  - Requirement 2: Functional
- Requirement 3: The interface shall provide visual indicators (e.g., badges, filter chips) showing all active filters/sorts with one-click removal options.
  - Requirement 3: Functional
- Requirement 4: Aggregation operations (sum, average, count, etc.) shall execute within 5 seconds for datasets under 1 million records on standard hardware.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall support cross-dimensional aggregation (e.g., sales by region by product category) with drill-down capabilities.

- Requirement 5: Functional
- Requirement 6: All filter/sort/aggregation combinations shall produce exportable results maintaining the applied data transformations.
  - Requirement 6: Functional

**User Story 12:** As a Publisher, I want to embed an interactive preview of my data on my site, so that users can be encouraged that this is the correct data for them.

**Requirements:**

- Requirement 1: The system shall generate embeddable HTML code snippets that publishers can copy/paste into their websites to display interactive data previews.
  - Requirement 1: Functional
- Requirement 2: Embedded previews shall maintain full functionality including filtering, sorting, and basic visualization controls (e.g., chart type selection).
  - Requirement 2: Functional
- Requirement 3: Previews shall load within 3 seconds on average network connections (4G/LTE) with a maximum data payload of 500KB.
  - Requirement 3: Non-Functional
- Requirement 4: The preview shall automatically resize to fit responsive container dimensions while maintaining aspect ratios and readability.
  - Requirement 4: Non-Functional
- Requirement 5: Publishers shall be able to customize preview appearance (colors, logos, default view) through the embedding interface.
  - Requirement 5: Functional
- Requirement 6: All embedded previews shall include a visible link/button to access the full dataset with tracking to measure conversion from preview to full access.
  - Requirement 6: Functional

**User Story 13:** As a Publisher, I want to know how many users have previewed a dataset, so that I know how interest in a dataset relates to its actual download numbers.

## Requirements:

- Requirement 1: The system shall track and record each unique user preview of a dataset, counting multiple previews by the same user within a 24-hour period as a single view.
  - Requirement 1: Functional
- Requirement 2: Preview metrics shall be displayed in the publisher dashboard with daily, weekly, and monthly view aggregates, updated in near real-time (maximum 15-minute delay).
  - Requirement 2: Functional
- Requirement 3: The system shall correlate preview counts with download numbers, displaying the conversion rate ( $\text{downloads} \div \text{previews}$ ) for each dataset.
  - Requirement 3: Functional
- Requirement 4: Preview analytics data shall be accessible via API for integration with third-party analytics tools, with response times under 500ms for standard queries.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall differentiate between organic previews (from search/discovery) and referral previews (from external links) in the analytics breakdown.
  - Requirement 5: Functional
- Requirement 6: All preview tracking shall respect user privacy settings and comply with GDPR/CCPA regulations, with opt-out mechanisms where required.
  - Requirement 5: Non-Functional

**User Story 14:** As a site editor, I want to assign priority numbers to news items, so that I can indicate which articles I want featured most prominently on the site.

### **Requirements:**

- Requirement 1: The system shall provide an editable priority field (numeric value 1-10) for each news item in the content management interface, with 1 being highest priority.
  - Requirement 1: Functional
- Requirement 2: Priority assignments shall immediately affect article placement in all automated feeds and homepage widgets, with changes visible within 60 seconds.
  - Requirement 2: Non-Functional
- Requirement 3: The interface shall visually distinguish priority levels through color coding (e.g., red=high, yellow=medium, green=low) in both list and editing views.
  - Requirement 3: Functional
- Requirement 4: Editors shall be able to bulk-assign priorities to multiple articles simultaneously through checkbox selection and batch editing.
  - Requirement 4: Functional
- Requirement 5: The system shall maintain an audit log of all priority changes including timestamp, editor ID, and previous/new values.
  - Requirement 5: Non-Functional
- Requirement 6: When priority values conflict (e.g., multiple items set to "1"), the system shall use publication date as a secondary sorting criterion (newest first).
  - Requirement 6: Functional

**User Story 15:** As a trainer, I want to update one of my existing courses or events, so that it reflects accurate information.

### **Requirements:**

- Requirement 1: The system shall allow trainers to edit all course/event details including title, description, schedule, location, and pricing through an intuitive editing interface.
  - Requirement 1: Functional

- Requirement 2: All updates shall be saved as draft versions until explicitly published, with clear visual distinction between published and draft states.
  - o Requirement 2: Functional
- Requirement 3: The system shall automatically notify currently enrolled participants via email when significant changes are made (e.g., schedule changes, location updates).
  - o Requirement 3: Functional
- Requirement 4: Course updates shall propagate to all public listings and calendars within 5 minutes of being published.
  - o Requirement 4: Non-Functional
- Requirement 5: The system shall maintain a version history of all changes with timestamps and trainer identification, viewable by administrators.
  - o Requirement 5: Non-Functional
- Requirement 6: Trainers shall be able to update course materials (documents, videos, links) without changing other course metadata.
  - o Requirement 6: Functional

**User Story 16:** As a site visitor, I want to have an advanced search option that lets me fill in a form of search criteria, so that I can quickly find what I am looking for.

**Requirements:**

- Requirement 1: The system shall provide an advanced search form with multiple filter fields (e.g., date ranges, categories, keywords, tags) that can be combined for precise searching.
  - o Requirement 1: Functional
- Requirement 2: The advanced search interface shall include auto-suggest functionality for keywords and filter values based on existing data.
  - o Requirement 2: Functional
- Requirement 3: Search results shall update dynamically as filters are modified, with response times under 2 seconds for typical queries.
  - o Requirement 3: Non-Functional

- Requirement 4: Users shall be able to save frequently used search configurations as presets for one-click access in future sessions.
  - o Requirement 4: Functional
- Requirement 5: The system shall display the number of matching results for each applied filter to help users refine their search.
  - o Requirement 5: Functional
- Requirement 6: All search criteria shall be shareable via generated URL, reproducing the exact search when accessed.
  - o Requirement 6: Functional

**User Story 17:** As a recruiter, I want to be able to extend an ad for another 30 days by visiting the site and updating the posting, so that my ad remains active.

shall ensure that the extended job ad is displayed correctly on the job board.

**Requirements:**

- Requirement 1: The system shall provide a clear "Extend Ad" button/option in the recruiter's dashboard for each active or expiring job posting.
  - o Requirement 1: Functional
- Requirement 2: When extending an ad, recruiters shall be able to review and update all posting details (description, requirements, etc.) before confirming the extension.
  - o Requirement 2: Functional
- Requirement 3: The extension process shall automatically add 30 calendar days to the original expiration date upon confirmation.
  - o Requirement 3: Functional
- Requirement 4: The system shall send an email confirmation to the recruiter immediately after successful extension, containing the new expiration date.
  - o Requirement 4: Non-Functional
- Requirement 5: Extended ads shall maintain their original posting date for display purposes but be flagged as "Recently Extended" in search results.
  - o Requirement 5: Functional

- Requirement 6: The extension feature shall be available until 11:59 PM on the ad's expiration date, after which the ad becomes archived.
  - o Requirement 6: Functional

**User Story 18:** As a user researcher, I want to test the user research plan, so that I make sure the in-person interviews are effective and capturing the right information.

**Requirements:**

- Requirement 1: The system shall allow researchers to conduct pilot interviews with internal team members to test question clarity and effectiveness before actual user interviews.
  - o Requirement 1: Functional
- Requirement 2: Researchers shall be able to record and timestamp pilot interview sessions, with automated transcription available within 1 hour of session completion.
  - o Requirement 2: Non-Functional
- Requirement 3: The system shall provide a collaborative editing interface where multiple researchers can review and annotate pilot interview transcripts to identify problematic questions.
  - o Requirement 3: Functional
- Requirement 4: Pilot interview data shall be automatically analyzed to flag potential issues (e.g., questions with low response rates, ambiguous answers) using predefined metrics.
  - o Requirement 4: Functional
- Requirement 5: The system shall generate a revision history of all research plan changes made based on pilot testing, with researcher attribution for each modification.
  - o Requirement 5: Non-Functional
- Requirement 6: Researchers shall be able to compare multiple versions of the research plan side-by-side to evaluate improvements between iterations.
  - o Requirement 6: Functional

**User Story 19:** As a data manager, I want to have the description of collected data sets that are used or updated throughout the project lifecycle, so that I can ensure the descriptions are current and add detail as the study proceeds.

**Requirements:**

- Requirement 1: The system shall provide an editable metadata template for each dataset including fields for purpose, collection methods, variables, and update frequency.
  - o Requirement 1: Functional
- Requirement 2: Dataset descriptions shall automatically display the last modification date/time and the identity of the last editor.
  - o Requirement 2: Functional
- Requirement 3: The system shall maintain version history of all description changes with the ability to restore previous versions if needed.
  - o Requirement 3: Non-Functional
- Requirement 4: Data managers shall receive automated weekly reminders to review and verify descriptions for all active datasets in their projects.
  - o Requirement 4: Non-Functional
- Requirement 5: The interface shall allow bulk updating of common metadata fields across multiple related datasets.
  - o Requirement 5: Functional
- Requirement 6: Dataset descriptions shall be exportable in standard formats (CSV, JSON) with all version history for compliance documentation.
  - o Requirement 6: Functional

**User Story 20:** As an IT staff member, I want to know which kind of data types will be produced or collected, so that I can determine what basic support services and functionalities are required.

**Requirements:**

- Requirement 1: The system shall provide a comprehensive data inventory template that captures all expected data types (e.g., text, numerical,

geospatial, multimedia) with their formats (CSV, JSON, SQL, etc.) and estimated volumes.

- Requirement 1: Functional
- Requirement 2: For each data type, the system shall document required storage characteristics (structured/unstructured), retention periods, and sensitivity classifications (PII, PHI, etc.).
  - Requirement 2: Functional
- Requirement 3: Data type specifications shall be version-controlled, with change tracking that includes approval workflows for modifications affecting infrastructure requirements.
  - Requirement 3: Non-Functional
- Requirement 4: The system shall generate automated infrastructure recommendations (storage type, DBMS, network bandwidth) based on the documented data types and volumes.
  - Requirement 4: Functional
- Requirement 5: Data type metadata shall be accessible via API for integration with IT service management tools, responding to queries within 500ms.
  - Requirement 5: Non-Functional
- Requirement 6: The interface shall flag potential infrastructure gaps by comparing documented data types against existing IT service capabilities.
  - Requirement 6: Functional

**User Story 21:** As a depositor, I want to deposit the files that I have, so that I don't have to spend a lot of time finding the right version and converting to the right format.

**Requirements:**

- Requirement 1: The system shall accept file uploads in all common formats (e.g., DOCX, PDF, JPG, CSV) without requiring format conversion by the depositor.
  - Requirement 1: Functional

- Requirement 2: File version detection shall automatically identify and flag potential duplicate or outdated versions based on filename patterns, metadata, and content hashing.
  - Requirement 2: Functional
- Requirement 3: The deposit interface shall provide real-time feedback on upload progress, with estimated completion times for files over 100MB.
  - Requirement 3: Non-Functional
- Requirement 4: Automated virus scanning shall complete for all uploaded files within 30 seconds of upload completion, with clear notifications for infected files.
  - Requirement 4: Non-Functional
- Requirement 5: Depositors shall be able to drag-and-drop multiple files/folders while maintaining original directory structures.
  - Requirement 5: Functional
- Requirement 6: The system shall generate persistent URLs for deposited files that remain valid even if the storage infrastructure changes.
  - Requirement 6: Non-Functional

**User Story 22:** As a Research Information manager, I want to track citation counts for published datasets, so that impact of datasets within academia can be demonstrated.

**Requirements:**

- Requirement 1: The system shall automatically harvest citations from major academic databases (CrossRef, DataCite, PubMed) for each published dataset daily.
  - Requirement 1: Functional
- Requirement 2: Citation counts shall be displayed prominently with each dataset record, updated in near real-time (maximum 24-hour delay from detection).
  - Requirement 2: Non-Functional

- Requirement 3: The system shall differentiate between direct dataset citations and secondary citations (e.g., papers citing derived publications) with separate metrics.
  - Requirement 3: Functional
- Requirement 4: Managers shall be able to generate time-series reports showing citation growth patterns for any date range, exportable in CSV/JSON formats.
  - Requirement 4: Functional
- Requirement 5: Automated alerts shall notify managers when high-impact citations (e.g., from top-tier journals) are detected for any dataset.
  - Requirement 5: Functional
- Requirement 6: All citation data shall be stored with provenance information (source database, harvest timestamp) to ensure auditability.
  - Requirement 6: Non-Functional

**User Story 23:** As a legal officer, I want to know about data sensitivity, so that I can establish sharing options.

**Requirements:**

- Requirement 1: The system shall classify all datasets according to a standardized sensitivity scale (e.g., Public, Internal, Confidential, Restricted) based on content type and applicable regulations.
  - Requirement 1: Functional
- Requirement 2: Each sensitivity classification shall automatically trigger corresponding sharing restrictions (view/download/edit permissions) following organizational policies.
  - Requirement 2: Functional
- Requirement 3: Legal officers shall be able to override automatic classifications with manual designations, requiring documented justification stored in audit logs.
  - Requirement 3: Non-Functional

- Requirement 4: The interface shall display clear visual indicators (color-coding/icons) of sensitivity levels adjacent to all dataset listings and metadata.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall generate automated alerts when datasets containing potentially sensitive information (PII, trade secrets) are prepared for sharing outside approved groups.
  - Requirement 5: Functional
- Requirement 6: All sensitivity classifications and sharing rules shall be exportable with timestamps for compliance reporting and regulatory audits.
  - Requirement 6: Non-Functional

**User Story 24:** As a data manager, I want to plan the anonymization of data, so that we protect the privacy of the people participating in the research as good as possible and still ensure reusability of data.

**Requirements:**

- Requirement 1: The system shall provide a data classification tool to identify and flag all direct and indirect personal identifiers (PII) in datasets using pattern recognition and machine learning.
  - Requirement 1: Functional
- Requirement 2: For each identified PII field, the system shall recommend appropriate anonymization techniques (generalization, pseudonymization, suppression, etc.) based on data type and context.
  - Requirement 2: Functional
- Requirement 3: Anonymization plans shall preserve dataset utility by maintaining statistical properties and relationships between variables where possible, with measurable data quality metrics.
  - Requirement 3: Non-Functional
- Requirement 4: The system shall generate previews of anonymized data outputs for review before final processing, with side-by-side comparisons showing changes.

- Requirement 4: Functional
- Requirement 5: All anonymization processes shall be fully documented with parameters used, including reversibility status for pseudonymized data where required.
  - Requirement 5: Non-Functional
- Requirement 6: The anonymization planner shall integrate with common research data formats (SPSS, CSV, SQL) and maintain processing logs for reproducibility.
  - Requirement 6: Functional

**User Story 25:** As a sponsor, I want to personalize my sponsorship page, so that I can promote my brand.

**Requirements:**

- Requirement 1: The system shall provide a WYSIWYG editor allowing sponsors to upload and position their logo, brand colors, and promotional images within predefined template zones.
  - Requirement 1: Functional
- Requirement 2: Sponsors shall be able to add customizable text sections (mission statements, product descriptions) with rich formatting options (headings, bullet points, hyperlinks).
  - Requirement 2: Functional
- Requirement 3: All personalized content shall render correctly across devices (mobile/desktop) and browsers, with image auto-scaling to maintain aspect ratios.
  - Requirement 3: Non-Functional
- Requirement 4: The system shall provide real-time preview functionality showing exactly how the page will appear to visitors before publishing changes.
  - Requirement 4: Functional

- Requirement 5: Branding elements shall comply with platform style guidelines (e.g., maximum logo dimensions, approved file formats) with automatic validation during upload.
  - Requirement 5: Non-Functional
- Requirement 6: Sponsors shall retain version control of their page designs, with the ability to revert to previous configurations if needed.
  - Requirement 6: Functional

**User Story 26:** As a UI designer, I want to redesign the Resources page, so that it matches the new Broker design styles.

**Requirements:**

- Requirement 1: The redesigned page shall implement the new Broker color palette, typography, and spacing guidelines as defined in the current design system documentation.
  - Requirement 1: NFunctional
- Requirement 2: All UI components (cards, buttons, filters) shall be replaced with the new Broker component library versions while maintaining existing functionality.
  - Requirement 2: Functional
- Requirement 3: The page layout shall adapt responsively across breakpoints (mobile/tablet/desktop) without visual degradation or functional impairment.
  - Requirement 3: Non-Functional
- Requirement 4: Content reorganization shall maintain or improve current page load performance, with no increase in load time beyond 5% of current benchmarks.
  - Requirement 4: Non-Functional
- Requirement 5: The redesign shall preserve all existing resource categorization and filtering capabilities while aligning with new interaction patterns.
  - Requirement 5: Functional

- Requirement 6: All visual changes shall pass WCAG 2.1 AA contrast requirements and maintain keyboard navigability for accessibility compliance.
  - o Requirement 6: Non-Functional

**User Story 27:** As a Developer , I want to clarify to users what exactly is triggering the CFDA error code in each case.

**Requirements:**

- Requirement 1: The system shall display a clear, user-friendly error message that specifies the exact field or condition triggering each CFDA error code.
  - o Requirement 1: Functional
- Requirement 2: Error messages shall include actionable guidance (e.g., "Required field missing: Project Title" or "Invalid date format: Use MM/DD/YYYY") to help users resolve issues.
  - o Requirement 2: Functional
- Requirement 3: The system shall log detailed technical information (field values, validation rules, timestamps) for each CFDA error to support debugging, accessible only to developers.
  - o Requirement 3: Non-Functional
- Requirement 4: Error messages shall appear in context (near the problematic field) with consistent visual styling (e.g., red border + icon) across all forms.
  - o Requirement 4: Non-Functional
- Requirement 5: The system shall provide a help link/button with each error that opens context-sensitive documentation about the specific CFDA requirement.
  - o Requirement 5: Functional
- Requirement 6: All error messaging shall be available in multiple languages (English/Spanish at minimum) based on user preferences.
  - o Requirement 6: Non-Functional

**User Story 28:** As a broker team member, I want to make some updates to the SQL codes for clarity

### **Requirements:**

- Requirement 1: The system shall allow authorized broker team members to edit SQL queries with a version-controlled SQL editor that maintains change history.
  - Requirement 1: Functional
- Requirement 2: All SQL code updates shall include mandatory inline comments explaining the purpose of complex joins, subqueries, and business logic.
  - Requirement 2: Functional
- Requirement 3: The SQL editor shall automatically format code according to organizational style guidelines (indentation, capitalization, spacing).
  - Requirement 3: Non-Functional
- Requirement 4: Updated queries shall undergo automated syntax validation and performance impact analysis before being saved to production.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall generate comparison reports showing differences between query versions with highlighted changes.
  - Requirement 5: Functional
- Requirement 6: Query execution plans shall be viewable alongside the SQL code to clarify performance implications of changes.
  - Requirement 6: Functional

**User Story 29:** As a Staff member, I want to Schedule a Meeting, so that I can bring the required parties together at a specific date/time to address an issue.

### **Requirements:**

- Requirement 1: The system shall allow staff to create meetings with title, description, date/time, duration, and participant list, with mandatory fields clearly marked.
  - Requirement 1: Functional

- Requirement 2: The system shall display real-time availability of all invited participants by integrating with their calendars, highlighting optimal time slots.
  - Requirement 2: Functional
- Requirement 3: Meeting invitations shall be sent automatically via email and calendar integration, with RSVP tracking and reminders 24 hours before the meeting.
  - Requirement 3: Non-Functional
- Requirement 4: Staff shall be able to reschedule or cancel meetings with automatic notifications to all participants, updating all linked calendars.
  - Requirement 4: Functional
- Requirement 5: The system shall support adding virtual meeting links (Zoom, Teams, etc.) that are automatically included in invitations and reminders.
  - Requirement 5: Functional
- Requirement 6: All scheduled meetings shall be visible in a centralized dashboard with filters for date, participants, and status (upcoming, canceled, completed).
  - Requirement 6: Non-Functional

**User Story 30:** As a Staff member, I want to Manage Hearing Calendars, so that I can track hearing-related activities and due dates

**Requirements:**

- Requirement 1: The system shall provide a centralized calendar interface to create, view, and edit hearing events with fields for case number, hearing type, location, parties involved, and key deadlines.
  - Requirement 1: Functional
- Requirement 2: Each hearing event shall automatically generate a timeline of required pre/post-hearing activities (e.g., document submissions, notifications) with configurable reminders.
  - Requirement 2: Functional

- Requirement 3: Calendar views shall be filterable by hearing type (e.g., motion, trial), status (upcoming, completed, postponed), and assigned staff member.
  - Requirement 3: Functional
- Requirement 4: The system shall synchronize in real-time with court scheduling systems to reflect changes in hearing dates/times, with change alerts to affected parties.
  - Requirement 4: Non-Functional
- Requirement 5: Staff shall be able to generate standardized hearing preparation checklists and reports from calendar entries, exportable in multiple formats (PDF, CSV).
  - Requirement 5: Functional
- Requirement 6: All calendar data shall maintain a complete audit trail showing who made changes, when, and what was modified, with read-only access for historical versions.
  - Requirement 6: Non-Functional

**User Story 31:** As a Development Staff member, I want to Issue a Development-related Permit, so that I can grant the request to the Applicant to begin work.

**Requirements:**

- Requirement 1: The system shall provide a permit issuance interface that displays all required applicant information, supporting documents, and approval checklists before permit generation.
  - Requirement 1: Functional
- Requirement 2: Staff shall be able to generate permits with automatically assigned unique ID numbers following the format [DEP-YYYY-00000] and digitally sign them using verified credentials.
  - Requirement 2: Functional
- Requirement 3: Issued permits shall include machine-readable QR codes containing all permit details, expiration dates, and inspection requirements for field verification.

- Requirement 3: Functional
- Requirement 4: The system shall automatically notify applicants via email/SMS when permits are issued, with attached PDF copies and a secure portal link for status tracking.
  - Requirement 4: Non-Functional
- Requirement 5: All issued permits shall be recorded in a searchable registry with timestamps, issuing officer, and links to associated applications, updating within 5 minutes of issuance.
  - Requirement 5: Non-Functional
- Requirement 6: The interface shall prevent permit issuance if outstanding requirements (fees, inspections, approvals) are unmet, with clear explanations of missing items
  - Requirement 6: Functional

**User Story 32:** As an Enforcement Staff member, I want to Issue a Notice of Violation, so that I can provide formal communication to the responsible party.

**Requirements:**

- Requirement 1: The system shall provide a violation notice template with mandatory fields for violation type, code reference, location, description, corrective actions, and compliance deadline.
  - Requirement 1: Functional
- Requirement 2: Staff shall be able to attach supporting evidence (photos, inspection reports, witness statements) directly to the notice, with automatic file type validation (JPG, PDF, etc.).
  - Requirement 2: Functional
- Requirement 3: Issued notices shall generate unique tracking numbers following the format [NOV-YYYY-00000] and include QR codes for field verification.
  - Requirement 3: Functional

- Requirement 4: The system shall automatically send notices via certified mail (with tracking) and email simultaneously, with delivery status visible in the case file.
  - Requirement 4: Non-Functional
- Requirement 5: All notices shall be logged in a central registry with timestamps, issuing officer, and status (issued, served, appealed, resolved), updating in real-time.
  - Requirement 5: Non-Functional
- Requirement 6: The interface shall prevent notice issuance if required fields are incomplete or evidentiary attachments are missing, with clear error prompts.
  - Requirement 6: Functional

**User Story 33:** As an API User, I want to be able to persistently store visualisation state in the database, So that such can be shared more easily and contribute to a visualisation gallery.

**Requirements:**

- Requirement 1: The API shall provide a POST endpoint to store complete visualization states (including filters, chart configurations, and data sources) as JSON documents in a dedicated database collection.
  - Requirement 1: Functional
- Requirement 2: Stored visualizations shall be retrievable via a unique persistent URL that remains valid regardless of system upgrades or migrations.
  - Requirement 2: Non-Functional
- Requirement 3: The API shall support versioning of visualization states, allowing users to save iterative improvements while maintaining access to previous versions.
  - Requirement 3: Functional

- Requirement 4: Visualization state documents shall be indexed for fast retrieval (<500ms response time) even when containing complex nested configurations.
  - Requirement 4: Non-Functional
- Requirement 5: The API shall include access control mechanisms (public/private/team-sharing) for stored visualizations, enforceable via API keys or OAuth tokens.
  - Requirement 5: Non-Functional
- Requirement 6: All visualization states shall include automatically generated metadata (creation date, last modified, owner, and data source references) for gallery display and search.
  - Requirement 6: Functional

**User Story 34:** As a Data Publishing User, I want to be able to Hide a dataset that I have already added as Public, So that I can fix my mistakes or have a dataset primarily for my own use.

**Requirements:**

- Requirement 1: The system shall provide a "Visibility" toggle for each dataset, allowing owners to switch between Public and Hidden states with one click.
  - Requirement 1: Functional
- Requirement 2: Hidden datasets shall remain accessible to the owner and designated collaborators through direct URLs, but be excluded from public searches and listings.
  - Requirement 2: Functional
- Requirement 3: Visibility changes shall take effect within 5 minutes, with clear status indicators showing the current visibility state.
  - Requirement 3: Non-Functional
- Requirement 4: The system shall maintain a version history of visibility changes, including timestamp and user who made the change, accessible to dataset owners.

- Requirement 4: Non-Functional
- Requirement 5: Public datasets with active citations or bookmarks shall display a warning before hiding, showing potential impact (e.g., "This dataset has 12 external references").
  - Requirement 5: Functional
- Requirement 6: Hidden datasets shall retain all metadata, permissions, and analytics data, becoming fully restorable to public status without data loss.
  - Requirement 6: Non-Functional

**User Story 35:** As a Data Publishing User, I want to have a view on all the datasets I have published, So that I can perform management actions on my own datasets.

**Requirements:**

- Requirement 1: The system shall provide a centralized "My Datasets" dashboard displaying all published datasets owned by the user in a sortable, paginated table view.
  - Requirement 1: Functional
- Requirement 2: Each dataset entry shall display key metadata (publication date, last modified, visibility status, download counts) and quick-action icons (edit, share, hide).
  - Requirement 2: Functional
- Requirement 3: The dashboard shall load within 3 seconds for users with up to 500 datasets, with progressive loading for larger collections.
  - Requirement 3: Non-Functional
- Requirement 4: Users shall be able to filter datasets by publication date range, visibility status (public/private), file type, and tags using persistent filter settings.
  - Requirement 4: Functional
- Requirement 5: Bulk actions (visibility changes, metadata updates, deletions) shall be available for selected datasets, with clear confirmation dialogs for irreversible actions.
  - Requirement 5: Functional

- Requirement 6: The dashboard shall include visual indicators for datasets requiring attention (expiring licenses, outdated metadata, or broken links) with resolution workflows.
  - Requirement 6: Functional

**User Story 36:** As an API user, I want to be able to change the colors of the embedded visualisations in my own platform, So that I can customize the visualisations.

**Requirements:**

- Requirement 1: The API shall accept color customization parameters (HEX/RGB values) for all visualization elements (bars, lines, backgrounds, text) via a PATCH endpoint.
  - Requirement 1: Functional
- Requirement 2: Color changes shall render in embedded visualizations within 5 seconds of API request completion, without requiring page reloads.
  - Requirement 2: Non-Functional
- Requirement 3: The API shall validate color inputs against accessibility contrast ratios (WCAG 2.1 AA) and suggest alternatives for non-compliant combinations.
  - Requirement 3: Non-Functional
- Requirement 4: Custom color schemes shall persist across sessions when stored via API, but remain editable through subsequent calls.
  - Requirement 4: Functional
- Requirement 5: The API shall provide predefined, organization-approved color palettes as optional parameters while allowing full customizations.
  - Requirement 5: Functional
- Requirement 6: All color customization requests shall include an optional "label" parameter to name and retrieve specific theme variations.
  - Requirement 6: Functional

**User Story 37:** As a site visitor, I want to read a new article on the front page about once a week, so that I am up on all the latest happenings.

### **Requirements:**

- Requirement 1: The system shall publish at least one new featured article on the homepage every 7 days ( $\pm 12$  hours), with clear publication timestamps.
  - o Requirement 1: Functional
- Requirement 2: New articles shall automatically replace the previous week's featured content in the prime homepage position, while maintaining an accessible archive.
  - o Requirement 2: Functional
- Requirement 3: Article teasers on the homepage shall load within 2 seconds for 95% of users, even with multimedia content (images/videos).
  - o Requirement 3: Non-Functional
- Requirement 4: Visitors shall be able to subscribe to weekly email/SMS notifications announcing new articles, with opt-out preferences.
  - o Requirement 4: Functional
- Requirement 5: The homepage shall visually distinguish new articles (e.g., "NEW" badge) for at least 7 days after publication.
  - o Requirement 5: Non-Functional
- Requirement 6: All articles shall display read-time estimates and maintain consistent formatting across devices (desktop/mobile/tablet).
  - o Requirement 6: Non-Functional

**User Story 38:** As a site visitor, I want to do a full-text search of article body, title, and author name, so that I can find what I want.

### **Requirements:**

- Requirement 1: The search interface shall allow queries across article titles, full text, and author names simultaneously, with results ranked by relevance.
  - o Requirement 1: Functional
- Requirement 2: Search results shall be returned within 1.5 seconds for 95% of queries on databases containing up to 10,000 articles.
  - o Requirement 2: Non-Functional

- Requirement 3: The system shall support Boolean operators (AND/OR/NOT) and phrase matching (quoted terms) for precise searching.
  - o Requirement 3: Functional
- Requirement 4: Results shall display highlighted matching terms in context snippets, showing where matches occurred (title/body/author).
  - o Requirement 4: Functional
- Requirement 5: All searchable content shall be reindexed automatically within 1 hour of article publication or edits.
  - o Requirement 5: Non-Functional
- Requirement 6: The interface shall provide spelling suggestions ("Did you mean...?") for queries with likely typos, based on common search patterns.
  - o Requirement 6: Functional

**User Story 39:** As a site editor, I want to edit the content of the email automatically sent to new Certified Scrum Masters and Product Owners, so that I don't need to involve a programmer on simple email edits.

**Requirements:**

- Requirement 1: The system shall provide a WYSIWYG editor interface for modifying email templates, accessible to authorized editors without coding skills.
  - o Requirement 1: Functional
- Requirement 2: Editors shall be able to preview email templates exactly as they will appear to recipients (including mobile rendering) before saving changes.
  - o Requirement 2: Functional
- Requirement 3: All template edits shall be version-controlled, allowing rollback to previous versions with timestamps and editor attribution.
  - o Requirement 3: Non-Functional
- Requirement 4: The system shall maintain separate templates for Scrum Masters and Product Owners while sharing common layout elements.
  - o Requirement 4: Functional

- Requirement 5: Template changes shall propagate to the email system within 5 minutes of being saved, without requiring deployment cycles.
  - o Requirement 5: Non-Functional
- Requirement 6: Editors shall be able to insert dynamic variables (e.g., {{first\_name}}, {{certification\_date}}) that auto-populate from user profiles.
  - o Requirement 6: Functional

**User Story 40:** As a moderator, I want to export a transcript of a game as a HTML file, so that I can save the stories and estimates locally.

**Requirements:**

- Requirement 1: The system shall provide an "Export as HTML" button in the moderator interface that generates a complete transcript including all user stories, estimates, discussion points, and final decisions.
  - o Requirement 1: Functional
- Requirement 2: Exported HTML files shall maintain the original chronological order of events with timestamps for each action (e.g., "14:32 - Story 3 estimated at 5 points").
  - o Requirement 2: Functional
- Requirement 3: The export process shall complete within 15 seconds for games containing up to 100 stories, producing files under 2MB in size.
  - o Requirement 3: Non-Functional
- Requirement 4: HTML output shall use semantic markup (proper heading hierarchy, for estimates, for discussions) for accessibility and readability.
  - o Requirement 4: Non-Functional
- Requirement 5: Moderators shall be able to select between "Basic" (story+estimates only) and "Full" (including all discussions) export formats before generation.
  - o Requirement 5: Functional
- Requirement 6: Exported files shall include metadata (game ID, date, moderator name) in both visible content and HTML tags.

- Requirement 6: Functional

**User Story 41:** As an estimator, I want to see all items we will try to estimate this session, so that I have a feel for the sizes of the various items.

**Requirements:**

- Requirement 1: The system shall display a scrollable list of all items to be estimated in the upcoming session, showing titles and brief descriptions.
  - Requirement 1: Functional
- Requirement 2: Items shall be visually grouped by category or type (e.g., Features, Bugs, Chores) with expandable/collapsible sections.
  - Requirement 2: Functional
- Requirement 3: The list shall load completely within 3 seconds for sessions containing up to 50 items, with progressive loading for larger sessions.
  - Requirement 3: Non-Functional
- Requirement 4: Each item shall display its historical estimation data (if available) including previous estimates and actual time spent.
  - Requirement 4: Functional
- Requirement 5: Estimators shall be able to filter/sort items by size, priority, or complexity before the session begins.
  - Requirement 5: Functional
- Requirement 6: The interface shall maintain this preview view throughout the session, with visual indicators showing which items have been completed.
  - Requirement 6: Non-Functional

**User Story 42:** As a participant, I want to always have the cards in the same order across multiple draws, so that it's easy to compare estimates.

### **Requirements:**

- Requirement 1: The system shall maintain a consistent default card order (e.g., ascending by value) for all estimation sessions, preserved across page refreshes and new draws.
  - Requirement 1: Functional
- Requirement 2: Card order shall be visually indicated through sequential numbering or positioning (left-to-right/top-to-bottom) that remains stable throughout the session.
  - Requirement 2: Functional
- Requirement 3: The chosen card order shall persist when switching between different views (e.g., from grid to list view) without reordering.
  - Requirement 3: Non-Functional
- Requirement 4: Participants shall be able to toggle between the default order and custom sorting (e.g., by frequency used) with one click, while maintaining the original order as the baseline.
  - Requirement 4: Functional
- Requirement 5: The system shall remember each participant's preferred card order preference (default/custom) across sessions when logged in.
  - Requirement 5: Non-Functional
- Requirement 6: Card reordering operations shall complete within 1 second for decks of up to 100 cards, with no visible latency during drag-and-drop interactions.
  - Requirement 6: Non-Functional

**User Story 43:** As a collection curator, I want to lift an embargo for an object in a simple way.

### **Requirements:**

- Requirement 1: The system shall provide a one-click "Lift Embargo" button on each embargoed object's management page, clearly visible to authorized curators.
  - Requirement 1: Functional

- Requirement 2: Before finalizing, the system shall display a summary of embargo details (start/end dates, restrictions) and require curator confirmation.
  - Requirement 2: Functional
- Requirement 3: Embargo removal shall take effect immediately, with object visibility updated across all platforms within 5 minutes.
  - Requirement 3: Non-Functional
- Requirement 4: The system shall automatically notify relevant stakeholders (researchers, legal team) via email when embargoes are lifted.
  - Requirement 4: Functional
- Requirement 5: All embargo changes shall be recorded in an audit log with timestamp, curator identity, and previous embargo terms.
  - Requirement 5: Non-Functional
- Requirement 6: Curators shall be able to lift embargoes in bulk for multiple objects sharing the same embargo terms through a batch action interface.
  - Requirement 6: Functional

**User Story 44:** As a repoadmin, I want to have the license be recorded in metadata and displayed alongside the item.

**Requirements:**

- Requirement 1: The system shall provide a mandatory license field in the item metadata schema, supporting standard license types (e.g., CC-BY, MIT, Apache 2.0) with autocomplete functionality.
  - Requirement 1: Functional
- Requirement 2: The selected license shall be displayed prominently near the item title in all public views, with a clickable link to the full license text.
  - Requirement 2: Functional
- Requirement 3: License metadata shall be stored in both human-readable and machine-readable (e.g., SPDX) formats for API consumption.
  - Requirement 3: Non-Functional

- Requirement 4: Repoadmins shall be able to batch update licenses for multiple items, with change confirmation and preview before application.
  - o Requirement 4: Functional
- Requirement 5: The system shall validate license compatibility when items with different licenses are bundled, issuing warnings for potential conflicts.
  - o Requirement 5: Functional
- Requirement 6: All license changes shall be recorded in the item's version history, preserving previous license information with timestamps and admin attribution.
  - o Requirement 6: Non-Functional

**User Story 45:** As a collection curator, I want to have a tool to perform author authority control.

**Requirements:**

- Requirement 1: The system shall provide an interface to search, compare, and merge author records, with suggestions for potential duplicates based on name similarity, affiliations, and publication history.
  - o Requirement 1: Functional
- Requirement 2: The tool shall integrate with standard authority files (e.g., VIAF, ORCID, LCNAF) to suggest authoritative forms of names and disambiguate authors.
  - o Requirement 2: Functional
- Requirement 3: All changes to author records shall be logged with timestamp, curator identity, and previous values, maintaining a full audit trail.
  - o Requirement 3: Non-Functional
- Requirement 4: The system shall display a preview of affected items before applying authority control changes, allowing curators to verify impacts.
  - o Requirement 4: Functional
- Requirement 5: The tool shall process up to 10,000 author records in under 5 minutes for batch operations, with progress indicators.

- Requirement 5: Non-Functional
- Requirement 6: Curators shall be able to export authority control reports showing all changes made during a session in standardized formats (CSV, JSON).
  - Requirement 6: Functional

**User Story 46:** As a depositor, I want to get feedback post-ingest alerting me if files I submitted do not conform to their format specifications, if they are not valid, or if they are not wellformed.

**Requirements:**

- Requirement 1: The system shall automatically validate all submitted files against their declared format specifications (e.g., PDF/A, TIFF, XML) and generate a detailed report of any non-conformities.
  - Requirement 1: Functional
- Requirement 2: Depositors shall receive an email notification within 15 minutes of ingest completion, summarizing validation results with clear severity indicators (Error, Warning, Info).
  - Requirement 2: Non-Functional
- Requirement 3: The validation report shall include specific line numbers, byte offsets, or visual markers indicating where format violations occur in problematic files.
  - Requirement 3: Functional
- Requirement 4: For invalid but salvageable files, the system shall provide actionable remediation suggestions (e.g., "Convert to PDF/A-1b using tool X").
  - Requirement 4: Functional
- Requirement 5: Validation feedback shall be accessible via both email and a persistent dashboard, remaining available for at least 30 days post-ingest.
  - Requirement 5: Non-Functional

- Requirement 6: The system shall maintain a machine-readable log of all validation outcomes (JSON/XML) for integration with external preservation systems.
  - o Requirement 6: Non-Functional

**User Story 47:** As a user, I want to revert to an older version of an uploaded file.

**Requirements:**

- Requirement 1: The system shall maintain a complete version history for all uploaded files, preserving each version with its timestamp and uploader information.
  - o Requirement 1: Functional
- Requirement 2: Users shall be able to preview older file versions (including content and metadata) before initiating a reversion.
  - o Requirement 2: Functional
- Requirement 3: The reversion process shall be executable with one click after confirmation, completing within 30 seconds for files under 100MB.
  - o Requirement 3: Non-Functional
- Requirement 4: Reverted files shall maintain their original version history chain, with the reversion action recorded as a new version entry.
  - o Requirement 4: Non-Functional
- Requirement 5: The system shall notify all collaborators when a file is reverted, indicating which version was restored and who performed the action.
  - o Requirement 5: Functional
- Requirement 6: Users shall be able to filter the version history by date range, file size, or uploader to quickly locate specific versions.
  - o Requirement 6: Functional

**User Story 48:** As a user, I want to filter the files I get from search results based on their type.

### Requirements:

- Requirement 1: The search interface shall include a file type filter dropdown with common file extensions (e.g., PDF, DOCX, JPG, MP4) that updates results in real-time when selected.
  - o Requirement 1: Functional
- Requirement 2: File type filters shall be applied client-side for sub-second response times when refining search results, without requiring server round-trips.
  - o Requirement 2: Non-Functional
- Requirement 3: The system shall display the number of matching results for each file type filter option next to its label (e.g., "PDF (142)").
  - o Requirement 3: Functional
- Requirement 4: Users shall be able to select multiple file types simultaneously (e.g., PDF + DOCX) with logical OR filtering behavior.
  - o Requirement 4: Functional
- Requirement 5: File type icons shall appear beside each result in filtered views, consistently matching the actual file extensions.
  - o Requirement 5: Non-Functional
- Requirement 6: Selected file type filters shall persist across pagination and remain visible/editable in a "Current Filters" summary panel.
  - o Requirement 6: Functional

**User Story 49:** As a researcher, I want to upload files prior to having them attached to a log book page.

### Requirements:

- Requirement 1: The system shall provide a "Temporary Uploads" area where researchers can upload files without immediate logbook assignment, with a 30-day retention policy.
  - o Requirement 1: Functional

- Requirement 2: Uploaded files shall receive automatic virus scanning and format validation, with results visible to the researcher within 1 minute of upload completion.
  - Requirement 2: Non-Functional
- Requirement 3: Researchers shall be able to preview, rename, and add descriptive metadata to uploaded files before logbook attachment.
  - Requirement 3: Functional
- Requirement 4: The interface shall clearly distinguish between attached logbook files and temporary uploads using visual indicators (icons/color coding).
  - Requirement 4: Non-Functional
- Requirement 5: When attaching to a logbook page, researchers shall be able to select multiple temporary uploads simultaneously through checkbox selection.
  - Requirement 5: Functional
- Requirement 6: The system shall automatically purge unassigned temporary uploads after 30 days, with email warnings sent at 25 days and 29 days.
  - Requirement 6: Non-Functional

**User Story 50:** As a researcher, I want to have the ability to locate and access data that colleagues want to share.

**Requirements:**

- Requirement 1: The system shall provide a dedicated "Shared Data" repository visible to all authorized researchers, with filtering by department, project, and data type.
  - Requirement 1: Functional
- Requirement 2: Shared datasets shall include complete metadata (owner, creation date, description, access requirements) and be searchable via full-text and keywords.
  - Requirement 2: Functional

- Requirement 3: Researchers shall receive real-time notifications when new data matching their interests is shared, based on configurable alerts.
  - o Requirement 3: Non-Functional
- Requirement 4: Access to shared data shall respect institutional policies, requiring owner approval for restricted files while allowing immediate access to open datasets.
  - o Requirement 4: Non-Functional
- Requirement 5: The system shall display data lineage information (provenance, transformations) for shared datasets to ensure proper attribution and reproducibility.
  - o Requirement 5: Functional
- Requirement 6: Shared data shall be accessible via API for programmatic access, with response times under 500ms for metadata queries.
  - o Requirement 6: Non-Functional

## APPENDIX BD

### CLAUDE TEST RESULTS WITH PROMPT PATTERN

In this section, Claude will convert the given prompt patterns and user stories into requirements.

**User Story 1:** As an Agency user, I want to accurately see who created a submission, so that I'm not confused about who last updated a submission.

#### Requirements:

- Requirement 1: The system shall display the name of the user who initially created each submission in a clearly labeled field on the submission detail view.
  - o Requirement 1: Functional
- Requirement 2: The system shall display the name of the user who last updated each submission in a clearly labeled field on the submission detail view.
  - o Requirement 2: Functional
- Requirement 3: The system shall maintain a complete audit trail of all users who have modified a submission, including timestamps of each modification.
  - o Requirement 3: Functional
- Requirement 4: The system shall visually distinguish between the original creator and the last updater when they are different users.
  - o Requirement 4: Functional
- Requirement 5: The system shall provide authorized Agency users with the ability to view the full modification history of any submission.
  - o Requirement 5: Functional
- Requirement 6: The system shall update the "last updated by" information within 5 seconds of any submission modification.
  - o Requirement 6: Non-Functional

**User Story 2:** As an Agency user, I want the header information box to show updated date AND time, so that I know when it was updated.

**Requirements:**

- Requirement 1: The system shall display both the date and time of the last update in the header information box for all agency users.
  - o Requirement 1: Functional
- Requirement 2: The system shall update the timestamp in the header information box within 5 seconds of any modification to the associated content.
  - o Requirement 2: Non-Functional
- Requirement 3: The system shall display the date and time in a consistent format across all header information boxes according to the agency user's configured timezone.
  - o Requirement 3: Functional
- Requirement 4: The system shall provide a hover or click feature that reveals additional details about the update, including who made the update.
  - o Requirement 4: Functional
- Requirement 5: The system shall visually highlight the updated timestamp for 24 hours after a change has been made to draw attention to recent updates.
  - o Requirement 5: Functional
- Requirement 6: The system shall maintain an audit log of all timestamp updates that can be accessed by authorized agency users.
  - o Requirement 6: Functional

**User Story 3:** As a Plan Review Staff member, I want to successfully Conduct a Plan Review Meeting with the Applicant and record the outcome, so that I can listen to it again.

## Requirements:

- Requirement 1: The system shall provide Plan Review Staff members with the ability to initiate and record a Plan Review Meeting with an Applicant within the application interface.
  - o Requirement 1: Functional
- Requirement 2: The system shall store meeting recordings in a secure, accessible location and maintain them for a minimum of 5 years after the meeting date.
  - o Requirement 2: Functional
- Requirement 3: The system shall allow Plan Review Staff members to access, play back, and download recordings of previous Plan Review Meetings they have conducted or are authorized to view.
  - o Requirement 3: Functional
- Requirement 4: The system shall ensure audio recording quality maintains a minimum clarity level sufficient for accurate comprehension of all meeting participants.
  - o Requirement 4: Non-Functional
- Requirement 5: The system shall automatically associate meeting recordings with the corresponding application record and display this association in the application interface.
  - o Requirement 5: Functional
- Requirement 6: The system shall notify and obtain consent from all meeting participants that the session will be recorded before initiating the recording function.
  - o Requirement 6: Functional

**User Story 4:** As a Public User, I want to Search for Information, so that I can obtain publicly available information concerning properties, County services, processes and other general information.

## **Requirements:**

- Requirement 1: The system shall provide a search function accessible to all public users without requiring login credentials.
  - Requirement 1: Functional
- Requirement 2: The system shall allow public users to search by multiple criteria including property address, parcel number, owner name, permit type, and service category.
  - Requirement 2: Functional
- Requirement 3: The system shall return search results within 3 seconds for standard queries under normal load conditions.
  - Requirement 3: Non-Functional
- Requirement 4: The system shall provide filtering capabilities to refine search results based on relevant categories such as information type, date range, and geographic location.
  - Requirement 4: Functional
- Requirement 5: The system shall display only publicly available information in search results, automatically filtering out confidential or restricted data.
  - Requirement 5: Functional
- Requirement 6: The system shall provide accessibility features that comply with WCAG 2.1 AA standards to ensure information is accessible to users with disabilities.
  - Requirement 6: Non-Functional

**User Story 5:** As a user, I want to view user documentation for the website, so that I know how to use the web app.

## **Requirements:**

- Requirement 1: The system shall provide a dedicated "Help" or "Documentation" section accessible from all pages of the web application.
  - Requirement 1: Functional
- Requirement 2: The system shall organize documentation content in a logical structure with categories, subcategories, and searchable topics.

- Requirement 2: Functional
- Requirement 3: The system shall provide context-sensitive help that displays relevant documentation based on the user's current location in the web application.
  - Requirement 3: Functional
- Requirement 4: The system shall support multiple documentation formats including text, images, and video tutorials to accommodate different learning preferences.
  - Requirement 4: Functional
- Requirement 5: The documentation shall maintain a minimum readability score of 70 on the Flesch Reading Ease scale to ensure content is understandable by users with various literacy levels.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall allow users to provide feedback on the usefulness of specific documentation content and suggest improvements.
  - Requirement 6: Functional

**User Story 6:** As an admin, I want to be able to block specific users based on IP address, so that I can prevent spamming on the websites.

**Requirements:**

- Requirement 1: The system shall provide administrators with the ability to block user access based on specific IP addresses or IP address ranges.
  - Requirement 1: Functional
- Requirement 2: The system shall implement blocked IP restrictions within 30 seconds of an administrator submitting a block request.
  - Requirement 2: Functional
- Requirement 3: The system shall maintain a log of all blocking actions, including the admin who initiated the block, timestamp, blocked IP address, and reason for blocking.
  - Requirement 3: Functional

- Requirement 4: The system shall allow administrators to set temporary or permanent IP blocks with configurable expiration dates and times.
  - o Requirement 4: Functional
- Requirement 5: The system shall provide administrators with the ability to view, modify, and remove existing IP blocks through an administrative interface.
  - o Requirement 5: Functional
- Requirement 6: The system shall display a customizable message to users attempting to access the website from blocked IP addresses, informing them of the restriction.
  - o Requirement 6: Non-Functional

**User Story 7:** As an Inspector, I want to Conduct Inspections, so that I can validate Customer compliance with code and regulations and provide results of the inspection to the Customer.

**Requirements:**

- Requirement 1: The system shall provide Inspectors with mobile access to scheduled inspection details including location, type, applicable codes, and customer information.
  - o Requirement 1: Functional
- Requirement 2: The system shall enable Inspectors to record inspection findings using standardized checklists with the ability to add custom comments and photo documentation.
  - o Requirement 2: Functional
- Requirement 3: The system shall allow Inspectors to mark inspection items as "Pass," "Fail," or "Not Applicable" with mandatory comments for failed items.
  - o Requirement 3: Functional
- Requirement 4: The system shall generate inspection reports immediately upon completion that can be electronically delivered to the Customer.
  - o Requirement 4: Functional

- Requirement 5: The system shall operate in offline mode with automatic synchronization when connectivity is restored to support inspections in areas with limited network access.
  - Requirement 5: Functional
- Requirement 6: The system shall maintain 99.5% uptime during standard business hours to ensure reliable access for Inspectors conducting field work.
  - Requirement 6: Non-Functional

**User Story 8:** As an admin, I want to be able to communicate directly with facilities, so that I can keep them updated about features we have on our website.

**Requirements:**

- Requirement 1: The system shall provide administrators with the ability to send communications to individual facilities, facility groups, or all facilities simultaneously.
  - Requirement 1: Functional
- Requirement 2: The system shall support multiple communication channels including in-app notifications, email, and SMS messages for facility updates.
  - Requirement 2: Functional
- Requirement 3: The system shall enable administrators to create, preview, schedule, and track delivery status of communications to facilities.
  - Requirement 3: Functional
- Requirement 4: The system shall maintain a searchable archive of all communications sent to facilities, including message content, recipients, delivery status, and read receipts.
  - Requirement 4: Functional
- Requirement 5: The system shall allow administrators to create communication templates for frequent or standard update types related to website features.
  - Requirement 5: Functional

- Requirement 6: The system shall deliver 99% of communications to their intended recipients within 5 minutes of submission under normal operating conditions.
  - Requirement 6: Non-Functional

**User Story 9:** As a Data Consuming User, I want to be able to search any dataset published and publicly accessible by their title and metadata, So that I can find the datasets I'm interested in.

**Requirements:**

- Requirement 1: The system shall provide a search functionality that allows users to enter keywords to find datasets by their titles.
  - Requirement 1: Functional
- Requirement 2: The system shall enable filtering of search results based on dataset metadata attributes including but not limited to: author, date published, file format, and subject category.
  - Requirement 2: Functional
- Requirement 3: The system shall return search results within 3 seconds after the user submits a search query under normal operating conditions.
  - Requirement 3: Non-Functional
- Requirement 4: The system shall display a minimum of 20 search results per page with pagination options to view additional results.
  - Requirement 4: Functional
- Requirement 5: The system shall provide autocomplete suggestions as users type in the search field based on existing dataset titles and metadata.
  - Requirement 5: Functional
- Requirement 6: The system shall maintain 99.5% uptime for the search functionality during standard business hours (8am-6pm local time).
  - Requirement 6: Non-Functional

**User Story 10:** As a Platform administrator, I want to be able to translate the data types hierarchies of the Viewer while in embed mode, So that my users can understand the interface in their native language.

### **Requirements:**

- Requirement 1: The system shall provide an administrative interface for platform administrators to upload and manage translations of data type hierarchies in the Viewer when in embed mode.
  - Requirement 1: Functional
- Requirement 2: The system shall support translation of all data type hierarchy labels and descriptions in a minimum of 10 languages, including but not limited to English, Spanish, French, German, Japanese, and Chinese.
  - Requirement 2: Functional
- Requirement 3: The system shall automatically apply the appropriate language translation based on the user's browser language settings or explicit language selection.
  - Requirement 3: Functional
- Requirement 4: The system shall maintain the original data structure and relationships when displaying translated data type hierarchies.
  - Requirement 4: Functional
- Requirement 5: The translation functionality shall not increase page load time by more than 500ms compared to non-translated views.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall provide a translation verification preview for administrators before publishing changes to end users.
  - Requirement 6: Functional

**User Story 11:** As a Data Consuming User, I want to be able to filter, sort and aggregate data by multiple dimensions and measures, So that I can get more granular views on the data.

### **Requirements:**

- Requirement 1: The system shall provide multiple filtering options that allow users to simultaneously apply constraints across at least 5 different data dimensions.
  - Requirement 1: Functional

- Requirement 2: The system shall enable users to sort data by any available dimension or measure in both ascending and descending order.
  - o Requirement 2: Functional
- Requirement 3: The system shall support standard aggregation functions including sum, average, count, minimum, maximum, and median across any numeric measure.
  - o Requirement 3: Functional
- Requirement 4: The system shall display filtered, sorted, and aggregated data within 3 seconds of user request for datasets up to 10 million records.
  - o Requirement 4: Non-Functional
- Requirement 5: The system shall allow users to save custom filter, sort, and aggregation configurations for future use.
  - o Requirement 5: Functional
- Requirement 6: The system shall provide a visual interface for creating and modifying filter, sort, and aggregation operations without requiring knowledge of query languages.
  - o Requirement 6: Functional

**User Story 12:** As a Publisher, I want to embed an interactive preview of my data on my site, so that users can be encouraged that this is the correct data for them.

**Requirements:**

- Requirement 1: The system shall provide an embeddable HTML/JavaScript code snippet that publishers can insert into their websites to display an interactive preview of their datasets.
  - o Requirement 1: Functional
- Requirement 2: The embedded data preview shall allow end users to interact with a sample of the dataset (minimum 20% or 100 rows, whichever is smaller) without requiring download of the complete dataset.
  - o Requirement 2: Functional
- Requirement 3: The embedded preview shall load within 5 seconds on standard broadband connections (10+ Mbps).

- Requirement 3: Non-Functional
- Requirement 4: The system shall provide customization options for publishers to control the visual appearance of the embedded preview, including colors, fonts, and layout to match their website design.
  - Requirement 4: Functional
- Requirement 5: The embedded preview shall be responsive and function correctly on devices with screen widths between 320px and 2560px.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall provide publishers with usage analytics for embedded previews, including view counts, interaction time, and conversion rates to full dataset access.
  - Requirement 6: Functional

**User Story 13:** As a Publisher, I want to know how many users have previewed a dataset, so that I know how interest in a dataset relates to its actual download numbers.

**Requirements:**

- Requirement 1: The system shall track and record each unique user preview of a dataset.
  - Requirement 1: Functional
- Requirement 2: The system shall provide a dashboard displaying the total preview count, download count, and conversion rate (downloads/previews) for each dataset published by the user.
  - Requirement 2: Functional
- Requirement 3: The system shall allow publishers to filter and sort preview and download metrics by date range, user demographics, and referral source.
  - Requirement 3: Functional
- Requirement 4: The system shall update preview and download metrics in the dashboard within 15 minutes of user activity.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall enable publishers to export usage metrics in CSV, Excel, and PDF formats.

- Requirement 5: Functional
- Requirement 6: The system shall maintain 99.5% accuracy in tracking preview and download events.
  - Requirement 5: Non-Functional

**User Story 14:** As a site editor, I want to assign priority numbers to news items, so that I can indicate which articles I want featured most prominently on the site.

**Requirements:**

- Requirement 1: The system shall provide a numeric priority field with values from 1-100 for each news item, where 1 represents the highest priority and 100 represents the lowest priority.
  - Requirement 1: Functional
- Requirement 2: The system shall allow site editors to modify the priority number of any news item through the content management interface.
  - Requirement 2: Functional
- Requirement 3: The system shall automatically sort and display news items on the website based on their assigned priority numbers, with higher priority items appearing in more prominent positions.
  - Requirement 3: Functional
- Requirement 4: The system shall update the display order of news items within 30 seconds after a priority number change is saved.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall provide a batch priority adjustment feature allowing editors to modify multiple news items' priorities simultaneously.
  - Requirement 5: Functional
- Requirement 6: The system shall maintain an audit log of all priority changes, recording the editor name, timestamp, previous priority value, and new priority value.
  - Requirement 6: Functional

**User Story 15:** As a trainer, I want to update one of my existing courses or events, so that it reflects accurate information.

### **Requirements:**

- Requirement 1: The system shall provide trainers with an edit interface to update all course details including title, description, curriculum, dates, times, location, and pricing for any course they have created.
  - Requirement 1: Functional
- Requirement 2: The system shall automatically notify all registered participants when critical course information (dates, times, location) is modified.
  - Requirement 2: Functional
- Requirement 3: The system shall maintain a version history of all course edits, allowing trainers to view and restore previous versions if needed.
  - Requirement 3: Functional
- Requirement 4: The system shall complete course information updates and publish them to all relevant pages within 2 minutes of submission.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall allow trainers to preview changes before publishing them to ensure accuracy.
  - Requirement 5: Functional
- Requirement 6: The system shall implement validation to prevent critical fields from being left blank during the update process.
  - Requirement 6: Functional

**User Story 16:** As a site visitor, I want to have an advanced search option that lets me fill in a form of search criteria, so that I can quickly find what I am looking for.

### **Requirements:**

- Requirement 1: The system shall provide an advanced search interface with a minimum of 10 searchable criteria fields including date range, categories, tags, author, content type, and keyword relevance.
  - Requirement 1: Functional
- Requirement 2: The system shall allow users to combine multiple search criteria using AND/OR logical operators to refine search results.

- Requirement 2: Functional
- Requirement 3: The system shall return search results within 3 seconds after submission of the advanced search form for queries with up to 5 simultaneous criteria.
  - Requirement 3: Non-Functional
- Requirement 4: The system shall provide the ability to save search criteria as named presets for future use by registered users.
  - Requirement 4: Functional
- Requirement 5: The system shall display search results in a sortable and filterable format, allowing users to further refine results after the initial search.
  - Requirement 5: Functional
- Requirement 6: The advanced search interface shall be accessible according to WCAG 2.1 AA standards, ensuring usability for visitors with disabilities.
  - Requirement 6: Non-Functional

**User Story 17:** As a recruiter, I want to be able to extend an ad for another 30 days by visiting the site and updating the posting, so that my ad remains active.

shall ensure that the extended job ad is displayed correctly on the job board.

**Requirements:**

- Requirement 1: The system shall provide a clearly visible "Extend Ad" button on the ad management dashboard for all active and expired ads that are less than 90 days old.
  - Requirement 1: Functional
- Requirement 2: The system shall automatically extend the ad's expiration date by 30 calendar days from the current expiration date when the extension function is activated.
  - Requirement 2: Functional
- Requirement 3: The system shall display the updated expiration date and confirmation message within 5 seconds after the extension is processed.
  - Requirement 3: Non-Functional

- Requirement 4: The system shall provide recruiters with the option to update ad content during the extension process without requiring a separate workflow.
  - Requirement 4: Functional
- Requirement 5: The system shall notify recruiters via email 7 days before an ad expires with a direct link to extend the posting.
  - Requirement 5: Functional
- Requirement 6: The system shall maintain 99.9% uptime for the ad extension functionality during business hours (8am-8pm in all time zones where the service operates).
  - Requirement 6: Non-Functional

**User Story 18:** As a user researcher, I want to test the user research plan, so that I make sure the in-person interviews are effective and capturing the right information.

**Requirements:**

- Requirement 1: The system shall provide a dedicated testing environment for user researchers to conduct pilot interviews using the same interface and tools that will be used in actual research sessions.
  - Requirement 1: Functional
- Requirement 2: The system shall allow user researchers to create, save, and modify interview scripts with question branching logic based on participant responses.
  - Requirement 2: Functional
- Requirement 3: The system shall record all pilot interview sessions (audio, video, and screen interactions) for review and analysis by the research team.
  - Requirement 3: Functional
- Requirement 4: The system shall generate automated metrics on interview question effectiveness, including response length, sentiment analysis, and question completion rates.
  - Requirement 4: Functional

- Requirement 5: The system shall provide collaborative feedback tools allowing peer researchers to comment on specific moments in the pilot interviews.
  - Requirement 5: Functional
- Requirement 6: The system shall ensure that all test data is processed and available for review within 15 minutes of completing a pilot interview session.
  - Requirement 6: Non-Functional

**User Story 19:** As a data manager, I want to have the description of collected data sets that are used or updated throughout the project lifecycle, so that I can ensure the descriptions are current and add detail as the study proceeds.

**Requirements:**

- Requirement 1: The system shall provide a metadata management interface that allows data managers to create, view, and update dataset descriptions throughout the project lifecycle.
  - Requirement 1: Functional
- Requirement 2: The system shall maintain a version history of all dataset descriptions, including the date, time, and user associated with each modification.
  - Requirement 2: Functional
- Requirement 3: The system shall automatically flag dataset descriptions that have not been reviewed or updated within 30 days of the dataset being modified.
  - Requirement 3: Functional
- Requirement 4: The system shall provide a standardized template for dataset descriptions that includes mandatory fields for data structure, source, collection methodology, update frequency, and usage permissions.
  - Requirement 4: Functional

- Requirement 5: The system shall allow data managers to associate relevant documentation, such as data dictionaries and collection protocols, with each dataset description.
  - Requirement 5: Functional
- Requirement 6: The system shall ensure 99.9% availability of the dataset description management functionality during business hours (8am-6pm, Monday-Friday).
  - Requirement 6: Non-Functional

**User Story 20:** As an IT staff member, I want to know which kind of data types will be produced or collected, so that I can determine what basic support services and functionalities are required.

**Requirements:**

- Requirement 1: The system shall provide a comprehensive data catalog that automatically identifies and classifies all data types being produced or collected across the organization's applications and systems.
  - Requirement 1: Functional
- Requirement 2: The system shall generate detailed reports on data volume projections by type, including structured data (relational databases), unstructured data (documents, images, videos), and semi-structured data (JSON, XML).
  - Requirement 2: Functional
- Requirement 3: The system shall notify IT staff members when new data types are introduced into the environment within 24 hours of detection.
  - Requirement 3: Functional
- Requirement 4: The system shall provide a dashboard showing storage requirements, processing needs, and security classifications for each identified data type.
  - Requirement 4: Functional

- Requirement 5: The system shall integrate with existing IT service management tools to automatically suggest appropriate support services based on identified data types.
  - Requirement 5: Functional
- Requirement 6: The system shall maintain 99.5% accuracy in data type identification and classification.
  - Requirement 6: Non-Functional

**User Story 21:** As a depositor, I want to deposit the files that I have, so that I don't have to spend a lot of time finding the right version and converting to the right format.

**Requirements:**

- Requirement 1: The system shall accept file uploads in at least 50 common file formats including PDF, DOCX, XLSX, CSV, JPG, PNG, MP4, and ZIP.
  - Requirement 1: Functional
- Requirement 2: The system shall provide drag-and-drop functionality for batch uploading multiple files simultaneously.
  - Requirement 2: Functional
- Requirement 3: The system shall automatically detect and extract metadata from uploaded files to minimize manual data entry.
  - Requirement 3: Functional
- Requirement 4: The system shall complete the processing and validation of uploaded files within 60 seconds for files up to 1GB in size.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall automatically convert non-preferred file formats to preservation-friendly formats in the background without requiring depositor intervention.
  - Requirement 5: Functional
- Requirement 6: The system shall provide clear, immediate feedback on upload success or failure, with specific error messages and suggested solutions when problems occur.
  - Requirement 6: Functional

**User Story 22:** As a Research Information manager, I want to track citation counts for published datasets, so that impact of datasets within academia can be demonstrated.

**Requirements:**

- Requirement 1: The system shall automatically track and update citation counts for published datasets by integrating with major academic citation databases including Web of Science, Scopus, Google Scholar, and Dimensions.
  - Requirement 1: Functional
- Requirement 2: The system shall generate citation reports for datasets showing total citations, citation growth over time, and comparative metrics against similar datasets in the same field.
  - Requirement 2: Functional
- Requirement 3: The system shall update citation metrics at least once per week to ensure current impact data is available.
  - Requirement 3: Functional
- Requirement 4: The system shall provide visualization tools for citation data including graphs, charts, and exportable reports in multiple formats (PDF, Excel, CSV).
  - Requirement 4: Functional
- Requirement 5: :The system shall maintain 98% accuracy in citation tracking compared to manual verification of citation counts.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall allow citation data to be filtered by time period, citing publication type, and academic discipline to enable detailed impact analysis.
  - Requirement 6: Functional

**User Story 23:** As a legal officer, I want to know about data sensitivity, so that I can establish sharing options.

## Requirements:

- Requirement 1: The system shall provide a data sensitivity classification module that automatically scans and categorizes datasets according to predefined sensitivity levels (e.g., public, internal, confidential, restricted).
  - o Requirement 1: Functional
- Requirement 2: The system shall generate detailed reports identifying specific types of sensitive data elements present in datasets, including PII, PHI, financial data, and intellectual property.
  - o Requirement 2: Functional
- Requirement 3: The system shall provide a rule-based engine allowing legal officers to establish sharing permissions based on data sensitivity classifications, user roles, and jurisdictional requirements.
  - o Requirement 3: Functional
- Requirement 4: The system shall maintain an audit log of all sensitivity assessments and sharing permission changes, including timestamp, user, rationale, and specific modifications.
  - o Requirement 4: Functional
- Requirement 5: The system shall process and classify datasets for sensitivity within 2 hours of submission for datasets up to 10GB in size.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall achieve a minimum of 99% accuracy in identifying regulated sensitive data elements as verified by manual legal review.
  - o Requirement 6: Non-Functional

**User Story 24:** As a data manager, I want to plan the anonymization of data, so that we protect the privacy of the people participating in the research as good as possible and still ensure reusability of data.

### **Requirements:**

- Requirement 1: The system shall provide data managers with configurable anonymization techniques including data masking, pseudonymization, generalization, and perturbation.
  - Requirement 1: Functional
- Requirement 2: The system shall allow data managers to define and save multiple anonymization profiles tailored to different research contexts and data sensitivity levels.
  - Requirement 2: Functional
- Requirement 3: The system shall enable data managers to preview the effects of anonymization strategies on data utility before implementing them permanently.
  - Requirement 3: Functional
- Requirement 4: The system shall generate detailed logs of all anonymization activities, including methods used, data fields affected, and transformation details for audit purposes.
  - Requirement 4: Functional
- Requirement 5: The system shall implement anonymization techniques that achieve a k-anonymity value of at least 5 for all published datasets.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall ensure that re-identification risk assessments are performed and documented before any anonymized data is released for research purposes.
  - Requirement 6: Functional

**User Story 25:** As a sponsor, I want to personalize my sponsorship page, so that I can promote my brand.

### **Requirements:**

- Requirement 1: The system shall provide sponsors with a dedicated self-service portal to customize their sponsorship page content, including text, images, and multimedia elements.

- Requirement 1: Functional
- Requirement 2: The system shall allow sponsors to upload and display their brand logo, color scheme, and fonts on their sponsorship page according to brand guidelines.
  - Requirement 2: Functional
- Requirement 3: The system shall support the inclusion of sponsor-defined call-to-action buttons with configurable link destinations and tracking parameters.
  - Requirement 3: Functional
- Requirement 4: The system shall provide analytics dashboards showing visitor engagement metrics for the sponsor's personalized page.
  - Requirement 4: Functional
- Requirement 5: The system shall enforce content moderation workflows ensuring all sponsor-provided content adheres to platform guidelines before publication.
  - Requirement 5: Functional
- Requirement 6: The system shall render customized sponsor pages with a page load time of less than 2 seconds for 95% of user requests.
  - Requirement 6: Non-Functional

**User Story 26:** As a UI designer, I want to redesign the Resources page, so that it matches the new Broker design styles.

**Requirements:**

- Requirement 1: The system shall implement the new Broker design system color palette, typography, and spacing guidelines throughout the Resources page.
  - Requirement 1: Non-Functional
- Requirement 2: The system shall support responsive layouts that maintain visual consistency with the Broker design styles across mobile, tablet, and desktop viewports.
  - Requirement 2: Non-Functional

- Requirement 3: The system shall provide UI designers with access to a component library containing all approved Broker design system elements for use in the Resources page redesign.
  - Requirement 3: Non-Functional
- Requirement 4: The system shall maintain accessibility compliance with WCAG 2.1 AA standards while implementing the new Broker design styles.
  - Requirement 4: Functional
- Requirement 5: The system shall support the creation and implementation of interactive design prototypes that can be reviewed and approved by stakeholders before development begins.
  - Requirement 5: Functional
- Requirement 6: The system shall enable A/B testing of the redesigned Resources page against the current version to measure user engagement metrics before full deployment.
  - Requirement 6: Functional

**User Story 27:** As a Developer , I want to clarify to users what exactly is triggering the CFDA error code in each case.

**Requirements:**

- Requirement 1: The system shall display specific error messages that clearly identify the exact condition triggering each CFDA error code.
  - Requirement 1: Functional
- Requirement 2: The system shall provide detailed documentation for developers that maps each CFDA error code to its corresponding validation rule and expected resolution approach.
  - Requirement 2: Functional
- Requirement 3: The system shall implement contextual help tooltips adjacent to CFDA error messages that explain the error in non-technical language.
  - Requirement 3: Functional

- Requirement 4: The system shall maintain a searchable error code knowledge base that developers can reference and update with new error conditions as they are discovered.
  - Requirement 4: Functional
- Requirement 5: The system shall log detailed diagnostic information for each CFDA error occurrence, including input values that triggered the error.
  - Requirement 5: Functional
- Requirement 6: The system shall ensure error messages display within 3 seconds of the error condition being detected.
  - Requirement 6: Non-Functional

**User Story 28:** As a broker team member, I want to make some updates to the SQL codes for clarity

**Requirements:**

- Requirement 1: The system shall provide broker team members with access to a version-controlled repository of all SQL code files used in the application.
  - Requirement 1: Functional
- Requirement 2: The system shall implement a code review workflow that requires approval from at least one senior team member before SQL code changes are deployed to production.
  - Requirement 2: Functional
- Requirement 3: The system shall enforce a standardized SQL formatting convention across all code files to maintain consistency and readability.
  - Requirement 3: Non-Functional
- Requirement 4: The system shall provide a documentation mechanism that allows broker team members to add explanatory comments to SQL code segments.
  - Requirement 4: Functional

- Requirement 5: The system shall include automated testing capabilities to verify that SQL code updates maintain the same functionality and data integrity as the original code.
  - Requirement 5: Functional
- Requirement 6: The system shall maintain a comprehensive changelog of all SQL code modifications, including the nature of the changes, justification, and implementing team member.
  - Requirement 6: Functional

**User Story 29:** As a Staff member, I want to Schedule a Meeting, so that I can bring the required parties together at a specific date/time to address an issue.

**Requirements:**

- Requirement 1: The system shall provide staff members with the ability to create meeting invitations with configurable date, time, duration, location, and participant list.
  - Requirement 1: Functional
- Requirement 2: The system shall automatically check participant availability and suggest alternative meeting times when conflicts are detected.
  - Requirement 2: Functional
- Requirement 3: The system shall distribute meeting invitations to all participants via email and in-app notifications, with options for participants to accept, decline, or propose new times.
  - Requirement 3: Functional
- Requirement 4: The system shall enable staff members to attach relevant documents, meeting agendas, and notes to meeting invitations.
  - Requirement 4: Functional
- Requirement 5: The system shall provide automated reminders to all meeting participants 24 hours and 1 hour before the scheduled meeting time.
  - Requirement 5: Functional
- Requirement 6: The system shall process meeting scheduling requests with a response time of less than 3 seconds under normal operating conditions.

- Requirement 6: Non-Functional

**User Story 30:** As a Staff member, I want to Manage Hearing Calendars, so that I can track hearing-related activities and due dates

**Requirements:**

- Requirement 1: The system shall provide staff members with the ability to create, view, edit, and delete hearing events on a centralized calendar interface.
  - Requirement 1: Functional
- Requirement 2: The system shall enable staff members to associate relevant case information, documents, and participants with each hearing calendar entry.
  - Requirement 2: Functional
- Requirement 3: The system shall automatically generate and track milestone dates and deadlines associated with each hearing based on configurable business rules.
  - Requirement 3: Functional
- Requirement 4: The system shall provide automated notifications to staff members for upcoming hearing-related deadlines at configurable intervals.
  - Requirement 4: Functional
- Requirement 5: The system shall support multiple calendar views including daily, weekly, monthly, and filtered views based on hearing type, location, or assigned staff.
  - Requirement 5: Functional
- Requirement 6: The system shall maintain 99.9% availability during business hours to ensure reliable access to hearing calendar information.
  - Requirement 6: Non-Functional

**User Story 31:** As a Development Staff member, I want to Issue a Development-related Permit, so that I can grant the request to the Applicant to begin work.

### **Requirements:**

- Requirement 1: The system shall provide Development Staff members with the ability to review all required application materials and verify that all prerequisites have been met before issuing a permit.
  - Requirement 1: Functional
- Requirement 2: The system shall enable Development Staff members to generate an official permit document with a unique identifier, issue date, expiration date, and all applicable terms and conditions.
  - Requirement 2: Functional
- Requirement 3: The system shall maintain a complete audit trail of all actions taken during the permit issuance process, including the staff member who issued the permit and timestamp.
  - Requirement 3: Functional
- Requirement 4: The system shall automatically notify the Applicant via email and in-app notification when their development permit has been issued.
  - Requirement 4: Functional
- Requirement 5: The system shall provide Development Staff members with the ability to attach specific conditions, restrictions, or special instructions to the issued permit.
  - Requirement 5: Functional
- Requirement 6: The system shall process permit issuance requests and generate official permit documents within 30 seconds of staff approval.
  - Requirement 6: Non-Functional

**User Story 32:** As an Enforcement Staff member, I want to Issue a Notice of Violation, so that I can provide formal communication to the responsible party.

### **Requirements:**

- Requirement 1: The system shall provide Enforcement Staff members with the ability to generate a Notice of Violation document containing violation

details, applicable codes/regulations violated, and required corrective actions.

- Requirement 1: Functional
- Requirement 2: The system shall allow Enforcement Staff members to attach supporting evidence including photographs, inspection reports, and previous communications to the Notice of Violation.
  - Requirement 2: Functional
- Requirement 3: The system shall enable Enforcement Staff members to specify compliance deadlines and potential consequences for non-compliance within the Notice of Violation.
  - Requirement 3: Functional
- Requirement 4: The system shall provide multiple delivery methods for Notices of Violation including email, certified mail, and in-person delivery with electronic signature capture.
  - Requirement 4: Functional
- Requirement 5: The system shall maintain a complete audit trail of all Notices of Violation including creation date, issuing staff member, delivery status, and recipient acknowledgment.
  - Requirement 5: Functional
- Requirement 6: The system shall generate Notices of Violation that comply with all legal formatting requirements and maintain 100% accuracy of cited code references.
  - Requirement 6: Non-Functional

**User Story 33:** As an API User, I want to be able to persistently store visualisation state in the database, So that such can be shared more easily and contribute to a visualisation gallery.

**Requirements:**

- Requirement 1: The system shall provide API endpoints for saving, retrieving, updating, and deleting visualization state data in the database.
  - Requirement 1: Functional

- Requirement 2: The system shall store visualization configurations including chart type, data mappings, filters, colors, labels, and interactive settings in a structured format.
  - Requirement 2: Functional
- Requirement 3: The system shall generate unique, shareable URLs for each stored visualization state that can be accessed without authentication.
  - Requirement 3: Functional
- Requirement 4: The system shall implement a tagging and categorization system to organize visualizations for inclusion in a searchable gallery.
  - Requirement 4: Functional
- Requirement 5: The system shall provide permission controls allowing API users to designate visualizations as private, shared with specific users, or public.
  - Requirement 5: Functional
- Requirement 6: The system shall process visualization state storage and retrieval requests with a response time of less than 2 seconds for 95% of requests under normal load.
  - Requirement 6: Non-Functional

**User Story 34:** As a Data Publishing User, I want to be able to Hide a dataset that I have already added as Public, So that I can fix my mistakes or have a dataset primarily for my own use.

**Requirements:**

- Requirement 1: The system shall provide Data Publishing Users with the ability to change the visibility status of their datasets from "Public" to "Hidden" through a dedicated interface control.
  - Requirement 1: Functional
- Requirement 2: The system shall immediately remove hidden datasets from public search results, listings, and access points when their status is changed.
  - Requirement 2: Functional

- Requirement 3: The system shall maintain all dataset content, metadata, and version history when a dataset's visibility status is changed to "Hidden."
  - o Requirement 3: Functional
- Requirement 4: The system shall notify users who have previously accessed or bookmarked the dataset that it is no longer publicly available.
  - o Requirement 4: Functional
- Requirement 5: The system shall provide Data Publishing Users with the ability to restore hidden datasets to public visibility with a single action.
  - o Requirement 5: Functional
- Requirement 6: The system shall implement visibility status changes within 5 seconds of the user request being submitted.
  - o Requirement 6: Non-Functional

**User Story 35:** As a Data Publishing User, I want to have a view on all the datasets I have published, So that I can perform management actions on my own datasets.

**Requirements:**

- Requirement 1: The system shall provide Data Publishing Users with a dedicated dashboard displaying all datasets they have published, including metadata such as publication date, visibility status, and usage metrics.
  - o Requirement 1: Functional
- Requirement 2: The system shall enable Data Publishing Users to filter and sort their published datasets based on multiple criteria including title, publication date, visibility status, and popularity.
  - o Requirement 2: Functional
- Requirement 3: The system shall allow Data Publishing Users to perform bulk management actions on multiple selected datasets simultaneously, including changing visibility status, updating metadata, and managing access permissions.
  - o Requirement 3: Functional

- Requirement 4: The system shall provide Data Publishing Users with detailed analytics for each published dataset, including view counts, download statistics, and user engagement metrics.
  - Requirement 4: Functional
- Requirement 5: The system shall notify Data Publishing Users of significant events related to their datasets, such as high traffic spikes, reaching usage milestones, or potential data quality issues.
  - Requirement 5: Functional
- Requirement 6: The system shall load the published datasets dashboard within 3 seconds for users with up to 500 published datasets under normal load conditions.
  - Requirement 6: Non-Functional

**User Story 36:** As an API user, I want to be able to change the colors of the embedded visualisations in my own platform, So that I can customize the visualisations.

**Requirements:**

- Requirement 1: The system shall provide API endpoints that allow users to customize the color scheme of embedded visualizations by specifying exact color values for individual chart elements.
  - Requirement 1: Functional
- Requirement 2: The system shall support multiple color specification formats including hexadecimal, RGB, RGBA, and HSL for maximum flexibility in visualization customization.
  - Requirement 2: Functional
- Requirement 3: The system shall enable API users to save custom color palettes as reusable themes that can be applied across multiple visualizations.
  - Requirement 3: Functional
- Requirement 4: The system shall provide programmatic access to modify visualization colors dynamically based on data values or external triggers from the hosting platform.
  - Requirement 4: Functional

- Requirement 5: The system shall maintain contrast ratios that adhere to WCAG 2.1 AA accessibility standards regardless of custom color selections.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall apply color customizations to embedded visualizations within 500 milliseconds of receiving the API request.
  - o Requirement 6: Non-Functional

**User Story 37:** As a site visitor, I want to read a new article on the front page about once a week, so that I am up on all the latest happenings.

**Requirements:**

- Requirement 1: The system shall publish a new featured article to the front page at least once every seven days.
  - o Requirement 1: Functional
- Requirement 2: The system shall provide a content management interface that allows editors to schedule articles for front page publication in advance.
  - o Requirement 2: Functional
- Requirement 3: The system shall display a "New" indicator beside front page articles that have been published within the last 72 hours.
  - o Requirement 3: Functional
- Requirement 4: The system shall notify registered users via email and/or push notification when a new article is published to the front page.
  - o Requirement 4: Functional
- Requirement 5: The system shall provide an archive feature that allows site visitors to access previous front page articles for at least 12 months after publication.
  - o Requirement 5: Functional
- Requirement 6: The system shall ensure front page articles load within 2 seconds for 95% of site visitors under normal traffic conditions.
  - o Requirement 6: Non-Functional

**User Story 38:** As a site visitor, I want to do a full-text search of article body, title, and author name, so that I can find what I want.

### **Requirements:**

- Requirement 1: The system shall provide a search function that allows site visitors to perform full-text searches across article body content, titles, and author names simultaneously.
  - Requirement 1: Functional
- Requirement 2: The system shall display search results ranked by relevance, with options to sort by date, title, or author name.
  - Requirement 2: Functional
- Requirement 3: The system shall support advanced search operators including exact phrase matching, Boolean operators (AND, OR, NOT), and wildcard characters.
  - Requirement 3: Functional
- Requirement 4: The system shall highlight matching search terms within the search results to help users quickly identify relevant content.
  - Requirement 4: Functional
- Requirement 5: The system shall provide search filters that allow users to narrow results by publication date range, article category, and content type.
  - Requirement 5: Functional
- Requirement 6: The system shall return search results within 2 seconds for 95% of queries under normal load conditions.
  - Requirement 6: Non-Functional

**User Story 39:** As a site editor, I want to edit the content of the email automatically sent to new Certified Scrum Masters and Product Owners, so that I don't need to involve a programmer on simple email edits.

### **Requirements:**

- Requirement 1: The system shall provide a user-friendly email template editor accessible to site editors without requiring technical knowledge or programming skills.
  - Requirement 1: Functional

- Requirement 2: The system shall allow editors to modify all content elements of certification emails including subject line, body text, images, links, and footer information.
  - Requirement 2: Functional
- Requirement 3: The system shall provide a WYSIWYG (What You See Is What You Get) interface for editing email templates with formatting options similar to common word processors.
  - Requirement 3: Functional
- Requirement 4: The system shall maintain dynamic variable fields for personalization (e.g., recipient name, certification type, date) that editors can place but not modify the underlying functionality of.
  - Requirement 4: Functional
- Requirement 5: The system shall include a preview function allowing editors to test how the email will appear across different email clients and devices before publishing changes.
  - Requirement 5: Functional
- Requirement 6: The system shall apply and activate edited email templates within 5 minutes of an editor saving and publishing changes.
  - Requirement 6: Non-Functional

**User Story 40:** As a moderator, I want to export a transcript of a game as a HTML file, so that I can save the stories and estimates locally.

**Requirements:**

- Requirement 1: The system shall provide a clearly labeled "Export Transcript" option accessible to users with moderator privileges from the game interface.
  - Requirement 1: Functional
- Requirement 2: The system shall generate an HTML file containing the complete game transcript, including all stories, estimates, participant names, timestamps, and final consensus values.
  - Requirement 2: Functional

- Requirement 3: The system shall format the HTML transcript with appropriate CSS styling to ensure readability, with clear visual distinction between stories, estimates, and participant contributions.
  - Requirement 3: Functional
- Requirement 4: The system shall complete the transcript export process within 10 seconds for games containing up to 500 conversation entries.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall include a unique filename for each exported transcript that contains the game ID, date, and moderator name.
  - Requirement 5: Functional
- Requirement 6: The system shall ensure that all special characters, emojis, and formatted text from the original game are properly preserved in the HTML export.
  - Requirement 6: Functional

**User Story 41:** As an estimator, I want to see all items we will try to estimate this session, so that I have a feel for the sizes of the various items.

**Requirements:**

- Requirement 1: The system shall display a comprehensive list view of all items scheduled for estimation in the current session, showing title, brief description, and item ID for each item.
  - Requirement 1: Functional
- Requirement 2: The system shall provide a sorting capability allowing estimators to arrange items by attributes including priority, complexity, category, and submission date.
  - Requirement 2: Functional
- Requirement 3: The system shall allow estimators to view a preliminary size comparison visualization of all items before detailed estimation begins.
  - Requirement 3: Functional

- Requirement 4: The system shall load the complete list of estimation items within 3 seconds of session initialization, even for sessions containing up to 100 items.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall enable estimators to expand any list item to see additional details without navigating away from the full list view.
  - Requirement 5: Functional
- Requirement 6: The system shall provide a dashboard showing statistical information about the estimation session, including total items, estimated completion time, and relative distribution of expected item sizes.
  - Requirement 6: Functional

**User Story 42:** As a participant, I want to always have the cards in the same order across multiple draws, so that it's easy to compare estimates.

**Requirements:**

- Requirement 1: The system shall maintain a consistent and fixed ordering of estimation cards for each participant throughout all estimation rounds within a session.
  - Requirement 1: Functional
- Requirement 2: The system shall arrange estimation cards in ascending numerical order from left to right (or top to bottom on mobile devices) for all participants.
  - Requirement 2: Functional
- Requirement 3: The system shall preserve the card order and positioning even when the estimation interface is refreshed or when a participant rejoins a session after disconnection.
  - Requirement 3: Functional
- Requirement 4: The system shall visually highlight previously selected cards in subsequent estimation rounds to aid in comparison.
  - Requirement 4: Functional

- Requirement 5: The system shall ensure that all card position changes and updates are rendered within 500ms across all participant devices to maintain synchronization.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall provide a configuration option for session moderators to enforce consistent card ordering across all participants.
  - Requirement 6: Functional

**User Story 43:** As a collection curator, I want to lift an embargo for an object in a simple way.

**Requirements:**

- Requirement 1: The system shall provide a single-action "Lift Embargo" button on the object management interface accessible to users with curator privileges.
  - Requirement 1: Functional
- Requirement 2: The system shall automatically update the object's accessibility status from "embargoed" to "public" across all connected platforms and repositories when an embargo is lifted.
  - Requirement 2: Functional
- Requirement 3: The system shall provide a confirmation dialog that displays the object details and embargo end date before finalizing the embargo lifting action.
  - Requirement 3: Functional
- Requirement 4: The system shall complete the embargo lifting process and make the object publicly accessible within 30 seconds of curator confirmation.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall maintain an audit log recording the date, time, user, and reason for lifting each embargo.
  - Requirement 5: Functional

- Requirement 6: The system shall send automated notifications to relevant stakeholders, including object owners and subscribers, when an embargo is lifted.
  - Requirement 6: Non-Functional

**User Story 44:** As a repoadmin, I want to have the license be recorded in metadata and displayed alongside the item.

**Requirements:**

- Requirement 1: The system shall provide a dedicated license field in the item metadata schema that supports both standard license types (e.g., Creative Commons, MIT, GPL) and custom license text.
  - Requirement 1: Functional
- Requirement 2: The system shall display the license information prominently alongside each item in all item view interfaces, including summary views, detailed views, and download pages.
  - Requirement 2: Functional
- Requirement 3: The system shall provide a visual icon representation of common license types that links to the full license text when clicked.
  - Requirement 3: Functional
- Requirement 4: The system shall enforce license metadata as a mandatory field that must be completed before an item can be published in the repository.
  - Requirement 4: Functional
- Requirement 5: The system shall provide an administrative interface allowing repository administrators to batch update license information across multiple items simultaneously.
  - Requirement 5: Functional
- Requirement 6: The system shall include license information in all metadata exports, API responses, and citation formats with 100% consistency.
  - Requirement 6: Non-Functional

**User Story 45:** As a collection curator, I want to have a tool to perform author authority control.

**Requirements:**

- Requirement 1: The system shall provide an author authority control interface that allows curators to search, create, merge, and manage author identity records across the collection.
  - o Requirement 1: Functional
- Requirement 2: The system shall automatically detect potential author name variants and duplicates using fuzzy matching algorithms with a minimum 90% accuracy rate.
  - o Requirement 2: Functional
- Requirement 3: The system shall integrate with external authority databases including ORCID, VIAF, and Library of Congress to validate and import standardized author information.
  - o Requirement 3: Functional
- Requirement 4: The system shall maintain a comprehensive audit trail of all author authority control actions, including the curator who made the change, timestamp, and specific modifications.
  - o Requirement 4: Functional
- Requirement 5: The system shall provide batch processing capabilities allowing curators to apply authority control changes across multiple records simultaneously.
  - o Requirement 5: Functional
- Requirement 6: The system shall complete 95% of individual author authority control operations within 3 seconds of curator submission.
  - o Requirement 6: Non-Functional

**User Story 46:** As a depositor, I want to get feedback post-ingest alerting me if files I submitted do not conform to their format specifications, if they are not valid, or if they are not wellformed.

### **Requirements:**

- Requirement 1: The system shall automatically validate all deposited files against their specified format specifications immediately after the ingest process completes.
  - Requirement 1: Functional
- Requirement 2: The system shall generate detailed validation reports identifying specific issues with file format conformance, validity, and well-formedness.
  - Requirement 2: Functional
- Requirement 3: The system shall notify depositors via email and in-application alerts within 10 minutes of completing the validation process when non-conforming files are detected.
  - Requirement 3: Functional
- Requirement 4: The system shall provide depositors with actionable recommendations for resolving identified file issues, including links to format specification documentation.
  - Requirement 4: Functional
- Requirement 5: The system shall enable depositors to download comprehensive validation reports containing technical details about each file issue for offline analysis.
  - Requirement 5: Functional
- Requirement 6: The system shall complete file validation processing for standard deposits (up to 1GB total size) within 5 minutes of ingest completion.
  - Requirement 6: Non-Functional

**User Story 47:** As a user, I want to revert to an older version of an uploaded file.

### **Requirements:**

- Requirement 1: The system shall maintain a complete version history of all uploaded files, including metadata and timestamps for each version.
  - Requirement 1: Functional

- Requirement 2: The system shall provide users with a version history interface that displays all previous versions of an uploaded file in chronological order.
  - Requirement 2: Functional
- Requirement 3: The system shall enable users to preview the content of previous file versions before selecting one to revert to.
  - Requirement 3: Functional
- Requirement 4: The system shall allow users to revert to any previous version of a file with a single action while preserving the complete version history.
  - Requirement 4: Functional
- Requirement 5: The system shall notify collaborators when a file has been reverted to a previous version, including which version was restored and by whom.
  - Requirement 5: Functional
- Requirement 6: The system shall complete the reversion process for files up to 1GB in size within 10 seconds under normal system load.
  - Requirement 6: Non-Functional

**User Story 48:** As a user, I want to filter the files I get from search results based on their type.

**Requirements:**

- Requirement 1: The system shall provide a file type filter interface that allows users to select one or multiple file types to narrow down search results.
  - Requirement 1: Functional
- Requirement 2: The system shall categorize files into standard groups (documents, images, videos, audio, spreadsheets, presentations, archives, and other) for easy filtering.
  - Requirement 2: Functional

- Requirement 3: The system shall display file type icons next to each search result to provide visual identification of file types.
  - Requirement 3: Functional
- Requirement 4: The system shall dynamically update search results within 1 second after a user selects or deselects a file type filter.
  - Requirement 4: Non-Functional
- Requirement 5: The system shall maintain filter selections when users navigate between search result pages or modify other search parameters.
  - Requirement 5: Functional
- Requirement 6: The system shall provide a count of available results for each file type to help users understand the distribution of file types in the current search results.
  - Requirement 6: Non-Functional

**User Story 49:** As a researcher, I want to upload files prior to having them attached to a log book page.

**Requirements:**

- Requirement 1: The system shall provide a dedicated file repository area where researchers can upload and store files independently of logbook page creation.
  - Requirement 1: Functional
- Requirement 2: The system shall maintain uploaded files in the researcher's personal repository for a minimum of 90 days before requiring attachment to a logbook page.
  - Requirement 2: Functional
- Requirement 3: The system shall provide a simple drag-and-drop interface for uploading multiple files simultaneously to the repository.
  - Requirement 3: Functional
- Requirement 4: The system shall allow researchers to organize pre-attached files with tags, folders, and descriptive metadata to facilitate later attachment to appropriate logbook pages.

- Requirement 4: Functional
- Requirement 5: The system shall process and store uploaded files within 10 seconds for files up to 500MB in size under normal network conditions.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall provide a seamless interface for selecting previously uploaded files when creating or editing logbook pages.
  - Requirement 6: Functional

**User Story 50:** As a researcher, I want to have the ability to locate and access data that colleagues want to share.

**Requirements:**

- Requirement 1: The system shall provide a searchable catalog of all shared datasets with filtering options by research domain, data type, date shared, and colleague name
  - Requirement 1: Functional
- Requirement 2: The system shall implement a notification mechanism that alerts researchers when colleagues share new data relevant to their declared research interests.
  - Requirement 2: Functional
- Requirement 3: The system shall provide immediate access to shared data through a single-click download or direct integration with analysis tools.
  - Requirement 3: Functional
- Requirement 4: The system shall display detailed metadata for each shared dataset including description, methodology, variables, and usage permissions.
  - Requirement 4: Functional
- Requirement 5: The system shall maintain 99.9% availability of the data sharing platform during standard research hours (8am-8pm, seven days a week).
  - Requirement 5: Non-Functional

- Requirement 6: The system shall provide a collaborative workspace where researchers can comment on, annotate, and discuss shared datasets with colleagues.
  - o Requirement 6: Functional



## APPENDIX BE

### QWEN TEST RESULTS WITH PROMPT PATTERN

In this section, Qwen will convert the given prompt patterns and user stories into requirements.

**User Story 1:** As an Agency user, I want to accurately see who created a submission, so that I'm not confused about who last updated a submission.

#### Requirements:

- Requirement 1: The system shall record and store the identity of the user who initially created each submission.
  - o Requirement 1: Functional
- Requirement 2: The system shall display the name or unique identifier of the original creator of the submission in the submission details view.
  - o Requirement 2: Functional
- Requirement 3: The system shall update and display the identity of the user who last modified the submission whenever an edit is made and saved.
  - o Requirement 3: Functional
- Requirement 4: The system shall maintain an audit trail that logs all creation and modification events, including timestamp and user ID for each action.
  - o Requirement 4: Functional
- Requirement 5: Access to submission metadata (creator and last modifier) shall be restricted to users with appropriate permissions to ensure data integrity and confidentiality.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall ensure that identity information associated with submissions remains accurate and tamper-proof throughout the submission lifecycle.
  - o Requirement 6: Non-Functional

**User Story 2:** As an Agency user, I want the header information box to show updated date AND time, so that I know when it was updated.

**Requirements:**

- Requirement 1: The system shall display the date and time of the last update in the header information box for each submission.
  - o Requirement 1: Functional
- Requirement 2: The displayed date and time in the header shall reflect the exact timestamp of the most recent modification made to the submission.
  - o Requirement 2: Functional
- Requirement 3: The system shall update the date and time in the header information box automatically whenever the submission is edited and saved.
  - o Requirement 3: Non-Functional
- Requirement 4: The date and time shown in the header shall be presented in a user-readable format compliant with ISO 8601 (e.g., YYYY-MM-DD HH:MM).
  - o Requirement 4: Functional
- Requirement 5: The system shall ensure that the timestamp displayed in the header corresponds to the correct time zone based on user or system settings.
  - o Requirement 5: Non-Functional
- Requirement 6: The header information box shall refresh its content in real-time or upon page reload to reflect the latest update timestamp.
  - o Requirement 6: Non-Functional

**User Story 3:** As a Plan Review Staff member, I want to successfully Conduct a Plan Review Meeting with the Applicant and record the outcome, so that I can listen to it again.

**Requirements:**

- Requirement 1: The system shall allow Plan Review Staff to schedule or initiate a Plan Review Meeting session with an Applicant.
  - o Requirement 1: Functional

- Requirement 2: The system shall provide audio recording functionality during the Plan Review Meeting to capture the entire discussion.
  - o Requirement 2: Functional
- Requirement 3: The system shall associate each recorded meeting with the corresponding submission and store it in a secure and accessible location.
  - o Requirement 3: Functional
- Requirement 4: Authorized users shall be able to playback the recorded meeting at any time through a built-in media player interface.
  - o Requirement 4: Functional
- Requirement 5: Recorded meetings shall be stored in a format that preserves data integrity and ensures long-term accessibility (e.g., MP3, WAV, or equivalent).
  - o Requirement 5: Non-Functional
- Requirement 6: Access to recorded meetings shall be restricted to authorized personnel only to ensure confidentiality and compliance with data protection policies.
  - o Requirement 6: Non-Functional

**User Story 4:** As a Public User, I want to Search for Information, so that I can obtain publicly available information concerning properties, County services, processes and other general information.

**Requirements:**

- Requirement 1: The system shall provide a search interface that allows Public Users to enter keywords or filters to locate relevant public information.
  - o Requirement 1: Functional
- Requirement 2: The system shall return search results in a clear and organized format, displaying titles, summaries, and links to detailed information.
  - o Requirement 2: Functional

- Requirement 3: Search functionality shall support common queries related to property records, County services, permits, and procedural guidelines.
  - o Requirement 3: Functional
- Requirement 4: The system shall allow Public Users to refine or filter search results based on categories such as topic, location, document type, or date.
  - o Requirement 4: Functional
- Requirement 5: Search response time shall not exceed 5 seconds under normal system load to ensure acceptable performance.
  - o Requirement 5: Non-Functional
- Requirement 6: The search feature shall be accessible via standard web browsers and mobile devices to support broad public access.
  - o Requirement 6: Non-Functional

**User Story 5:** As a user, I want to view user documentation for the website, so that I know how to use the web app.

**Requirements:**

- Requirement 1: The system shall provide access to user documentation from the main navigation menu or a clearly visible help icon.
  - o Requirement 1: Functional
- Requirement 2: User documentation shall be organized in a searchable knowledge base or help center format for easy reference.
  - o Requirement 2: Functional
- Requirement 3: Documentation shall include step-by-step guides, screenshots, and examples to assist users in performing common tasks within the web app.
  - o Requirement 3: Functional
- Requirement 4: The system shall allow users to search for specific topics or keywords within the user documentation.
  - o Requirement 4: Functional
- Requirement 5: User documentation shall be available in a readable format across desktop and mobile devices without loss of content or functionality.

- Requirement 5: Non-Functional
- Requirement 6: The documentation system shall ensure that all content is reviewed and updated annually to reflect current system functionality.
  - Requirement 6: Non-Functional

**User Story 6:** As an admin, I want to be able to block specific users based on IP address, so that I can prevent spamming on the websites.

**Requirements:**

- Requirement 1: The system shall allow the Admin to add, remove, or edit a list of blocked IP addresses through an administrative interface.
  - Requirement 1: Functional
- Requirement 2: The system shall prevent any HTTP requests originating from a blocked IP address from accessing or submitting data to the website.
  - Requirement 2: Functional
- Requirement 3: Blocked IP addresses shall be stored securely in the system and persist across application restarts or updates.
  - Requirement 3: Functional
- Requirement 4: The system shall log all access attempts from blocked IP addresses, including timestamp and attempted action.
  - Requirement 4: Functional
- Requirement 5: IP blocking functionality shall have minimal performance impact, ensuring response times remain under 100ms for legitimate traffic.
  - Requirement 5: Non-Functional
- Requirement 6: Access to the IP blocking feature shall be restricted to users with administrative privileges only.
  - Requirement 6: Non-Functional

**User Story 7:** As an Inspector, I want to Conduct Inspections, so that I can validate Customer compliance with code and regulations and provide results of the inspection to the Customer.

## Requirements:

- Requirement 1: The system shall allow an Inspector to create, schedule, and manage inspection appointments related to a specific property or project.
  - Requirement 1: Functional
- Requirement 2: The system shall provide a digital checklist aligned with applicable codes and regulations to guide the Inspector during the inspection process.
  - Requirement 2: Functional
- Requirement 3: The system shall allow the Inspector to capture notes, photos, and other evidence during the inspection for documentation purposes.
  - Requirement 3: Functional
- Requirement 4: The system shall generate a formal inspection report summarizing findings, including any code violations or compliance statuses.
  - Requirement 4: Functional
- Requirement 5: Inspection data and reports shall be accessible to authorized Customers in a timely manner after completion.
  - Requirement 5: Non-Functional
- Requirement 6: The system shall support offline data entry during inspections and synchronize data upon reconnection to ensure usability in field environments.
  - Requirement 6: Non-Functional

**User Story 8:** As an admin, I want to be able to communicate directly with facilities, so that I can keep them updated about features we have on our website.

## Requirements:

- Requirement 1: The system shall provide an internal messaging or notification module that allows the Admin to send messages directly to registered facilities.
  - Requirement 1: Functional

- Requirement 2: Messages sent by the Admin shall be viewable by authorized facility users within their account dashboard or a dedicated notifications section.
  - o Requirement 2: Functional
- Requirement 3: The system shall allow the Admin to attach documents, guides, or links to website features when sending communications to facilities.
  - o Requirement 3: Functional
- Requirement 4: The system shall maintain a message history for each facility, allowing both Admins and facility users to reference past communications.
  - o Requirement 4: Functional
- Requirement 5: Message delivery performance shall ensure that notifications are delivered within 5 seconds under normal system load.
  - o Requirement 5: Non-Functional
- Requirement 6: Access to the messaging feature shall be secured and restricted to authenticated Admins and authorized facility personnel only.
  - o Requirement 6: Non-Functional

**User Story 9:** As a Data Consuming User, I want to be able to search any dataset published and publicly accessible by their title and metadata, So that I can find the datasets I'm interested in.

**Requirements:**

- Requirement 1: The system shall provide a search interface that allows users to query datasets using keywords from their title and metadata fields.
  - o Requirement 1: Functional
- Requirement 2: Search results shall display relevant datasets with key information including title, description, publication date, and metadata tags.
  - o Requirement 2: Functional

- Requirement 3: The system shall support filtering of search results based on metadata attributes such as category, data source, format, and update frequency.
  - Requirement 3: Functional
- Requirement 4: Each dataset entry shall include a detailed metadata view containing standardized descriptive information (e.g., author, schema, usage rights).
  - Requirement 4: Functional
- Requirement 5: The search functionality shall return results within 3 seconds under normal system load to ensure usability and responsiveness.
  - Requirement 5: Non-Functional
- Requirement 6: The dataset search feature shall be accessible via standard web browsers and conform to accessibility standards (e.g., WCAG 2.1).
  - Requirement 6: Non-Functional

**User Story 10:** As a Platform administrator, I want to be able to translate the data types hierarchies of the Viewer while in embed mode, So that my users can understand the interface in their native language.

**Requirements:**

- Requirement 1: The system shall allow the Platform Administrator to upload or select language-specific translations for data type hierarchies used within the Viewer.
  - Requirement 1: Functional
- Requirement 2: Translations shall be applied dynamically when the Viewer is accessed by end users, based on browser language settings or user preference.
  - Requirement 2: Functional
- Requirement 3: The system shall support translation of all visible labels, tooltips, and hierarchical node names within the embedded Viewer interface.
  - Requirement 3: Functional

- Requirement 4: Translation files shall be compatible with standard localization formats such as JSON or XML for easy integration and updates.
  - o Requirement 4: Functional
- Requirement 5: Language switching in embed mode shall not degrade performance by more than a 10% increase in load time.
  - o Requirement 5: Non-Functional
- Requirement 6: The system shall maintain visual consistency and proper rendering of translated text across different languages, including right-to-left (RTL) scripts.
  - o Requirement 6: Non-Functional

**User Story 11:** As a Data Consuming User, I want to be able to filter, sort and aggregate data by multiple dimensions and measures, So that I can get more granular views on the data.

**Requirements:**

- Requirement 1: The system shall allow users to apply filters based on one or more categorical or numerical dimensions within the dataset.
  - o Requirement 1: Functional
- Requirement 2: Users shall be able to sort data in ascending or descending order based on any measurable attribute or dimension.
  - o Requirement 2: Functional
- Requirement 3: The system shall support aggregation functions (e.g., sum, average, count) across selected measures grouped by one or more dimensions.
  - o Requirement 3: Functional
- Requirement 4: Filtering, sorting, and aggregation controls shall be accessible through an intuitive user interface such as dropdowns, sliders, or input fields.
  - o Requirement 4: Functional
- Requirement 5: The system shall update filtered or aggregated views in real-time or within 5 seconds of applying changes under normal load conditions.

- Requirement 5: Non-Functional
- Requirement 6: The data interaction interface shall remain responsive and usable when handling datasets containing up to 100,000 records.
  - Requirement 6: Non-Functional

**User Story 12:** As a Publisher, I want to embed an interactive preview of my data on my site, so that users can be encouraged that this is the correct data for them.

**Requirements:**

- Requirement 1: The system shall allow Publishers to generate an embeddable HTML or JavaScript snippet for displaying an interactive preview of their dataset.
  - Requirement 1: Functional
- Requirement 2: The embedded preview shall support basic interactivity such as filtering, sorting, and column visibility customization by end users.
  - Requirement 2: Functional
- Requirement 3: The embedded preview shall reflect real-time or near real-time data updates from the source dataset to ensure accuracy.
  - Requirement 3: Functional
- Requirement 4: Publishers shall be able to customize the visual appearance of the embedded preview (e.g., theme, colors, size) to match their website branding.
  - Requirement 4: Functional
- Requirement 5: The embedded preview shall load within 3 seconds under normal network conditions to maintain a positive user experience.
  - Requirement 5: Non-Functional
- Requirement 6: The embedding functionality shall be compatible with modern web browsers and responsive design standards for mobile and desktop access.
  - Requirement 6: Non-Functional

**User Story 13:** As a Publisher, I want to know how many users have previewed a dataset, so that I know how interest in a dataset relates to its actual download numbers.

### **Requirements:**

- Requirement 1: The system shall track and record each unique preview event for a dataset, including timestamp and user identifier (if available).
  - Requirement 1: Functional
- Requirement 2: The system shall provide Publishers with access to real-time analytics showing total and unique preview counts per dataset.
  - Requirement 2: Functional
- Requirement 3: Preview count data shall be presented alongside download statistics in a unified reporting dashboard for comparative analysis.
  - Requirement 3: Functional
- Requirement 4: The system shall differentiate between anonymous and authenticated user previews, if applicable, to improve data accuracy.
  - Requirement 4: Functional
- Requirement 5: Analytics data shall be updated within 5 seconds of a preview event under normal system load to ensure timely insights.
  - Requirement 5: Non-Functional
- Requirement 6: Access to preview analytics shall be secured and limited to authorized Publishers and administrators only.
  - Requirement 6: Non-Functional

**User Story 14:** As a site editor, I want to assign priority numbers to news items, so that I can indicate which articles I want featured most prominently on the site.

### **Requirements:**

- Requirement 1: The system shall allow the Site Editor to assign a numeric priority value (e.g., 1–10) to each news item through the content management interface.
  - Requirement 1: Functional
- Requirement 2: News items shall be displayed on the site in descending order of assigned priority number, with higher-priority items appearing first.
  - Requirement 2: Functional

- Requirement 3: The system shall automatically update the article display order on the live site whenever priority values are changed and saved.
  - Requirement 3: Functional
- Requirement 4: Priority settings shall be preserved across system restarts, updates, and page reloads without data loss.
  - Requirement 4: Functional
- Requirement 5: Changes to news item priorities shall take effect within 2 seconds of being published under normal system conditions.
  - Requirement 5: Non-Functional
- Requirement 6: Access to modify news item priorities shall be restricted to users with Site Editor or equivalent permissions.
  - Requirement 6: Non-Functional

**User Story 15:** As a trainer, I want to update one of my existing courses or events, so that it reflects accurate information.

**Requirements:**

- Requirement 1: The system shall allow Trainers to access and edit details of previously created courses or events through an intuitive editing interface.
  - Requirement 1: Functional
- Requirement 2: Trainers shall be able to modify course content, title, description, schedule, and associated materials without losing historical data or registration records.
  - Requirement 2: Functional
- Requirement 3: The system shall maintain a version history of each course or event update, including timestamp and the identity of the Trainer who made the change.
  - Requirement 3: Functional
- Requirement 4: All updates made by the Trainer shall be reflected immediately in the system and visible to authorized users and registrants.
  - Requirement 4: Functional

- Requirement 5: Course editing operations shall complete within 3 seconds under normal system load to support efficient content management.
  - o Requirement 5: Non-Functional
- Requirement 6: Access to edit course or event details shall be restricted to authenticated Trainers with appropriate permissions.
  - o Requirement 6: Non-Functional

**User Story 16:** As a site visitor, I want to have an advanced search option that lets me fill in a form of search criteria, so that I can quickly find what I am looking for.

**Requirements:**

- Requirement 1: The system shall provide an advanced search form that allows Site Visitors to input multiple search criteria such as keywords, categories, date ranges, and other relevant filters.
  - o Requirement 1: Functional
- Requirement 2: The system shall display search results in a structured format that clearly matches the entered criteria, including titles, summaries, and direct links to content.
  - o Requirement 2: Functional
- Requirement 3: Search forms shall support both required and optional fields, allowing users to refine their queries with varying levels of detail.
  - o Requirement 3: Functional
- Requirement 4: Users shall be able to save or bookmark customized search forms for future reuse.
  - o Requirement 4: Functional
- Requirement 5: The advanced search feature shall return results within 3 seconds under normal system load to ensure usability and responsiveness.
  - o Requirement 5: Non-Functional
- Requirement 6: The advanced search interface shall be accessible via standard web browsers and optimized for use on both desktop and mobile devices.
  - o Requirement 6: Non-Functional

**User Story 17:** As a recruiter, I want to be able to extend an ad for another 30 days by visiting the site and updating the posting, so that my ad remains active.

shall ensure that the extended job ad is displayed correctly on the job board.

**Requirements:**

- Requirement 1: The system shall allow Recruiters to access and edit the expiration date of an active job posting through their account dashboard.
  - o Requirement 1: Functional
- Requirement 2: The system shall provide a one-click option to extend the job ad by exactly 30 days from the current expiration date or the current date, whichever is later.
  - o Requirement 2: Functional
- Requirement 3: An updated expiration date shall be reflected immediately in both the recruiter's dashboard and the publicly visible job listing.
  - o Requirement 3: Functional
- Requirement 4: The system shall notify the Recruiter via confirmation message or email upon successful extension of the job ad.
  - o Requirement 4: Functional
- Requirement 5: Extension functionality shall be available without performance delays, completing within 2 seconds under normal system load.
  - o Requirement 5: Non-Functional
- Requirement 6: Access to update or extend job postings shall be restricted to authenticated Recruiters with ownership of the respective job ad.
  - o Requirement 6: Non-Functional

**User Story 18:** As a user researcher, I want to test the user research plan, so that I make sure the in-person interviews are effective and capturing the right information.

### **Requirements:**

- Requirement 1: The system shall provide a template or structure for defining and documenting the objectives, questions, and success criteria of the user research plan.
  - o Requirement 1: Functional
- Requirement 2: The system shall allow the User Researcher to simulate or walk through the interview process using the defined research plan to identify gaps or inefficiencies.
  - o Requirement 2: Functional
- Requirement 3: Interview notes and feedback captured during the test run shall be stored and organized by topic, theme, or question to aid in evaluating effectiveness.
  - o Requirement 3: Functional
- Requirement 4: The system shall generate a summary report comparing planned interview goals with findings from the test session to help refine the research plan.
  - o Requirement 4: Functional
- Requirement 5: The interface used for testing and refining the research plan shall respond to user input within 2 seconds under normal system load.
  - o Requirement 5: Non-Functional
- Requirement 6: Access to create, modify, and test user research plans shall be restricted to authorized User Researchers only.
  - o Requirement 6: Non-Functional

**User Story 19:** As a data manager, I want to have the description of collected data sets that are used or updated throughout the project lifecycle, so that I can ensure the descriptions are current and add detail as the study proceeds.

### **Requirements:**

- Requirement 1: The system shall allow the Data Manager to create and maintain detailed metadata descriptions for each dataset within the system.
  - o Requirement 1: Functional

- Requirement 2: The system shall enable the Data Manager to update dataset descriptions in real-time as changes occur during the project lifecycle.
  - o Requirement 2: Functional
- Requirement 3: Each dataset description shall include version history, including timestamp, author, and summary of changes made.
  - o Requirement 3: Functional
- Requirement 4: Dataset descriptions shall be linked to their corresponding data files and accessible directly from the dataset overview page.
  - o Requirement 4: Functional
- Requirement 5: All updates to dataset descriptions must be saved reliably and remain accessible without data loss under normal system operation.
  - o Requirement 5: Non-Functional
- Requirement 6: Access to view and edit dataset descriptions shall be role-based, ensuring only authorized Data Managers can make changes.
  - o Requirement 6: Non-Functional

**User Story 20:** As an IT staff member, I want to know which kind of data types will be produced or collected, so that I can determine what basic support services and functionalities are required.

**Requirements:**

- Requirement 1: The system shall provide a centralized data catalog where data types, formats, and sources can be documented and maintained.
  - o Requirement 1: Functional
- Requirement 2: Project teams shall be required to register anticipated data types before initiating data collection or creation activities.
  - o Requirement 2: Functional
- Requirement 3: The system shall classify registered data types into categories (e.g., structured, unstructured, sensitive, public) to assist in determining handling and support needs.
  - o Requirement 3: Functional

- Requirement 4: Registered data type information shall be accessible to authorized IT staff for capacity planning, infrastructure setup, and service provisioning.
  - Requirement 4: Functional
- Requirement 5: Data type registration and classification must complete within 2 seconds under normal system load to ensure timely access by IT staff.
  - Requirement 5: Non-Functional
- Requirement 6: Access to data type information and registration tools shall be role-based, ensuring only authorized users can view or modify entries.
  - Requirement 6: Non-Functional

**User Story 21:** As a depositor, I want to deposit the files that I have, so that I don't have to spend a lot of time finding the right version and converting to the right format.

**Requirements:**

- Requirement 1: The system shall allow Depositors to upload files in their original format without requiring prior conversion.
  - Requirement 1: Functional
- Requirement 2: The system shall automatically detect and record the file version or metadata upon upload to prevent duplication and confusion.
  - Requirement 2: Functional
- Requirement 3: Uploaded files shall be organized in a searchable repository where Depositors can easily locate previous versions or related files.
  - Requirement 3: Functional
- Requirement 4: The system shall support bulk upload functionality to allow multiple files or folders to be deposited in a single operation.
  - Requirement 4: Functional
- Requirement 5: File upload operations shall complete within 10 seconds for standard-sized files under normal network and system conditions.
  - Requirement 5: Non-Functional

- Requirement 6: Access to file repositories and upload functionality shall be secured and limited to authenticated Depositors only.
  - o Requirement 6: Non-Functional

**User Story 22:** As a Research Information manager, I want to track citation counts for published datasets, so that impact of datasets within academia can be demonstrated.

**Requirements:**

- Requirement 1: The system shall automatically detect and record citations referencing a published dataset using digital reference tracking methods (e.g., DOI lookups or metadata harvesting).
  - o Requirement 1: Functional
- Requirement 2: Citation data shall be associated with the corresponding dataset and displayed in a dedicated section on the dataset landing page.
  - o Requirement 2: Functional
- Requirement 3: The system shall provide filtering and sorting options to view citation counts by time period, publication source, or academic discipline.
  - o Requirement 3: Functional
- Requirement 4: Citation count data shall be updated at least once every 24 hours to ensure reasonably current impact metrics.
  - o Requirement 4: Functional
- Requirement 5: Citation tracking and display functionality shall perform reliably under normal system load, with data refreshes completing within acceptable timeframes.
  - o Requirement 5: Non-Functional
- Requirement 6: Access to citation reports and related analytics shall be role-based, ensuring only authorized Research Information Managers can view or export the data.
  - o Requirement 6: Non-Functional

**User Story 23:** As a legal officer, I want to know about data sensitivity, so that I can establish sharing options.

### **Requirements:**

- Requirement 1: The system shall classify datasets based on predefined sensitivity levels (e.g., Public, Internal, Confidential, Restricted) to support legal review.
  - Requirement 1: Functional
- Requirement 2: Each dataset shall include metadata indicating its sensitivity classification, data owner, and applicable regulatory requirements.
  - Requirement 2: Functional
- Requirement 3: The system shall provide a dashboard or view specifically for Legal Officers to review data sensitivity information across all datasets.
  - Requirement 3: Functional
- Requirement 4: Based on sensitivity level, the system shall suggest or enforce appropriate sharing policies, such as access controls or encryption requirements.
  - Requirement 4: Functional
- Requirement 5: Data sensitivity classification and associated policy recommendations must be accessible within 3 seconds under normal system load.
  - Requirement 5: Non-Functional
- Requirement 6: Access to data sensitivity reports and policy configuration tools shall be restricted to authorized Legal Officers only.
  - Requirement 6: Non-Functional

**User Story 24:** As a data manager, I want to plan the anonymization of data, so that we protect the privacy of the people participating in the research as good as possible and still ensure reusability of data.

### **Requirements:**

- Requirement 1: The system shall provide tools to identify personally identifiable information (PII) or sensitive attributes within datasets for anonymization planning.
  - Requirement 1: Functional

- Requirement 2: The system shall support configurable anonymization methods such as pseudonymization, generalization, suppression, and k-anonymity modeling.
  - Requirement 2: Functional
- Requirement 3: An anonymization plan shall be version-controlled, documenting applied methods, parameters, and rationale for audit and reproducibility purposes.
  - Requirement 3: Functional
- Requirement 4: The system shall assess and report on the impact of anonymization techniques on data utility to help balance privacy and reusability.
  - Requirement 4: Functional
- Requirement 5: Anonymization planning tools shall perform efficiently, with preview functions loading within 5 seconds under normal system load.
  - Requirement 5: Non-Functional
- Requirement 6: Access to anonymization tools and sensitive data metadata shall be restricted to authorized Data Managers only.
  - Requirement 6: Non-Functional

**User Story 25:** As a sponsor, I want to personalize my sponsorship page, so that I can promote my brand.

**Requirements:**

- Requirement 1: The system shall allow Sponsors to upload and display their logo, brand colors, and custom banners on their dedicated sponsorship page.
  - Requirement 1: Functional
- Requirement 2: The system shall provide a customizable template where Sponsors can edit text content, add links, and embed multimedia elements to represent their brand effectively.
  - Requirement 2: Functional
- Requirement 3: Personalized sponsorship pages shall be publicly accessible and searchable via the platform's directory or navigation menu.

- Requirement 3: Functional
- Requirement 4: Changes made to the sponsorship page shall be previewable in real-time before being published live.
  - Requirement 4: Functional
- Requirement 5: T The personalized sponsorship page shall load within 3 seconds under normal network conditions to ensure a positive user experience.
  - Requirement 5: Non-Functional
- Requirement 6: Access to edit sponsorship page content shall be restricted to authenticated Sponsors with appropriate permissions.
  - Requirement 6: Non-Functional

**User Story 26:** As a UI designer, I want to redesign the Resources page, so that it matches the new Broker design styles.

**Requirements:**

- Requirement 1: The system shall allow the UI Designer to apply the latest Broker design styles (e.g., typography, color scheme, spacing, buttons) to the Resources page layout.
  - Requirement 1: Functional
- Requirement 2: All visual elements on the Resources page shall be responsive and consistent with the Broker style guide across desktop, tablet, and mobile devices.
  - Requirement 2: Functional
- Requirement 3: The redesigned page shall maintain all existing functionality and interactive components (e.g., search, filters, download links) without disruption.
  - Requirement 3: Non-Functional
- Requirement 4: The system shall provide a preview mode that allows the UI Designer to review the updated page layout before publishing changes live.
  - Requirement 4: Functional

- Requirement 5: Page load time for the redesigned Resources page shall not exceed 3 seconds under normal network conditions.
  - o Requirement 5: Non-Functional
- Requirement 6: Access to modify and publish changes to the Resources page shall be restricted to authorized UI Designers only.
  - o Requirement 6: Non-Functional

**User Story 27:** As a Developer, I want to clarify to users what exactly is triggering the CFDA error code in each case.

**Requirements:**

- Requirement 1: The system shall provide descriptive error messages for each CFDA error code that explain the root cause of the error in user-friendly language.
  - o Requirement 1: Functional
- Requirement 2: Each CFDA error message shall include a unique error code along with a brief technical explanation for developers or support personnel.
  - o Requirement 2: Functional
- Requirement 3: Error messages shall be displayed in context (e.g., within the form, on the screen where the error occurred) to help users identify the source.
  - o Requirement 3: Functional
- Requirement 4: The system shall log detailed error information, including stack traces and input values, for every CFDA error occurrence to aid in debugging.
  - o Requirement 4: Functional
- Requirement 5: Error message display and logging must perform reliably without introducing delays exceeding 1 second under normal system load.
  - o Requirement 5: Non-Functional
- Requirement 6: Access to detailed error logs and system-level diagnostics shall be restricted to authorized Developers or support staff only.
  - o Requirement 6: Non-Functional

**User Story 28:** As a broker team member, I want to make some updates to the SQL codes for clarity

**Requirements:**

- Requirement 1: The system shall allow authorized Broker Team Members to access and edit SQL code used within the application or reporting modules.
  - o Requirement 1: Functional
- Requirement 2: SQL code editors shall include syntax highlighting and formatting tools to improve readability and aid in making clarity improvements.
  - o Requirement 2: Functional
- Requirement 3: All changes made to SQL code shall be logged with metadata including timestamp, user ID, and a brief description of the change made.
  - o Requirement 3: Functional
- Requirement 4: The system shall validate SQL syntax before saving changes to prevent accidental introduction of runtime errors.
  - o Requirement 4: Functional
- Requirement 5: Editing SQL code shall not degrade system performance or cause delays exceeding 2 seconds during normal operations.
  - o Requirement 5: Non-Functional
- Requirement 6: Access to modify SQL code shall be restricted to authenticated Broker Team Members with appropriate permissions.
  - o Requirement 6: Non-Functional

**User Story 29:** As a Staff member, I want to Schedule a Meeting, so that I can bring the required parties together at a specific date/time to address an issue.

**Requirements:**

- Requirement 1: The system shall allow Staff Members to create a new meeting event by specifying title, date, time, duration, and list of required participants.
  - o Requirement 1: Functional

- Requirement 2: The system shall send calendar invites or notifications to all selected participants upon scheduling the meeting.
  - Requirement 2: Functional
- Requirement 3: The system shall check and display participant availability (if integrated with calendar systems) to help avoid scheduling conflicts.
  - Requirement 3: Functional
- Requirement 4: Meeting details shall be editable by the organizer before the meeting starts, including adding or removing participants and rescheduling.
  - Requirement 4: Functional
- Requirement 5: Scheduling a meeting shall complete within 3 seconds after submission under normal system load.
  - Requirement 5: Non-Functional
- Requirement 6: Access to schedule meetings shall be restricted to authenticated Staff Members with appropriate permissions.
  - Requirement 6: Non-Functional

**User Story 30:** As a Staff member, I want to Manage Hearing Calendars, so that I can track hearing-related activities and due dates

**Requirements:**

- Requirement 1: The system shall allow Staff Members to create, edit, and delete calendar entries related to hearings, including date, time, location, and participants.
  - Requirement 1: Functional
- Requirement 2: The system shall display an overview calendar showing all scheduled hearings and associated milestones or due dates in a visual format (daily, weekly, monthly views).
  - Requirement 2: Functional
- Requirement 3: The system shall notify users of upcoming hearings and deadlines via email or in-system alerts at configurable intervals (e.g., 24 hours before).
  - Requirement 3: Functional

- Requirement 4: Hearing calendar entries shall be linked to relevant case files or records for traceability and contextual access.
  - o Requirement 4: Functional
- Requirement 5: Calendar operations such as adding, updating, or viewing entries must complete within 3 seconds under normal system load.
  - o Requirement 5: Non-Functional
- Requirement 6: Access to manage and view hearing calendars shall be role-based, ensuring only authorized Staff Members can perform these actions.
  - o Requirement 6: Non-Functional

**User Story 31:** As a Development Staff member, I want to Issue a Development-related Permit, so that I can grant the request to the Applicant to begin work.

**Requirements:**

- Requirement 1: The system shall allow Development Staff to review all required documentation and application details before issuing a development-related permit.
  - o Requirement 1: Functional
- Requirement 2: The system shall enable authorized staff to generate and issue a formal permit with a unique identifier, effective date, and conditions.
  - o Requirement 2: Functional
- Requirement 3: Issued permits shall be associated with the corresponding applicant and project or parcel information in the system for traceability.
  - o Requirement 3: Functional
- Requirement 4: The system shall notify the Applicant automatically upon permit issuance, including access to the digital permit document and next steps.
  - o Requirement 4: Non-Functional
- Requirement 5: Permit issuance actions must complete within 5 seconds under normal system load to support efficient processing.
  - o Requirement 5: Non-Functional

- Requirement 6: Access to issue permits shall be restricted to authenticated Development Staff members with appropriate role-based permissions.
  - o Requirement 6: Non-Functional

**User Story 32:** As an Enforcement Staff member, I want to Issue a Notice of Violation, so that I can provide formal communication to the responsible party.

**Requirements:**

- Requirement 1: The system shall allow Enforcement Staff to generate a Notice of Violation based on case or inspection findings, including violation type, description, and applicable regulations.
  - o Requirement 1: Functional
- Requirement 2: Each issued Notice of Violation shall be assigned a unique identifier and timestamp to ensure proper tracking and recordkeeping.
  - o Requirement 2: Functional
- Requirement 3: The system shall associate the Notice of Violation with the responsible party, property, and related enforcement case for audit and reference purposes.
  - o Requirement 3: Functional
- Requirement 4: The system shall enable the Notice of Violation to be printed or electronically delivered to the responsible party with a delivery confirmation option.
  - o Requirement 4: Functional
- Requirement 5: Issuance of a Notice of Violation must complete within 5 seconds under normal system load to support timely enforcement actions.
  - o Requirement 5: Non-Functional
- Requirement 6: Access to issue and view Notices of Violation shall be restricted to authenticated Enforcement Staff members with appropriate role-based permissions.
  - o Requirement 6: Non-Functional

**User Story 33:** As an API User, I want to be able to persistently store visualisation state in the database, So that such can be shared more easily and contribute to a visualisation gallery.

**Requirements:**

- Requirement 1: The system shall allow API Users to save the current state of a visualization (e.g., filters, layout, data sources) to the database using a programmatic interface.
  - Requirement 1: Functional
- Requirement 2: Saved visualization states shall include metadata such as title, description, author, timestamp, and associated dataset identifiers for traceability and searchability.
  - Requirement 2: Functional
- Requirement 3: The system shall support retrieval of stored visualization states via API so that they can be restored or displayed in a visualization gallery.
  - Requirement 3: Functional
- Requirement 4: Each saved visualization state shall be uniquely identifiable and versionable to allow updates without loss of prior configurations.
  - Requirement 4: Functional
- Requirement 5: Storage and retrieval operations for visualization states must complete within 2 seconds under normal system load to maintain responsiveness.
  - Requirement 5: Non-Functional
- Requirement 6: Access to store, retrieve, and share visualization states shall be secured and limited to authenticated and authorized API Users only.
  - Requirement 6: Non-Functional

**User Story 34:** As a Data Publishing User, I want to be able to Hide a dataset that I have already added as Public, So that I can fix my mistakes or have a dataset primarily for my own use.

### **Requirements:**

- Requirement 1: The system shall allow Data Publishing Users to change the visibility status of a dataset from Public to Hidden through a user interface or API.
  - Requirement 1: Functional
- Requirement 2: Hidden datasets shall no longer appear in public search results, catalogs, or data portals, but remain accessible to the owner or authorized users.
  - Requirement 2: Functional
- Requirement 3: The system shall maintain a version history or audit trail when a dataset is hidden, including the timestamp and identity of the user who initiated the action.
  - Requirement 3: Functional
- Requirement 4: The system shall provide an option to restore a hidden dataset to public visibility with all original metadata and access settings intact.
  - Requirement 4: Functional
- Requirement 5: Changes to dataset visibility must take effect immediately or within 2 seconds under normal system load.
  - Requirement 5: Non-Functional
- Requirement 6: Access to hide or un-hide datasets shall be restricted to authenticated Data Publishing Users with ownership or administrative rights over the dataset.
  - Requirement 6: Non-Functional

**User Story 35:** As a Data Publishing User, I want to have a view on all the datasets I have published, So that I can perform management actions on my own datasets.

### **Requirements:**

- Requirement 1: The system shall provide a dedicated dashboard or section where Data Publishing Users can view a complete list of datasets they have published.

- Requirement 1: Functional
- Requirement 2: Each dataset entry in the list shall display key metadata including title, description, publication date, visibility status, and last update timestamp.
  - Requirement 2: Functional
- Requirement 3: The system shall allow users to perform management actions directly from the dataset list, such as editing metadata, hiding, or deleting the dataset.
  - Requirement 3: Functional
- Requirement 4: The dataset list shall support filtering and sorting options (e.g., by name, date, status) to improve usability and navigation.
  - Requirement 4: Functional
- Requirement 5: Loading time for the dataset list shall not exceed 3 seconds under normal system load with up to 100 listed datasets.
  - Requirement 5: Non-Functional
- Requirement 6: Access to view and manage datasets shall be role-based, ensuring only the dataset owner or authorized users can perform management actions.
  - Requirement 6: Non-Functional

**User Story 36:** As an API user, I want to be able to change the colors of the embedded visualisations in my own platform, So that I can customize the visualisations.

**Requirements:**

- Requirement 1: The system shall allow API Users to define custom color schemes for embedded visualizations through configuration parameters or theme settings.
  - Requirement 1: Functional
- Requirement 2: Custom color settings shall be applied dynamically to visualizations when rendered on the user’s platform without requiring code changes.
  - Requirement 2: Functional

- Requirement 3: The system shall support both global theme-level color changes and per-visualization color overrides to allow granular customization.
  - Requirement 3: Functional
- Requirement 4: Color customization options shall include foreground, background, data series, and legend colors to ensure full styling flexibility.
  - Requirement 4: Functional
- Requirement 5: Changes to visualization colors must render within 2 seconds under normal system load to maintain a responsive user experience.
  - Requirement 5: Non-Functional
- Requirement 6: Access to color customization features and related API endpoints shall be secured and limited to authenticated API Users only.
  - Requirement 6: Non-Functional

**User Story 37:** As a site visitor, I want to read a new article on the front page about once a week, so that I am up on all the latest happenings.

**Requirements:**

- Requirement 1: The system shall display the latest article prominently on the front page for all unauthenticated and authenticated users to view.
  - Requirement 1: Functional
- Requirement 2: Articles shall be scheduled for weekly publication, with the ability to set a future publish date and time through the content management interface.
  - Requirement 2: Functional
- Requirement 3: The system shall archive older articles in a dedicated section or news feed, allowing visitors to access past content easily.
  - Requirement 3: Functional
- Requirement 4: Front page articles shall support rich media including images, videos, and formatted text to enhance readability and engagement.
  - Requirement 4: Functional

- Requirement 5: Article loading time on the front page must not exceed 3 seconds under normal traffic conditions to ensure a positive user experience.
  - o Requirement 5: Non-Functional
- Requirement 6: The front page article section shall be accessible across modern web browsers and mobile devices without loss of functionality or layout integrity.
  - o Requirement 6: Non-Functional

**User Story 38:** As a site visitor, I want to do a full-text search of article body, title, and author name, so that I can find what I want.

**Requirements:**

- Requirement 1: The system shall provide a full-text search interface that allows Site Visitors to enter keywords or phrases to search across article titles, bodies, and author names.
  - o Requirement 1: Functional
- Requirement 2: Search results shall include relevant articles ranked by keyword match accuracy, with highlighted excerpts showing matched text.
  - o Requirement 2: Functional
- Requirement 3: The system shall support Boolean operators (AND, OR, NOT) and phrase searches to refine query results.
  - o Requirement 3: Functional
- Requirement 4: Search filters shall be available to narrow results by date range, author, category, or publication type.
  - o Requirement 4: Functional
- Requirement 5: Search queries shall return results within 2 seconds under normal system load to ensure usability and responsiveness.
  - o Requirement 5: Non-Functional
- Requirement 6: The full-text search feature shall be accessible via standard web browsers and optimized for use on both desktop and mobile devices.
  - o Requirement 6: Non-Functional

**User Story 39:** As a site editor, I want to edit the content of the email automatically sent to new Certified Scrum Masters and Product Owners, so that I don't need to involve a programmer on simple email edits.

**Requirements:**

- Requirement 1: The system shall provide a WYSIWYG (What You See Is What You Get) email template editor accessible through the administrative interface for editing automated email content.
  - o Requirement 1: Functional
- Requirement 2: Email templates shall support dynamic placeholders (e.g., %User.FirstName%, %UserRole%) that are populated automatically when the email is sent.
  - o Requirement 2: Functional
- Requirement 3: Changes made to email templates shall be saved and applied immediately or with a preview option before activation.
  - o Requirement 3: Functional
- Requirement 4: The system shall maintain version history of email templates, including timestamps and the identity of the editor who made each change.
  - o Requirement 4: Functional
- Requirement 5: Loading and saving email template edits must complete within 3 seconds under normal system load to ensure usability.
  - o Requirement 5: Non-Functional
- Requirement 6: Access to edit email templates shall be restricted to authenticated Site Editors with appropriate permissions.
  - o Requirement 6: Non-Functional

**User Story 40:** As a moderator, I want to export a transcript of a game as a HTML file, so that I can save the stories and estimates locally.

### **Requirements:**

- Requirement 1: The system shall allow Moderators to generate an HTML-formatted transcript of a completed game session, including all stories, estimates, and player interactions.
  - Requirement 1: Functional
- Requirement 2: Exported HTML files shall be styled with basic formatting (e.g., tables, headers, timestamps) for readability when viewed in a browser.
  - Requirement 2: Functional
- Requirement 3: The export function shall include all relevant game data such as story titles, point estimates, participant names, and final consensus values.
  - Requirement 3: Functional
- Requirement 4: Moderators shall be able to initiate the export process directly from the game summary screen through a clearly labeled export button.
  - Requirement 4: Functional
- Requirement 5: HTML export generation must complete within 3 seconds for sessions containing up to 50 stories under normal system load.
  - Requirement 5: Non-Functional
- Requirement 6: Access to export game transcripts shall be restricted to authenticated Moderators who administered or participated in the respective game session.
  - Requirement 6: Non-Functional

**User Story 41:** As an estimator, I want to see all items we will try to estimate this session, so that I have a feel for the sizes of the various items.

### **Requirements:**

- Requirement 1: The system shall display a list of all estimation items for the current session, including title, description, and any associated metadata (e.g., type, priority).
  - Requirement 1: Functional

- Requirement 2: Estimation items shall be presented in a clear, readable format that supports quick scanning and comparison by Estimators.
  - o Requirement 2: Functional
- Requirement 3: The system shall allow sorting or filtering of estimation items by attributes such as category, size range, or estimated complexity.
  - o Requirement 3: Functional
- Requirement 4: Each item shall include any historical or reference data (e.g., previous estimates, similar items) to aid in comparative sizing.
  - o Requirement 4: Functional
- Requirement 5: Loading time for the list of estimation items must not exceed 3 seconds under normal system load to support efficient planning.
  - o Requirement 5: Non-Functional
- Requirement 6: Access to view estimation items shall be restricted to authenticated participants who are part of the current estimation session.
  - o Requirement 6: Non- Functional

**User Story 42:** As a participant, I want to always have the cards in the same order across multiple draws, so that it's easy to compare estimates.

**Requirements:**

- Requirement 1: The system shall preserve the order of cards displayed to each participant across multiple estimation rounds for the same item.
  - o Requirement 1: Functional
- Requirement 2: Card sequence shall remain consistent for all participants during a collaborative estimation session to support alignment and comparison.
  - o Requirement 2: Functional
- Requirement 3: The system shall allow configuration of default card ordering (e.g., ascending, descending, custom sequence) at the session level.
  - o Requirement 3: Functional

- Requirement 4: Card display settings shall be retained for returning participants across sessions unless explicitly changed by the user or session moderator.
  - Requirement 4: Functional
- Requirement 5: Consistent card rendering must occur within 1 second of round initiation under normal system load to maintain usability.
  - Requirement 5: Non-Functional
- Requirement 6: Access to modify card order settings shall be restricted to authenticated Participants or Moderators with appropriate permissions in the session.
  - Requirement 6: Non-Functional

**User Story 43:** As a collection curator, I want to lift an embargo for an object in a simple way.

**Requirements:**

- Requirement 1: The system shall provide a dedicated action button or option within the object's detail view to lift an embargo with minimal steps (e.g., one-click or confirmation dialog).
  - Requirement 1: Functional
- Requirement 2: When an embargo is lifted, the system shall update the object's visibility status across all views and access points immediately.
  - Requirement 2: Functional
- Requirement 3: The system shall log the embargo lifting event, including timestamp, user identity, and reason (optional or mandatory depending on policy).
  - Requirement 3: Functional
- Requirement 4: A confirmation message shall be displayed to the Collection Curator after successfully lifting the embargo, indicating the new availability status of the object.
  - Requirement 4: Functional

- Requirement 5: Lifting an embargo must complete within 2 seconds under normal system load to ensure responsive interaction.
  - o Requirement 5: Non-Functional
- Requirement 6: Access to lift embargoes shall be restricted to authenticated Collection Curators or users with appropriate administrative roles.
  - o Requirement 6: Non-Functional

**User Story 44:** As a repoadmin, I want to have the license be recorded in metadata and displayed alongside the item.

**Requirements:**

- Requirement 1: The system shall allow RepoAdmins to assign a license type (e.g., Creative Commons, MIT, Public Domain) to each repository item during or after submission.
  - o Requirement 1: Functional
- Requirement 2: License metadata shall be stored in a standardized format (e.g., SPDX identifiers or Dublin Core terms) for consistency and interoperability.
  - o Requirement 2: Functional
- Requirement 3: The assigned license shall be prominently displayed on the item's landing page or detail view to inform users of usage rights.
  - o Requirement 3: Functional
- Requirement 4: The system shall support bulk license assignment or update for multiple items to streamline administrative tasks.
  - o Requirement 4: Functional
- Requirement 5: Display of license information must occur within 1 second of item page load under normal system conditions to ensure usability.
  - o Requirement 5: Non-Functional
- Requirement 6: Access to modify or assign licenses shall be restricted to authenticated RepoAdmins or users with appropriate administrative roles.
  - o Requirement 6: Non-Functional

**User Story 45:** As a collection curator, I want to have a tool to perform author authority control.

**Requirements:**

- Requirement 1: The system shall provide a dedicated interface for managing author names, including merging, renaming, and linking variant forms of an author's name to a canonical entry.
  - o Requirement 1: Functional
- Requirement 2: The system shall support integration with external authority files (e.g., VIAF, ISNI, ORCID) to assist in identifying and validating authoritative author records.
  - o Requirement 2: Functional
- Requirement 3: Changes made via the authority control tool shall be reflected consistently across all associated items, metadata views, and search indexes.
  - o Requirement 3: Functional
- Requirement 4: The system shall maintain a log of authority control actions, including who made the change, when it was made, and what entities were affected.
  - o Requirement 4: Functional
- Requirement 5: Authority control operations such as merging or updating author records must complete within 3 seconds under normal system load to ensure usability.
  - o Requirement 5: Non-Functional
- Requirement 6: Access to the authority control tool shall be restricted to authenticated Collection Curators or administrators with appropriate permissions.
  - o Requirement 6: Non-Functional

**User Story 46:** As a depositor, I want to get feedback post-ingest alerting me if files I submitted do not conform to their format specifications, if they are not valid, or if they are not wellformed.

### **Requirements:**

- Requirement 1: The system shall automatically validate deposited files against specified format standards (e.g., PDF/A, TIFF, XML schema) after ingestion.
  - Requirement 1: Functional
- Requirement 2: The system shall notify the Depositor via in-system message or email if any file fails validation, is not well-formed, or does not conform to format specifications.
  - Requirement 2: Functional
- Requirement 3: Validation results shall include detailed error messages or logs describing the nature of each failure to assist the Depositor in correcting issues.
  - Requirement 3: Functional
- Requirement 4: The system shall provide an interface or report summarizing validation outcomes for all files within a submission package.
  - Requirement 4: Functional
- Requirement 5: Post-ingest validation and feedback delivery must complete within 5 minutes under normal system load to ensure timely response.
  - Requirement 5: Non-Functional
- Requirement 6: Access to validation reports and ingest feedback shall be restricted to the original Depositor and authorized administrative users.
  - Requirement 6: Non-Functional

**User Story 47:** As a user, I want to revert to an older version of an uploaded file.

### **Requirements:**

- Requirement 1: The system shall maintain a version history for each uploaded file, allowing Users to view and access previous versions.
  - Requirement 1: Functional
- Requirement 2: Users shall be able to select and restore a specific prior version of a file through a clear and accessible interface option.
  - Requirement 2: Functional

- Requirement 3: Restoring a previous version shall replace the current file version while preserving the version history for audit and rollback purposes.
  - Requirement 3: Functional
- Requirement 4: Each version of a file shall be timestamped and labeled with the identity of the user who made the change (if available).
  - Requirement 4: Functional
- Requirement 5: Version restoration operations must complete within 5 seconds under normal system load to ensure responsive interaction.
  - Requirement 5: Non-Functional
- Requirement 6: Access to restore previous versions shall be restricted to authenticated Users with ownership or edit permissions on the respective file.
  - Requirement 6: Non-Functional

**User Story 48:** As a user, I want to filter the files I get from search results based on their type.

**Requirements:**

- Requirement 1: The system shall allow Users to apply filters to search results based on file type (e.g., PDF, DOCX, XLSX, JPEG) through a dedicated filtering interface.
  - Requirement 1: Functional
- Requirement 2: The system shall display a list of available file types present in the current search results for easy selection and filtering.
  - Requirement 2: Functional
- Requirement 3: Filtering by file type shall update the displayed search results dynamically or upon user confirmation without requiring a full page reload.
  - Requirement 3: Functional
- Requirement 4: The system shall support multi-select filtering so users can include multiple file types in a single filtered result set.
  - Requirement 4: Functional

- Requirement 5: Filtering operations must complete within 2 seconds under normal system load to maintain responsiveness and usability.
  - Requirement 5: Non-Functional
- Requirement 6: The file type filtering feature shall be accessible and functional across modern web browsers and mobile devices.
  - Requirement 6: Non-Functional

**User Story 49:** As a researcher, I want to upload files prior to having them attached to a log book page.

**Requirements:**

- Requirement 1: The system shall allow Researchers to upload files to a personal or project workspace without requiring immediate association with a log book page.
  - Requirement 1: Functional
- Requirement 2: Uploaded files shall be stored in a temporary or draft state until they are explicitly linked to a log book page by the Researcher.
  - Requirement 2: Functional
- Requirement 3: The system shall provide a file management interface where Researchers can view, organize, and later assign uploaded files to specific log book entries.
  - Requirement 3: Functional
- Requirement 4: Each uploaded file shall display metadata such as filename, upload date, file type, and status (e.g., "Unlinked", "Attached") for easy tracking.
  - Requirement 4: Functional
- Requirement 5: File upload operations must complete within 5 seconds for standard-sized files under normal system and network conditions.
  - Requirement 5: Non-Functional
- Requirement 6: Access to upload and manage unlinked files shall be restricted to authenticated Researchers with appropriate permissions for the associated project or logbook.

- Requirement 6: Non-Functional

**User Story 50:** As a researcher, I want to have the ability to locate and access data that colleagues want to share.

**Requirements:**

- Requirement 1: The system shall provide a searchable or browsable data sharing interface where Researchers can locate datasets shared by colleagues.
  - Requirement 1: Functional
- Requirement 2: Shared datasets shall include metadata such as title, description, owner, date shared, and access permissions to aid discovery and understanding.
  - Requirement 2: Functional
- Requirement 3: The system shall notify Researchers when new datasets are shared with them via in-system alerts or email notifications.
  - Requirement 3: Functional
- Requirement 4: Researchers shall be able to filter shared datasets by project, team member, date range, or data type to improve search efficiency.
  - Requirement 4: Functional
- Requirement 5: Access to shared datasets must be completed within 3 seconds of selection under normal system load to support efficient workflow.
  - Requirement 5: Non-Functional
- Requirement 6: Access to shared datasets shall be role-based and restricted to authorized Researchers only, based on permissions set by the data owner.
  - Requirement 6: Non-Functional

## APPENDIX CA

### CHATGPT TEST RESULTS WITHOUT PROMPT PATTERN

**User Story 2:** As an Agency user, I want the header information box to show updated date AND time, so that I know when it was updated.

#### Requirements:

- Functional Requirements:
  - The header information box shall display both the updated date and time in the format: DD/MM/YYYY HH:MM (24-hour format).
  - The updated timestamp shall refresh automatically whenever the underlying data in the header information box is updated..
  - The displayed time shall reflect the local time zone of the Agency user.
  - The updated date and time shall be clearly visible and placed in a consistent position within the header information box.
- Non-Functional Requirements:
  - The timestamp update shall occur within 1 second of the data change being completed.
  - The updated date and time text shall meet WCAG 2.1 AA standards for contrast and font size, ensuring readability for all users.

**User Story 6:** As an admin, I want to be able to block specific users based on IP address, so that I can prevent spamming on the websites.

#### Requirements:

- Functional Requirements:
  - The admin panel shall provide a user interface where an admin can manually enter and submit IP addresses to be blocked.
  - Upon submission, the system shall confirm that the IP address has been successfully blocked with a success message or visual confirmation.

- All incoming requests from blocked IP addresses shall be denied access to the website, returning an appropriate error message (e.g., "403 Forbidden").
- The system shall allow the admin to view a list of all currently blocked IP addresses, along with timestamps of when they were added.
- Non-Functional Requirements:
  - The system shall be capable of efficiently managing and enforcing IP blocks for up to 10,000 IP addresses without impacting website performance.
  - Every IP block and unblock action shall be logged with the admin's user ID, IP address, timestamp, and action type for auditing purposes.

**User Story 14:** As a site editor, I want to assign priority numbers to news items, so that I can indicate which articles I want featured most prominently on the site.

**Requirements:**

- Functional Requirements:
  - Each news item shall have a priority number field (e.g., integer input) that the site editor can set manually during creation or editing.
  - News items on the site's homepage or featured section shall be displayed in descending order of priority — highest number appears first.
  - If no priority number is assigned, the system shall assign a default priority of 0 to ensure proper ordering without errors.
  - Site editors shall be able to update the priority number of any news item at any time from the CMS interface.
- Non-Functional Requirements:
  - The system shall validate that the priority number is a whole number between -999 and 9999, rejecting any invalid input.
  - Changing a priority number shall immediately reflect in the display order of articles without noticeable delay (within 1 second).

**User Story 20:** As an IT staff member, I want to know which kind of data types will be produced or collected, so that I can determine what basic support services and functionalities are required.

**Requirements:**

- Functional Requirements:
  - The system shall provide a comprehensive list of all data types (e.g., text, image, video, geolocation, user credentials) collected or generated across the platform.
  - Each data type listed shall include metadata, such as data format, expected size range, sensitivity level (e.g., personal, public), and storage location.
  - IT staff shall be able to access this information in real-time through an internal dashboard or documentation portal.
  - The data type information interface shall include search and filtering options (e.g., by module, department, or data sensitivity) to easily find relevant details.
- Non-Functional Requirements:
  - All data types shall be classified by security level (e.g., confidential, restricted, public) to help determine appropriate access controls and protection measures.
  - The data type documentation shall be automatically updated whenever new data types are added or modified in the system, with a timestamp and change log.

## APPENDIX CB

### GEMINI TEST RESULTS WITHOUT PROMPT PATTERN

**User Story 2:** As an Agency user, I want the header information box to show updated date AND time, so that I know when it was updated.

#### Requirements:

- Functional Requirements:
  - The header information box must display the date when the information was last updated.
  - The header information box must display the time (including hours and minutes) when the information was last updated.
  - The date and time displayed should update automatically whenever the underlying information in the header information box is refreshed or changed. The user should not need to manually trigger an update of the timestamp.
- Non-Functional Requirements:
  - The displayed date and time should reflect the actual time of the latest update with minimal delay (e.g., within a few seconds or minutes, depending on the system's update frequency).
  - The date and time should be displayed in a clear, easily understandable format for the user (e.g., YYYY-MM-DD HH:MM, DD/MM/YYYY hh:mm AM/PM). The format should be consistent throughout the application.
  - The updated date and time should be consistently displayed within the header information box across all relevant pages or sections of the application where this header is visible.

**User Story 6:** As an admin, I want to be able to block specific users based on IP address, so that I can prevent spamming on the websites.

## Requirements:

- Functional Requirements:
  - The system must provide an interface for administrators to input one or more specific IP addresses that they wish to block.
  - The system shall allow administrators to remove IP addresses or ranges from the blocklist.
  - The system must have a mechanism to prevent users originating from the specified IP addresses from performing certain actions on the websites (e.g., posting comments, submitting forms, creating accounts). The specific actions to be blocked should be configurable or clearly defined.
  - The system must provide an interface for administrators to remove IP addresses from the blocked list, thereby allowing traffic from those IPs again.
- Non-Functional Requirements:
  - The IP blocking mechanism should not significantly degrade the performance or responsiveness of the websites for legitimate users. The process of checking against the blocked IP list should be efficient.
  - The system should maintain an audit log of all blocking and unblocking actions performed by administrators, including the timestamp and the admin user who performed the action.

**User Story 14:** As a site editor, I want to assign priority numbers to news items, so that I can indicate which articles I want featured most prominently on the site.

## Requirements:

- Functional Requirements:
  - The content management system (CMS) interface for editing news items must include a field where a site editor can input a numerical priority value.

- The system must define a valid range for the priority numbers (e.g., 1 to 10, where 1 is the highest priority, or a similar scale). This range should be clearly communicated to the site editors.
- The system must store the assigned priority number for each news item in the database.
- The system must allow the front-end display logic to retrieve and sort or filter news items based on their assigned priority numbers, ensuring that higher priority items can be displayed more prominently (e.g., at the top of a list, in a larger font, in a featured section).
- Non-Functional Requirements:
  - The priority assignment field in the CMS should be intuitive and easy for site editors to use. Clear labeling or instructions should be provided.
  - The process of retrieving and ordering news items based on their priority should be efficient and not negatively impact the loading time of the website pages

**User Story 20:** As an IT staff member, I want to know which kind of data types will be produced or collected, so that I can determine what basic support services and functionalities are required.

**Requirements:**

- Functional Requirements:
  - The system documentation must explicitly list and describe all data types that the system will produce, collect, process, and store. This should include primitive types (e.g., integer, string, boolean, date), complex types (e.g., JSON objects, XML documents), and any custom data structures.
  - For each data type, the documentation should clearly indicate its source (where it originates from, e.g., user input, external API, system-generated) and where it is used or outputted within the system.

- Where applicable, the documentation should specify the exact format of the data types (e.g., date format - YYYY-MM-DD, time format - HH:MM:SS, specific structure for JSON objects).
- Non-Functional Requirements:
  - The data type documentation must be easily accessible and understandable to all relevant IT staff members. It should be organized logically and kept up-to-date as the system evolves.
  - A defined process or mechanism must be in place to ensure that the data type documentation is updated whenever changes are made to the system that affect the data being produced or collected. IT staff should be notified of these updates.
  - The documentation should include clear and concise examples of each data type to illustrate its structure and content. This will aid in understanding and planning support services.

## APPENDIX CC

### DEEPSEEK TEST RESULTS WITHOUT PROMPT PATTERN

**User Story 2:** As an Agency user, I want the header information box to show updated date AND time, so that I know when it was updated.

#### Requirements:

- Functional Requirements:
  - The header information box must display both the date and time of the last update in a clearly visible format.
  - The system shall automatically update the timestamp in the header whenever relevant data is modified.
  - The date and time format should follow a consistent standard (e.g., YYYY-MM-DD HH:MM:SS or a user-configurable format)..
- Non-Functional Requirements:
  - The timestamp should be displayed in the user's local timezone to avoid confusion.
  - The timestamp update should not introduce noticeable delays in the system's response time.
  - The displayed timestamp must be accurate and synchronized with the system's actual update time, with no more than a 1-second deviation.

**User Story 6:** As an admin, I want to be able to block specific users based on IP address, so that I can prevent spamming on the websites.

#### Requirements:

- Functional Requirements:
  - The admin dashboard must include an interface to input and save IP addresses for blocking.

- The system shall automatically deny access to any user attempting to connect from a blocked IP address.
- The admin should be able to view, add, edit, and remove blocked IPs from a centralized management panel.
- Non-Functional Requirements:
  - The IP blocking mechanism must not be bypassable via VPNs or proxy spoofing (e.g., by logging additional request metadata).
  - The IP validation check should not introduce more than 100ms of latency to page load times.
  - All IP blocking actions (add/remove) must be logged with the admin's username, timestamp, and reason for audit purposes.

**User Story 14:** As a site editor, I want to assign priority numbers to news items, so that I can indicate which articles I want featured most prominently on the site.

**Requirements:**

- Functional Requirements:
  - The CMS must allow editors to assign a numerical priority value (e.g., 1-10) to each news item.
  - The system shall automatically sort and display news items in descending order of priority on the website's homepage and category pages.
  - Editors should be able to bulk-edit priority values for multiple news items at once.
- Non-Functional Requirements:
  - The priority input field should include tooltips or guidelines (e.g., "1 = Highest priority, 10 = Lowest") to ensure consistent usage..
  - Sorting and displaying news by priority should not increase page load time by more than 200ms.
  - Any changes to news item priorities must be logged with the editor's username, timestamp, and old/new values for tracking.

**User Story 20:** As an IT staff member, I want to know which kind of data types will be produced or collected, so that I can determine what basic support services and functionalities are required.

**Requirements:**

- Functional Requirements:
  - The system shall provide a detailed data dictionary or schema documentation listing all data types collected (e.g., strings, integers, dates, JSON, binary files).
  - For each data type, the system must specify expected formats (e.g., YYYY-MM-DD for dates, max length for strings) and validation rules.
  - The system shall log and report any data type mismatches or validation failures for troubleshooting.
- Non-Functional Requirements:
  - Data type definitions must be version-controlled and updated whenever new data fields are added or modified.
  - Sensitive data types (e.g., PII, financial data) must be flagged to ensure proper handling under GDPR/other regulations.
  - Data types should align with industry standards (e.g., ISO 8601 for dates) to facilitate integration with external systems.

## APPENDIX CD

### CLAUDE TEST RESULTS WITHOUT PROMPT PATTERN

**User Story 2:** As an Agency user, I want the header information box to show updated date AND time, so that I know when it was updated.

#### Requirements:

- Functional Requirements:
  - The system must show the calendar date (month, day, year) when information was last updated.
  - The system must show the specific time (hours, minutes, seconds) when information was last updated.
  - The timestamp should automatically refresh whenever the underlying data is modified.
  - Date and time information should be converted and displayed according to the user's local timezone settings.
- Non-Functional Requirements:
  - The date/time format must follow the agency's established formatting conventions for consistency across the application.
  - The header information timestamp must remain visible and legible across desktop, tablet, and mobile views.

**User Story 6:** As an admin, I want to be able to block specific users based on IP address, so that I can prevent spamming on the websites.

#### Requirements:

- Functional Requirements:
  - The system must allow administrators to input and save specific IP addresses that should be blocked from accessing the websites.

- The system must automatically prevent users with blocked IP addresses from accessing or interacting with any part of the websites.
- Administrators should be able to see the current list of blocked IPs, modify existing entries, and remove IP addresses when blocks are no longer needed.
- The system must accept both specific IP addresses (e.g., 192.168.1.1) and IP ranges using CIDR notation (e.g., 192.168.1.0/24) for more flexible blocking capabilities..
- Non-Functional Requirements:
  - When users from blocked IPs attempt to access the websites, they should receive a consistent, professional error message that doesn't reveal security details.
  - The IP verification process should occur quickly without noticeably affecting page load times or overall website performance for non-blocked users.

**User Story 14:** As a site editor, I want to assign priority numbers to news items, so that I can indicate which articles I want featured most prominently on the site.

**Requirements:**

- Functional Requirements:
  - The system must allow site editors to input and save priority numbers for each news item through the content management interface.
  - The system must automatically arrange news items on the site with higher priority articles featured more prominently (e.g., top positions, larger thumbnails, highlighted sections).
  - The system must enable editors to update the priority value of any news item after initial publication to adjust prominence as needed.
  - The prioritization system must use a consistent numerical scale (e.g., 1-10 or 1-100) with defined values indicating relative importance.
- Non-Functional Requirements:

- When priority numbers are modified, the website should reflect these changes immediately without requiring manual republishing or extensive delays.
- The system must preserve all assigned priority values during technical maintenance, database migrations, or CMS upgrades to ensure content arrangement consistency.

**User Story 20:** As an IT staff member, I want to know which kind of data types will be produced or collected, so that I can determine what basic support services and functionalities are required.

**Requirements:**

- **Functional Requirements:**
  - The system must maintain and make accessible a detailed inventory of all data types, formats, and structures that will be collected or generated.
  - Visual representations must be available that illustrate how each data type is captured, processed, transformed, stored, and accessed throughout the system.
  - The system must provide quantitative information about expected data volumes, storage requirements, and growth patterns for capacity planning purposes.
  - Clear documentation must be available detailing how long each type of data needs to be stored, archived, or deleted according to business and compliance needs.
- **Non-Functional Requirements:**
  - The data catalog and related documentation must be maintained with current information whenever new features are added or data structures are modified.
  - Data type specifications should be available in formats that can be easily imported into IT planning, monitoring, and management tools.

## APPENDIX CE

### QWEN TEST RESULTS WITHOUT PROMPT PATTERN

**User Story 2:** As an Agency user, I want the header information box to show updated date AND time, so that I know when it was updated.

#### Requirements:

- Functional Requirements:
  - The header information box must display both the date and time of the last update in a clear and readable format (e.g., "Last Updated: MM/DD/YYYY HH:MM AM/PM").
  - The system must automatically update the "Last Updated" timestamp whenever there is a change in the content displayed in the header information box.
  - The date and time displayed must reflect the user's local timezone to ensure accuracy and relevance for the user.
- Non-Functional Requirements:
  - The font size, color, and placement of the "Last Updated" text must be consistent with the overall design guidelines of the application to maintain usability and aesthetics.
  - The system must ensure that the "Last Updated" timestamp is accurate to within 1 second of the actual update time.
  - The feature must be accessible to all users, including those using screen readers, by ensuring proper labeling and semantic HTML structure for the "Last Updated" information.

**User Story 6:** As an admin, I want to be able to block specific users based on IP address, so that I can prevent spamming on the websites.

## Requirements:

- Functional Requirements:
  - The system must provide an interface (e.g., a form or dashboard) for admins to input and block specific IP addresses.
  - Once an IP address is blocked, the system must prevent any further requests from that IP address to access the website or perform actions such as posting comments, submitting forms, or logging in.
  - The system must log all blocked IP addresses along with the timestamp and reason (if provided by the admin) for blocking, ensuring transparency and traceability.
  - The system must allow admins to unblock previously blocked IP addresses through the same interface, with immediate effect.
- Non-Functional Requirements:
  - The blocking mechanism must respond within 200 milliseconds to ensure minimal impact on website performance when checking for blocked IPs.
  - The system must ensure that the IP blocking feature is secure and cannot be bypassed by malicious users (e.g., through IP spoofing or other techniques).

**User Story 14:** As a site editor, I want to assign priority numbers to news items, so that I can indicate which articles I want featured most prominently on the site.

## Requirements:

- Functional Requirements:
  - The system must allow site editors to assign a priority number (e.g., 1 for highest priority, 2 for second priority, etc.) to each news item through an intuitive interface (e.g., dropdown or input field)
  - The system must automatically display news items with higher priority numbers more prominently on the site (e.g., at the top of the homepage or in a featured section).

- The system must ensure that no two news items can have the same priority number to avoid conflicts in ranking.
- The system must allow site editors to update or change the priority numbers of news items at any time, with changes reflected immediately on the site.
- Non-Functional Requirements:
  - The system must ensure that the assignment and display of priority numbers are processed within 500 milliseconds to maintain a responsive user experience.
  - The interface for assigning priority numbers must be accessible, supporting keyboard navigation and screen readers for users with disabilities.

**User Story 20:** As an IT staff member, I want to know which kind of data types will be produced or collected, so that I can determine what basic support services and functionalities are required.

**Requirements:**

- Functional Requirements:
  - The system must provide a comprehensive list of all data types (e.g., text, numbers, dates, images, videos, etc.) that will be produced or collected during its operation.
  - The system must specify the format and structure of each data type (e.g., JSON for structured data, PNG/JPEG for images, MP4 for videos) to ensure compatibility with IT infrastructure and tools.
  - The system must document the expected size and volume of data for each data type to help IT staff plan storage and bandwidth requirements.
  - The system must ensure that all data types are accessible via standard APIs or export mechanisms (e.g., CSV, XML) to facilitate integration with other systems and tools used by IT staff.
- Non-Functional Requirements:

- The system must ensure that data types are processed and stored in compliance with relevant data protection regulations (e.g., GDPR, HIPAA) to avoid legal and security risks.
- The system must provide real-time monitoring and alerts for unusual data production or collection patterns (e.g., sudden spikes in data volume) to assist IT staff in maintaining system stability.



**APPENDIX DA**

**CHATGPT CLASSIFICATION AMBIGUITY ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>F/NF</b>	<b>Correct Categorization</b>	<b>Ambiguity Score (10-0)</b>	<b>Ambiguous Terms</b>
1	CH1.1	F	F	10	-
	CH1.2	F	F	10	-
	CH1.3	F	F	10	-
	CH1.4	F	F	10	-
	CH1.5	NF	NF	10	-
	CH1.6	F	F	10	-
2	CH2.1	F	F	10	-
	CH2.2	F	F	10	-
	CH2.3	F	F	10	-
	CH2.4	F	F	9	immediately
	CH2.5	NF	NF	10	-
	CH2.6	NF	NF	10	-
3	CH3.1	F	F	10	-
	CH3.2	F	F	10	-
	CH3.3	F	F	10	-
	CH3.4	F	F	10	-
	CH3.5	NF	NF	10	-
	CH3.6	NF	NF	10	-
4	CH3.1	F	F	10	-
	CH3.2	NF	NF	10	-
	CH3.3	F	F	10	-
	CH3.4	F	F	10	-
	CH3.5	F	F	10	-
	CH3.6	NF	NF	10	-
5	CH5.1	F	F	10	-
	CH5.2	F	F	10	-
	CH5.3	F	F	10	-
	CH5.4	F	F	10	-
	CH5.5	NF	NF	10	-
	CH5.6	NF	NF	10	-
6	CH6.1	F	F	10	-
	CH6.2	F	F	10	-
	CH6.3	F	F	10	-
	CH6.4	F	F	9	all
	CH6.5	NF	NF	10	-

ChatGPT Classification Ambiguity Analysis (continued)

	CH6.6	F	F	10	-
7	CH7.1	F	F	10	-
	CH7.2	F	F	10	-
	CH7.3	F	F	10	-
	CH7.4	F	F	10	-
	CH7.5	NF	NF	10	-
	CH7.6	NF	NF	8	secure, all
8	CH8.1	F	F	10	-
	CH8.2	F	F	10	-
	CH8.3	F	F	9	all
	CH8.4	F	F	10	-
	CH8.5	NF	NF	10	-
	CH8.6	NF	NF	9	all
9	CH9.1	F	F	10	-
	CH9.2	F	F	10	-
	CH9.3	NF	NF	10	-
	CH9.4	F	F	10	-
	CH9.5	F	F	10	-
	CH9.6	NF	NF	9	all
10	CH10.1	F	F	10	-
	CH10.2	F	F	10	-
	CH10.3	F	F	10	-
	CH10.4	F	F	10	-
	CH10.5	NF	NF	10	-
	CH10.6	NF	NF	10	-
11	CH11.1	F	F	10	-
	CH11.2	F	F	10	-
	CH11.3	F	F	10	-
	CH11.4	F	F	10	-
	CH11.5	NF	NF	10	-
	CH11.6	F	F	10	-
12	CH12.1	F	F	10	-
	CH12.2	F	F	10	-
	CH12.3	F	F	10	-
	CH12.4	F	F	10	-
	CH12.5	NF	NF	10	-
	CH12.6	NF	NF	9	responsive
13	CH13.1	F	F	10	-
	CH13.2	F	F	10	-
	CH13.3	F	F	10	-
	CH13.4	F	F	10	-
	CH13.5	NF	NF	10	-

ChatGPT Classification Ambiguity Analysis (continued)

	CH13.6	NF	NF	10	-
14	CH14.1	F	F	10	-
	CH14.2	F	F	10	-
	CH14.3	F	F	10	-
	CH14.4	F	F	10	-
	CH14.5	NF	NF	10	-
	CH14.6	NF	NF	10	-
15	CH15.1	F	F	10	-
	CH15.2	F	F	10	-
	CH15.3	F	F	10	-
	CH15.4	F	F	10	-
	CH15.5	NF	NF	10	-
	CH15.6	F	F	9	all
16	CH16.1	F	F	10	-
	CH16.2	F	F	10	-
	CH16.3	F	F	10	-
	CH16.4	F	F	10	-
	CH16.5	NF	NF	10	-
	CH16.6	F	F	9	all
17	CH17.1	F	F	9	secure
	CH17.2	F	F	10	-
	CH17.3	F	F	9	immediately
	CH17.4	F	F	10	-
	CH17.5	NF	NF	10	-
	CH17.6	NF	NF	9	all
18	CH18.1	F	F	10	-
	CH18.2	F	F	10	-
	CH18.3	F	F	10	-
	CH18.4	F	F	10	-
	CH18.5	NF	NF	10	-
	CH18.6	F	F	10	-
19	CH19.1	F	F	10	-
	CH19.2	F	F	10	-
	CH19.3	F	F	10	-
	CH19.4	F	F	10	-
	CH19.5	NF	NF	10	-
	CH19.6	NF	NF	10	-
20	CH20.1	F	F	9	all
	CH20.2	F	F	10	-
	CH20.3	F	F	9	real-time
	CH20.4	F	F	9	all
	CH20.5	NF	NF	10	-

ChatGPT Classification Ambiguity Analysis (continued)

	CH20.6	NF	NF	10	-
21	CH21.1	F	F	10	-
	CH21.2	F	F	10	-
	CH21.3	F	F	10	-
	CH21.4	F	F	9	acceptable
	CH21.5	NF	NF	10	-
	CH21.6	NF	NF	9	all
22	CH22.1	F	F	10	-
	CH22.2	F	F	10	-
	CH22.3	F	F	10	-
	CH22.4	F	F	10	-
	CH22.5	NF	NF	10	-
	CH22.6	F	F	10	-
23	CH23.1	F	F	10	-
	CH23.2	F	F	10	-
	CH23.3	F	F	10	-
	CH23.4	NF	NF	10	-
	CH23.5	NF	NF	10	-
	CH23.6	F	F	9	all
24	CH24.1	F	F	10	-
	CH24.2	F	F	10	-
	CH24.3	F	F	10	-
	CH24.4	F	F	10	-
	CH24.5	NF	NF	9	-
	CH24.6	NF	NF	8	all
25	CH25.1	F	F	10	-
	CH25.2	F	F	10	-
	CH25.3	F	F	10	-
	CH25.4	F	F	10	-
	CH25.5	NF	NF	9	all
	CH25.6	NF	NF	9	all
26	CH26.1	F	F	10	-
	CH26.2	F	F	10	-
	CH26.3	F	F	10	-
	CH26.4	F	F	10	-
	CH26.5	NF	NF	9	all
	CH26.6	NF	NF	10	-
27	CH27.1	F	F	10	-
	CH27.2	F	F	10	-
	CH27.3	F	F	10	-
	CH27.4	F	F	10	-
	CH27.5	NF	NF	10	-

ChatGPT Classification Ambiguity Analysis (continued)

	CH27.6	NF	NF	9	all
28	CH28.1	F	F	10	-
	CH28.2	F	F	10	-
	CH28.3	F	F	10	-
	CH28.4	F	F	10	-
	CH28.5	NF	NF	10	-
	CH28.6	NF	NF	9	secure
29	CH29.1	F	F	10	-
	CH29.2	F	F	10	-
	CH29.3	F	F	9	all
	CH29.4	F	F	10	-
	CH29.5	NF	NF	10	-
	CH29.6	NF	NF	9	secure
30	CH30.1	F	F	10	-
	CH30.2	F	F	10	-
	CH30.3	F	F	10	-
	CH30.4	F	F	10	-
	CH30.5	NF	NF	9	all
	CH30.6	NF	NF	9	all
31	CH31.1	F	F	10	-
	CH31.2	F	F	10	-
	CH31.3	F	F	10	-
	CH31.4	F	F	10	-
	CH31.5	NF	NF	10	-
	CH31.6	NF	NF	8	secure, all
32	CH32.1	F	F	10	-
	CH32.2	F	F	10	-
	CH32.3	F	F	10	-
	CH32.4	F	F	10	-
	CH32.5	NF	NF	10	-
	CH32.6	NF	NF	9	all
33	CH33.1	F	F	10	-
	CH33.2	F	F	10	-
	CH33.3	F	F	10	-
	CH33.4	F	F	10	-
	CH33.5	NF	NF	10	-
	CH33.6	NF	NF	8	appropriate, secure
34	CH34.1	F	F	10	-
	CH34.2	F	F	9	immediately
	CH34.3	F	F	10	-
	CH34.4	F	F	10	-
	CH34.5	NF	NF	10	-

ChatGPT Classification Ambiguity Analysis (continued)

	CH34.6	NF	NF	10	-
35	CH35.1	F	F	9	all
	CH35.2	F	F	10	-
	CH35.3	F	F	10	-
	CH35.4	F	F	10	-
	CH35.5	NF	NF	9	all
	CH35.6	NF	NF	10	-
36	CH36.1	F	F	10	-
	CH36.2	F	F	10	-
	CH36.3	F	F	10	-
	CH36.4	F	F	10	-
	CH36.5	NF	NF	10	-
	CH36.6	NF	NF	9	proper
37	CH37.1	F	F	10	-
	CH37.2	F	F	10	-
	CH37.3	F	F	10	-
	CH37.4	F	F	10	-
	CH37.5	NF	NF	9	all
	CH37.6	NF	NF	10	-
38	CH38.1	F	F	10	-
	CH38.2	F	F	10	-
	CH38.3	F	F	10	-
	CH38.4	F	F	10	-
	CH38.5	NF	NF	10	-
	CH38.6	NF	NF	10	-
39	CH39.1	F	F	10	-
	CH39.2	F	F	10	-
	CH39.3	F	F	10	-
	CH39.4	F	F	10	-
	CH39.5	NF	NF	10	-
	CH39.6	NF	NF	9	all
40	CH40.1	F	F	10	-
	CH40.2	F	F	10	-
	CH40.3	F	F	10	-
	CH40.4	F	F	10	-
	CH40.5	NF	NF	10	-
	CH40.6	NF	NF	10	-
41	CH41.1	F	F	9	all
	CH41.2	F	F	10	-
	CH41.3	F	F	10	-
	CH41.4	F	F	10	-
	CH41.5	NF	NF	10	-

ChatGPT Classification Ambiguity Analysis (continued)

	CH41.6	NF	NF	10	-
42	CH42.1	F	F	10	-
	CH42.2	F	F	9	all
	CH42.3	F	F	10	-
	CH42.4	F	F	9	all
	CH42.5	NF	NF	10	-
	CH42.6	NF	NF	10	-
43	CH43.1	F	F	10	-
	CH43.2	F	F	10	-
	CH43.3	F	F	10	-
	CH43.4	F	F	9	immediately
	CH43.5	NF	NF	10	-
	CH43.6	NF	NF	10	-
44	CH44.1	F	F	10	-
	CH44.2	F	F	10	-
	CH44.3	F	F	10	-
	CH44.4	F	F	10	-
	CH44.5	NF	NF	10	-
	CH44.6	NF	NF	10	-
45	CH45.1	F	F	10	-
	CH45.2	F	F	9	all
	CH45.3	F	F	10	-
	CH45.4	F	F	10	-
	CH45.5	NF	NF	10	-
	CH45.6	F	F	9	all
46	CH46.1	F	F	10	-
	CH46.2	F	F	10	-
	CH46.3	F	F	10	-
	CH46.4	F	F	10	-
	CH46.5	NF	NF	10	-
	CH46.6	NF	NF	9	all
47	CH47.1	F	F	9	all
	CH47.2	F	F	10	-
	CH47.3	F	F	10	-
	CH47.4	F	F	9	immediately
	CH47.5	NF	NF	10	-
	CH47.6	NF	NF	10	-
48	CH48.1	F	F	10	-
	CH48.2	F	F	10	-
	CH48.3	F	F	10	-
	CH48.4	F	F	10	-
	CH48.5	NF	NF	10	-

ChatGPT Classification Ambiguity Analysis (continued)

	CH48.6	NF	NF	9	all
49	CH49.1	F	F	9	immediately
	CH49.2	F	F	10	-
	CH49.3	F	F	10	-
	CH49.4	F	F	10	-
	CH49.5	NF	NF	10	-
	CH49.6	F	F	9	all
	50	CH50.1	F	F	10
CH50.2		F	F	10	-
CH50.3		F	F	10	-
CH50.4		F	F	10	-
CH50.5		NF	F	10	-
CH50.6		NF	NF	10	-

**APPENDIX DB**

**CHATGPT SIMILARITY PASSIVENESS 5W1H ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>SS</b>	<b>Passive Voice</b>	<b>Completeness</b>	<b>Completeness Score (0-6)</b>
1	CH1.1	0.626	no	Who, What, Where	3
	CH1.2	0.710	yes	Who, What, When	3
	CH1.3	0.640	no	Who, What	2
	CH1.4	0.577	yes	What, When, Where	3
	CH1.5	0.702	no	What, How	2
	CH1.6	0.670	no	Who, What, How	3
2	CH2.1	0.508	no	Who, What, Where, How	4
	CH2.2	0.515	no	Who, What, Where, How	4
	CH2.3	0.692	no	Who, What, Where	3
	CH2.4	0.804	yes	Who, What, When	3
	CH2.5	0.607	no	Who, What, When	3
	CH2.6	0.711	no	Who, What, How	3
3	CH3.1	0.821	no	Who, What, Where	3
	CH3.2	0.770	no	Who, What	2
	CH3.3	0.735	no	Who, What, When, How	4
	CH3.4	0.810	no	Who, What, Where	3
	CH3.5	0.763	yes	Who, What, Why, How	4
	CH3.6	0.663	no	Who, What, When	3
	CH3.1	0.926	no	Who, What	2
	CH3.2	0.740	yes	Who, What, When	3

ChatGPT Similarity Passiveness 5W1H Analysis (continued)

4	CH3.3	0.885	no	Who, What	2
	CH3.4	0.833	yes	Who, What	2
	CH3.5	0.780	no	Who, What	2
	CH3.6	0.678	no	Who, What	2
5	CH5.1	0.682	no	Who, What, Where, How	4
	CH5.2	0.809	no	Who, What	2
	CH5.3	0.731	no	Who, What, How	3
	CH5.4	0.780	no	Who, What, How	3
	CH5.5	0.686	no	Who, What, When	3
	CH5.6	0.738	yes	Who, What, When, Why	4
6	CH6.1	0.851	no	Who, What, Where	3
	CH6.2	0.852	no	Who, What, Where, How	4
	CH6.3	0.855	yes	Who, What, How	3
	CH6.4	0.782	no	Who, What, Why	3
	CH6.5	0.740	no	Who, What, When	3
	CH6.6	0.734	no	Who, What, How	3
7	CH7.1	0.908	no	Who, What, Where	3
	CH7.2	0.848	no	Who, What, When	3
	CH7.3	0.895	no	Who, What, When	3
	CH7.4	0.873	no	Who, What, How	3
	CH7.5	0.774	yes	Who, What, When	3
	CH7.6	0.894	no	Who, What, Why, How	4
	CH8.1	0.790	no	Who, What, Where	3
	CH8.2	0.803	no	Who, What, How	3

ChatGPT Similarity Passiveness 5W1H Analysis (continued)

8	CH8.3	0.728	no	Who, What, How	3
	CH8.4	0.744	yes	Who, What, When, How	4
	CH8.5	0.695	yes	Who, What, When	3
	CH8.6	0.772	no	Who, What, Why, How	4
9	CH9.1	0.775	no	Who, What	2
	CH9.2	0.780	no	Who, What	2
	CH9.3	0.737	yes	Who, What, When	3
	CH9.4	0.807	no	Who, What, How	3
	CH9.5	0.724	no	Who, What, Where	3
	CH9.6	0.558	no	Who, What, When, How	4
10	CH10.1	0.898	no	Who, What, Where	3
	CH10.2	0.839	no	Who, What, How	3
	CH10.3	0.863	no	Who, What, Where, How	4
	CH10.4	0.879	no	Who, What, Where	3
	CH10.5	0.810	yes	Who, What, When, Where	4
	CH10.6	0.862	yes	Who, What, Why, How	4
11	CH11.1	0.855	no	Who, What, How	3
	CH11.2	0.835	no	Who, What, How	3
	CH11.3	0.776	no	Who, What, How	3
	CH11.4	0.885	yes	Who, What, How	3
	CH11.5	0.800	no	Who, What, When, How	4
	CH11.6	0.857	no	Who, What, How	3
	CH12.1	0.812	no	Who, What	2

ChatGPT Similarity Passiveness 5W1H Analysis (continued)

12	CH12.2	0.814	no	Who, What, How	3
	CH12.3	0.830	no	Who, What, Where	3
	CH12.4	0.851	yes	Who, What, When, How	4
	CH12.5	0.693	no	Who, What, When, How	4
	CH12.6	0.855	no	Who, What, Where, How	4
13	CH13.1	0.783	no	Who, What, When	3
	CH13.2	0.744	no	Who, What, Where	3
	CH13.3	0.776	no	Who, What, When	3
	CH13.4	0.726	no	Who, What, Where, Why	4
	CH13.5	0.721	no	Who, What, When	3
	CH13.6	0.792	yes	Who, What, Why, How	4
14	CH14.1	0.808	no	Who, What, When	3
	CH14.2	0.746	no	Who, What, Where, How	4
	CH14.3	0.772	no	Who, What, When	3
	CH14.4	0.739	yes	Who, What, How	3
	CH14.5	0.696	yes	Who, What, When	3
	CH14.6	0.705	no	Who, What, Where, How	4
15	CH15.1	0.824	no	Who, What, Where	3
	CH15.2	0.808	no	Who, What	2
	CH15.3	0.860	no	Who, What, How	3
	CH15.4	0.819	no	Who, What	2
	CH15.5	0.776	no	Who, What, When, Why	4

ChatGPT Similarity Passiveness 5W1H Analysis (continued)

	CH15.6	0.815	yes	Who, What, Where, How	4
16	CH16.1	0.684	no	Who, What, Where	3
	CH16.2	0.764	no	Who, What, Where, How	4
	CH16.3	0.740	no	Who, What, Where	3
	CH16.4	0.718	no	Who, What, Where, How	4
	CH16.5	0.585	yes	Who, What, When	3
	CH16.6	0.716	no	Who, What, How	3
17	CH17.1	0.867	no	Who, What, Where, How	4
	CH17.2	0.852	no	Who, What, How	3
	CH17.3	0.786	yes	Who, What, When, How	4
	CH17.4	0.838	no	Who, What, When	3
	CH17.5	0.794	yes	Who, What, When, Where	4
	CH17.6	0.826	no	Who, What, Why, How	4
18	CH18.1	0.869	no	Who, What, Where	3
	CH18.2	0.879	no	Who, What, When	3
	CH18.3	0.854	no	Who, What	2
	CH18.4	0.859	no	Who, What, Why	3
	CH18.5	0.889	yes	Who, What, How	3
	CH18.6	0.840	no	Who, What, Why, How	4
	CH19.1	0.894	no	Who, What, When	3
	CH19.2	0.882	no	Who, What, When, Why, How	5

ChatGPT Similarity Passiveness 5W1H Analysis (continued)

19	CH19.3	0.870	no	Who, What, When	3
	CH19.4	0.887	no	Who, What, How	3
	CH19.5	0.854	no	Who, What, When, How	4
	CH19.6	0.847	no	Who, What, How	3
20	CH20.1	0.885	yes	Who, What	2
	CH20.2	0.859	no	Who, What, How	3
	CH20.3	0.869	yes	Who, What, When, How	4
	CH20.4	0.866	no	Who, What, Why	3
	CH20.5	0.841	yes	Who, What, How	3
	CH20.6	0.816	no	Who, What, When, Why	4
21	CH21.1	0.772	no	Who, What, How	3
	CH21.2	0.721	no	Who, What, How	3
	CH21.3	0.794	no	Who, What, How	3
	CH21.4	0.835	no	Who, What, When, How	4
	CH21.5	0.681	no	Who, What, When, How	4
	CH21.6	0.796	no	Who, What, Why, How	4
22	CH22.1	0.803	no	Who, What, How	3
	CH22.2	0.799	no	Who, What, Where	3
	CH22.3	0.757	no	Who, What, When, How	4
	CH22.4	0.859	no	Who, What, How	3
	CH22.5	0.784	no	Who, What, How	3
	CH22.6	0.870	no	Who, What, Why	3

ChatGPT Similarity Passiveness 5W1H Analysis (continued)

23	CH23.1	0.619	no	Who, What, How	3
	CH23.2	0.645	no	Who, What, How	3
	CH23.3	0.628	no	Who, What, How	3
	CH23.4	0.714	no	Who, What, Why, How	4
	CH23.5	0.511	no	Who, What, When	3
	CH23.6	0.748	no	Who, What, Why	3
24	CH24.1	0.835	no	Who, What, When	3
	CH24.2	0.897	no	Who, What, How	3
	CH24.3	0.882	no	Who, What, Why	3
	CH24.4	0.848	yes	Who, What, When	3
	CH24.5	0.882	no	Who, What, How	3
	CH24.6	0.834	no	Who, What, Why, How	4
25	CH25.1	0.701	no	Who, What, Where	3
	CH25.2	0.627	no	Who, What, Where	3
	CH25.3	0.685	no	Who, What, Why	3
	CH25.4	0.642	no	Who, What, Where	3
	CH25.5	0.531	no	Who, What, When, How	4
	CH25.6	0.574	no	Who, What, Where, How	4
	CH26.1	0.863	no	Who, What, Where, Why	4
	CH26.2	0.795	no	Who, What, Why, How	4
	CH26.3	0.841	no	Who, What, When, Where	4

ChatGPT Similarity Passiveness 5W1H Analysis (continued)

26	CH26.4	0.814	no	Who, What, Where, How	4
	CH26.5	0.696	no	Who, What, When, Where, How	5
	CH26.6	0.818	no	Who, What, Why, How	4
27	CH27.1	0.872	no	Who, What, Where, Why	4
	CH27.2	0.789	no	Who, What, When, Where, How	5
	CH27.3	0.879	no	Who, What, Why	3
	CH27.4	0.839	no	Who, What, How	3
	CH27.5	0.737	no	Who, What, When	3
	CH27.6	0.764	yes	Who, What, Why, How	4
28	CH28.1	0.792	no	Who, What, Where	3
	CH28.2	0.870	no	Who, What, Why, How	4
	CH28.3	0.856	no	Who, What, Where, Why	4
	CH28.4	0.838	yes	Who, What, When, Why, How	5
	CH28.5	0.799	yes	Who, What, When, Where	4
	CH28.6	0.850	no	Who, What, Why, How	4
29	CH29.1	0.887	no	Who, What, How	3
	CH29.2	0.836	no	Who, What, Where	3
	CH29.3	0.884	yes	Who, What, When, How	4
	CH29.4	0.888	no	Who, What, Where	3
	CH29.5	0.773	yes	Who, What, When	3

ChatGPT Similarity Passiveness 5W1H Analysis (continued)

	CH29.6	0.825	no	Who, What, Why, How	4
30	CH30.1	0.858	no	Who, What, How	3
	CH30.2	0.675	no	Who, What, When	3
	CH30.3	0.817	no	Who, What, How	3
	CH30.4	0.689	no	Who, What, Why	3
	CH30.5	0.656	yes	Who, What, When, Where	4
	CH30.6	0.739	no	Who, What, Why	3
31	CH31.1	0.787	no	Who, What	2
	CH31.2	0.915	no	Who, What, When	3
	CH31.3	0.802	no	Who, What, How	3
	CH31.4	0.823	yes	Who, What, When, How	4
	CH31.5	0.770	yes	Who, What, When	3
	CH31.6	0.732	no	Who, What, Why, How	4
32	CH32.1	0.893	no	Who, What	2
	CH32.2	0.851	no	Who, What, How	3
	CH32.3	0.775	no	Who, What, How	3
	CH32.4	0.818	no	Who, What, Where, How	4
	CH32.5	0.730	yes	Who, What, When	3
	CH32.6	0.815	no	Who, What, Why, How	4
33	CH33.1	0.845	no	Who, What, Where, How	4
	CH33.2	0.869	no	Who, What, Why, How	4
	CH33.3	0.849	no	Who, What, How	3

ChatGPT Similarity Passiveness 5W1H Analysis (continued)

	CH33.4	0.889	no	Who, What, Where, How	4
	CH33.5	0.751	no	Who, What, When	3
	CH33.6	0.843	no	Who, What, Why, How	4
34	CH34.1	0.702	no	Who, What, Where	3
	CH34.2	0.752	yes	Who, What, When, Where, How	5
	CH34.3	0.685	no	Who, What, How	3
	CH34.4	0.771	no	Who, What, When, How	4
	CH34.5	0.693	no	Who, What, When	3
	CH34.6	0.726	no	Who, What, When, How	4
35	CH35.1	0.790	no	Who, What, Where	3
	CH35.2	0.686	no	Who, What, Where, How	4
	CH35.3	0.718	no	Who, What, How	3
	CH35.4	0.756	no	Who, What, Where, How	4
	CH35.5	0.702	no	Who, What, When, Where	4
	CH35.6	0.799	no	Who, What, Where, Why, How	5
36	CH36.1	0.798	no	Who, What, How	3
	CH36.2	0.746	no	Who, What, How	3
	CH36.3	0.792	yes	Who, What, When, Where, How	5
	CH36.4	0.784	yes	Who, What, When	3
	CH36.5	0.786	no	Who, What, When	3

ChatGPT Similarity Passiveness 5W1H Analysis (continued)

	CH36.6	0.669	no	Who, What, Why	3
37	CH37.1	0.709	no	Who, What, Where	3
	CH37.2	0.793	yes	Who, What, When, Where	4
	CH37.3	0.735	no	Who, What, Where, How	4
	CH37.4	0.749	no	Who, What, Why	3
	CH37.5	0.685	no	Who, What, When, Where, How	5
	CH37.6	0.546	no	Who, What, Why, How	4
38	CH38.1	0.795	no	Who, What, Where	3
	CH38.2	0.657	no	Who, What, How	3
	CH38.3	0.692	no	Who, What, Where, Why	4
	CH38.4	0.710	no	Who, What, How	3
	CH38.5	0.565	no	Who, What, When, How	4
	CH38.6	0.726	no	Who, What, How	3
39	CH39.1	0.817	no	Who, What	2
	CH39.2	0.744	no	Who, What, How	3
	CH39.3	0.857	no	Who, What, How	3
	CH39.4	0.804	no	Who, What, How	3
	CH39.5	0.734	yes	Who, What, When	3
	CH39.6	0.888	no	Who, What, How	3
40	CH40.1	0.844	no	Who, What, Where	3
	CH40.2	0.783	no	Who, What, When	3
	CH40.3	0.777	no	Who, What	2

ChatGPT Similarity Passiveness 5W1H Analysis (continued)

	CH40.4	0.653	no	Who, What, Where	3
	CH40.5	0.716	no	Who, What, When	3
	CH40.6	0.782	no	Who, What, Why	3
41	CH41.1	0.721	no	Who, What, When	3
	CH41.2	0.752	no	Who, What	2
	CH41.3	0.792	no	Who, What, How	3
	CH41.4	0.774	no	Who, What, How	3
	CH41.5	0.676	no	Who, What, When	3
	CH41.6	0.835	no	Who, What, When, Why	4
42	CH42.1	0.796	no	Who, What, When	3
	CH42.2	0.830	no	Who, What	2
	CH42.3	0.819	no	Who, What, How	3
	CH42.4	0.843	no	Who, What, How	3
	CH42.5	0.750	no	Who, What, When	3
	CH42.6	0.832	no	Who, What, When, How	4
43	CH43.1	0.755	no	Who, What	2
	CH43.2	0.839	no	Who, What, How	3
	CH43.3	0.874	no	Who, What, Why, How	4
	CH43.4	0.670	yes	Who, What, When, How	4
	CH43.5	0.761	no	Who, What, When	3
	CH43.6	0.713	no	Who, What, Why, How	4
	CH44.1	0.834	no	Who, What, When	3
	CH44.2	0.821	no	Who, What	2

ChatGPT Similarity Passiveness 5W1H Analysis (continued)

44	CH44.3	0.799	no	Who, What, Where, How	4
	CH44.4	0.818	no	Who, What, How	3
	CH44.5	0.778	yes	Who, What, When	3
	CH44.6	0.803	no	Who, What, Why, How	4
45	CH45.1	0.855	no	Who, What, Why	3
	CH45.2	0.631	no	Who, What, How	3
	CH45.3	0.812	no	Who, What, Why, How	4
	CH45.4	0.673	no	Who, What, Where, How	4
	CH45.5	0.806	yes	Who, What, Why, How	4
	CH45.6	0.813	no	Who, What, How	3
46	CH46.1	0.776	no	Who, What, When	3
	CH46.2	0.575	no	Who, What	2
	CH46.3	0.645	no	Who, What, Where	3
	CH46.4	0.680	no	Who, What, Where	3
	CH46.5	0.573	yes	Who, What, When	3
	CH46.6	0.723	no	Who, What, Why, How	4
47	CH47.1	0.803	no	Who, What	2
	CH47.2	0.892	no	Who, What, How	3
	CH47.3	0.861	no	Who, What, When	3
	CH47.4	0.694	no	Who, What, When, Why	4
	CH47.5	0.809	no	Who, What, How	3
	CH47.6	0.790	no	Who, What, Why, How	4
	CH48.1	0.726	no	Who, What	2

ChatGPT Similarity Passiveness 5W1H Analysis (continued)

48	CH48.2	0.842	no	Who, What, Why, How	4
	CH48.3	0.824	no	Who, What, Why, How	4
	CH48.4	0.868	no	Who, What, Where, Why	4
	CH48.5	0.736	yes	Who, What, When	3
	CH48.6	0.857	no	Who, What, Why, How	4
49	CH49.1	0.923	no	Who, What, When, Why	4
	CH49.2	0.843	no	Who, What, Where	3
	CH49.3	0.801	no	Who, What, When, Where	4
	CH49.4	0.897	no	Who, What, When, Where	4
	CH49.5	0.683	yes	Who, What, Why, How	4
	CH49.6	0.700	no	Who, What, Where	3
50	CH50.1	0.826	no	Who, What, How	3
	CH50.2	0.644	no	Who, What, How	3
	CH50.3	0.824	no	Who, What, How	3
	CH50.4	0.849	no	Who, What, How	3
	CH50.5	0.833	yes	Who, What, When, How	4
	CH50.6	0.668	no	Who, What, When	3

**APPENDIX DC**

**CHATGPT READABILITY ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>Felsch-Kincaid Ease</b>	<b>Felsch-Kincaid Grade Level</b>	<b>Gunning Fog</b>
1	CH1.1	42.72	12.3	14.0
	CH1.2	57.27	8.8	14.17
	CH1.3	51.18	11.1	16.0
	CH1.4	18.35	15.4	16.02
	CH1.5	34.26	13.5	16.0
	CH1.6	17.34	15.8	16.0
2	CH2.1	60.65	9.5	9.71
	CH2.2	59.64	9.9	10.0
	CH2.3	57.61	10.7	12.44
	CH2.4	49.15	11.9	14.25
	CH2.5	55.24	9.5	11.4
	CH2.6	54.22	9.9	13.86
3	CH3.1	33.24	13.8	16.02
	CH3.2	31.89	12.3	11.31
	CH3.3	13.95	15.0	19.33
	CH3.4	30.87	12.7	14.0
	CH3.5	28.84	13.5	18.56
	CH3.6	30.87	12.7	14.0
4	CH3.1	5.83	18.2	19.63
	CH3.2	28.84	13.5	16.21
	CH3.3	35.27	13.1	16.02
	CH3.4	12.94	15.4	18.9
	CH3.5	66.74	7.2	8.28
	CH3.6	17.0	13.9	11.47
5	CH5.1	35.27	13.1	9.71
	CH5.2	18.35	15.4	16.02
	CH5.3	12.94	15.4	16.4
	CH5.4	4.47	16.6	16.4
	CH5.5	29.86	13.1	11.4
	CH5.6	34.26	13.5	14.0
6	CH6.1	11.92	15.8	18.56
	CH6.2	28.84	13.5	13.86
	CH6.3	38.32	11.9	11.4
	CH6.4	35.27	13.1	13.92
	CH6.5	52.19	10.7	9.71
	CH6.6	21.4	14.3	13.9

ChatGPT Readability Analysis (continued)

7	CH7.1	12.94	15.4	21.4
	CH7.2	29.86	13.1	16.4
	CH7.3	52.19	10.7	13.92
	CH7.4	11.92	15.8	18.56
	CH7.5	9.89	16.6	16.02
	CH7.6	-1.96	17.0	17.03
8	CH8.1	1.43	17.8	22.34
	CH8.2	11.92	15.8	18.56
	CH8.3	28.84	13.5	13.86
	CH8.4	16.32	16.2	16.02
	CH8.5	26.81	14.2	16.02
	CH8.6	-10.42	18.2	19.89
9	CH9.1	31.89	12.3	11.31
	CH9.2	30.87	12.7	14.0
	CH9.3	53.21	10.3	7.2
	CH9.4	23.77	15.4	17.89
	CH9.5	41.7	12.7	16.02
	CH9.6	28.84	13.5	13.86
10	CH10.1	24.78	15.0	16.02
	CH10.2	36.28	12.7	16.09
	CH10.3	40.69	13.1	14.25
	CH10.4	28.84	13.5	13.86
	CH10.5	53.21	10.3	9.42
	CH10.6	20.38	14.6	16.21
11	CH11.1	15.31	16.6	19.71
	CH11.2	24.78	15.0	17.92
	CH11.3	29.86	13.1	18.9
	CH11.4	-3.99	17.8	18.9
	CH11.5	32.22	14.2	14.25
	CH11.6	29.86	13.1	16.4
12	CH12.1	23.43	13.5	17.03
	CH12.2	30.2	15.0	16.27
	CH12.3	36.28	12.7	13.87
	CH12.4	9.89	16.6	20.23
	CH12.5	39.33	11.5	11.33
	CH12.6	27.83	13.9	16.09
13	CH13.1	66.74	7.2	8.28
	CH13.2	47.79	10.3	11.33
	CH13.3	52.19	10.7	11.81
	CH13.4	29.86	13.1	16.4
	CH13.5	60.65	9.5	9.71
	CH13.6	-7.04	19.0	20.23
	CH14.1	25.8	14.6	18.0

ChatGPT Readability Analysis (continued)

14	CH14.2	33.24	13.8	14.11
	CH14.3	44.75	11.5	13.87
	CH14.4	55.58	11.5	12.93
	CH14.5	53.21	10.3	9.42
	CH14.6	25.8	14.6	18.0
15	CH15.1	52.19	10.7	13.92
	CH15.2	42.72	12.3	14.0
	CH15.3	41.7	12.7	12.21
	CH15.4	45.76	11.1	11.51
	CH15.5	35.27	13.1	11.81
	CH15.6	9.89	16.6	18.13
16	CH16.1	57.27	8.8	11.31
	CH16.2	29.18	15.4	19.6
	CH16.3	30.87	12.7	11.33
	CH16.4	54.22	9.9	11.51
	CH16.5	48.81	9.9	8.46
	CH16.6	60.65	9.5	9.71
17	CH17.1	37.3	12.3	16.21
	CH17.2	57.61	10.7	12.44
	CH17.3	10.91	16.2	18.31
	CH17.4	29.86	13.1	18.9
	CH17.5	41.7	12.7	14.11
	CH17.6	29.86	13.1	16.4
18	CH18.1	44.75	11.5	11.64
	CH18.2	20.72	16.6	19.6
	CH18.3	42.72	12.3	12.0
	CH18.4	24.78	15.0	19.83
	CH18.5	33.24	13.8	16.02
	CH18.6	35.27	13.1	13.92
19	CH19.1	25.8	14.6	18.0
	CH19.2	47.79	10.3	11.33
	CH19.3	35.27	13.1	16.02
	CH19.4	45.76	11.1	13.86
	CH19.5	26.81	14.2	16.02
	CH19.6	4.47	16.6	21.4
20	CH20.1	49.15	11.9	14.25
	CH20.2	16.32	16.2	19.83
	CH20.3	41.7	12.7	14.11
	CH20.4	33.24	13.8	16.02
	CH20.5	36.28	12.7	13.87
	CH20.6	39.67	13.4	14.42
	CH21.1	9.89	16.6	20.23
	CH21.2	-5.01	18.2	18.56

ChatGPT Readability Analysis (continued)

21	CH21.3	55.24	9.5	11.4
	CH21.4	2.44	17.4	20.53
	CH21.5	50.16	11.5	12.21
	CH21.6	35.27	13.1	18.13
22	CH22.1	29.86	13.1	18.9
	CH22.2	24.44	13.1	17.51
	CH22.3	37.3	12.3	11.51
	CH22.4	9.89	16.6	18.13
	CH22.5	10.91	16.2	22.76
	CH22.6	56.25	9.1	11.33
23	CH23.1	11.58	13.9	16.93
	CH23.2	12.94	15.4	18.9
	CH23.3	13.95	15.0	16.67
	CH23.4	10.91	16.2	13.87
	CH23.5	-0.95	16.6	20.58
	CH23.6	7.52	15.4	20.58
24	CH24.1	36.28	12.7	13.87
	CH24.2	29.86	13.1	8.9
	CH24.3	35.27	13.1	16.02
	CH24.4	38.32	11.9	13.9
	CH24.5	6.84	17.8	21.53
	CH24.6	47.79	10.3	11.33
25	CH25.1	44.75	11.5	11.64
	CH25.2	47.79	10.3	14.0
	CH25.3	70.13	8.0	7.2
	CH25.4	42.72	12.3	16.0
	CH25.5	27.83	13.9	16.09
	CH25.6	35.27	13.1	13.92
26	CH26.1	46.1	13.0	14.8
	CH26.2	45.76	11.1	13.86
	CH26.3	45.76	11.1	13.86
	CH26.4	27.83	13.9	16.09
	CH26.5	35.27	13.1	18.13
	CH26.6	30.87	12.7	11.33
27	CH27.1	50.16	11.5	12.21
	CH27.2	51.18	11.1	10.0
	CH27.3	41.7	12.7	14.11
	CH27.4	27.83	13.9	13.87
	CH27.5	38.32	11.9	11.4
	CH27.6	16.32	16.2	16.02
28	CH28.1	34.26	13.5	14.0
	CH28.2	44.75	11.5	16.09
	CH28.3	42.72	12.3	12.0

ChatGPT Readability Analysis (continued)

	CH28.4	8.88	17.0	22.0
	CH28.5	32.22	14.2	17.89
	CH28.6	36.28	12.7	13.87
29	CH29.1	36.28	12.7	13.87
	CH29.2	29.86	13.1	16.4
	CH29.3	21.4	14.3	16.4
	CH29.4	54.22	9.9	9.15
	CH29.5	13.95	15.0	16.67
	CH29.6	19.37	15.0	16.09
	30	CH30.1	49.15	11.9
CH30.2		44.75	11.5	11.64
CH30.3		52.19	10.7	9.71
CH30.4		19.53	12.9	12.22
CH30.5		37.3	12.3	11.51
CH30.6		30.87	12.7	14.0
31	CH31.1	21.4	14.3	16.4
	CH31.2	0.42	18.2	18.0
	CH31.3	39.33	11.5	14.0
	CH31.4	35.27	13.1	16.02
	CH31.5	44.75	11.5	13.87
	CH31.6	36.28	12.7	11.64
32	CH32.1	34.26	13.5	14.0
	CH32.2	1.43	17.8	20.23
	CH32.3	40.35	11.1	11.31
	CH32.4	19.71	17.0	18.09
	CH32.5	35.27	13.1	16.02
	CH32.6	33.24	13.8	17.92
33	CH33.1	17.34	15.8	18.0
	CH33.2	28.84	13.5	13.86
	CH33.3	10.91	16.2	16.09
	CH33.4	-7.04	19.0	18.13
	CH33.5	28.84	13.5	13.86
	CH33.6	3.46	17.0	16.21
34	CH34.1	21.74	16.2	17.93
	CH34.2	34.26	13.5	14.0
	CH34.3	28.84	13.5	16.21
	CH34.4	39.33	11.5	14.0
	CH34.5	36.28	12.7	11.64
	CH34.6	44.75	11.5	13.87
35	CH35.1	37.3	12.3	13.86
	CH35.2	17.34	15.8	20.0
	CH35.3	48.13	12.3	14.42
	CH35.4	31.21	14.6	16.16

ChatGPT Readability Analysis (continued)

	CH35.5	25.8	14.6	16.0
	CH35.6	33.24	13.8	14.11
36	CH36.1	-8.05	19.3	20.0
	CH36.2	55.24	9.5	11.4
	CH36.3	36.28	12.7	13.87
	CH36.4	53.21	10.3	11.64
	CH36.5	51.18	11.1	12.0
	CH36.6	54.39	7.8	8.11
37	CH37.1	42.38	10.3	11.47
	CH37.2	68.1	8.7	10.0
	CH37.3	34.26	13.5	16.0
	CH37.4	56.25	9.1	14.0
	CH37.5	52.19	10.7	11.81
	CH37.6	44.41	9.6	10.0
38	CH38.1	43.73	11.9	11.81
	CH38.2	66.74	7.2	8.28
	CH38.3	41.36	10.7	8.28
	CH38.4	39.33	11.5	11.33
	CH38.5	47.79	10.3	8.67
	CH38.6	39.33	11.5	8.67
39	CH39.1	30.2	15.0	14.6
	CH39.2	33.92	11.5	16.47
	CH39.3	39.33	11.5	11.33
	CH39.4	-2.98	17.4	19.33
	CH39.5	35.27	13.1	13.92
	CH39.6	38.32	11.9	8.9
40	CH40.1	31.21	14.6	16.16
	CH40.2	43.73	11.9	16.02
	CH40.3	44.75	11.5	13.87
	CH40.4	45.42	9.2	14.71
	CH40.5	40.69	13.1	12.44
	CH40.6	35.27	13.1	13.92
41	CH41.1	53.21	10.3	9.42
	CH41.2	11.92	15.8	18.56
	CH41.3	62.68	8.7	9.15
	CH41.4	27.83	13.9	16.09
	CH41.5	63.7	8.4	6.4
	CH41.6	48.13	12.3	12.68
42	CH42.1	34.26	13.5	16.0
	CH42.2	75.54	7.9	12.21
	CH42.3	37.3	12.3	11.51
	CH42.4	53.21	10.3	11.64
	CH42.5	20.38	14.6	18.56

ChatGPT Readability Analysis (continued)

	CH42.6	30.87	12.7	14.0
43	CH43.1	39.33	11.5	16.67
	CH43.2	48.13	12.3	14.42
	CH43.3	12.94	15.4	18.9
	CH43.4	12.94	15.4	13.9
	CH43.5	39.33	11.5	11.33
	CH43.6	29.86	13.1	18.9
44	CH44.1	24.78	15.0	16.02
	CH44.2	26.81	14.2	20.23
	CH44.3	17.34	15.8	18.0
	CH44.4	67.08	9.1	10.3
	CH44.5	38.32	11.9	13.9
	CH44.6	28.84	13.5	13.86
45	CH45.1	34.26	13.5	16.0
	CH45.2	43.9	9.7	13.72
	CH45.3	0.42	18.2	20.0
	CH45.4	11.07	14.1	16.43
	CH45.5	32.22	14.2	14.25
	CH45.6	32.22	14.2	14.25
46	CH46.1	4.82	18.6	21.27
	CH46.2	38.82	11.7	13.94
	CH46.3	23.77	15.4	19.71
	CH46.4	30.2	15.0	16.27
	CH46.5	36.28	12.7	16.09
	CH46.6	25.8	14.6	20.0
47	CH47.1	54.22	9.9	11.51
	CH47.2	50.16	11.5	12.21
	CH47.3	43.73	11.9	13.92
	CH47.4	27.83	13.9	13.87
	CH47.5	19.71	17.0	19.63
	CH47.6	43.73	11.9	13.92
48	CH48.1	60.82	7.4	8.01
	CH48.2	36.28	12.7	13.87
	CH48.3	33.24	13.8	16.02
	CH48.4	47.12	12.7	12.93
	CH48.5	52.19	10.7	7.6
	CH48.6	65.05	9.9	10.94
49	CH49.1	41.7	12.7	14.11
	CH49.2	44.75	11.5	16.09
	CH49.3	68.26	6.6	9.82
	CH49.4	59.64	9.9	12.0
	CH49.5	44.75	11.5	16.09
	CH49.6	68.26	6.6	9.82

ChatGPT Readability Analysis (continued)

50	CH50.1	36.28	12.7	13.87
	CH50.2	35.95	10.7	12.0
	CH50.3	50.16	11.5	14.11
	CH50.4	44.75	11.5	16.09
	CH50.5	69.11	8.3	11.81
	CH50.6	43.73	11.9	11.81



**APPENDIX DD**

**GEMINI CLASSIFICATION AMBIGUITY ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>F/NF</b>	<b>Correct Categorization</b>	<b>Ambiguity Score (10-0)</b>	<b>Ambiguous Terms</b>
1	G1.1	F	F	10	-
	G1.2	F	F	10	-
	G1.3	NF	NF	10	-
	G1.4	NF	NF	9	all
	G1.5	NF	NF	10	-
	G1.6	NF	NF	10	-
2	G2.1	F	F	10	-
	G2.2	F	F	10	-
	G2.3	F	F	10	-
	G2.4	NF	NF	9	all
	G2.5	NF	NF	10	-
	G2.6	NF	NF	10	-
3	G3.1	F	F	10	-
	G3.2	F	F	10	-
	G3.3	F	F	10	-
	G3.4	F	F	9	later
	G3.5	NF	NF	9	sufficient
	G3.6	NF	NF	9	secure
4	G3.1	F	F	10	-
	G3.2	F	F	10	-
	G3.3	F	F	9	various
	G3.4	NF	NF	10	-
	G3.5	NF	NF	8	reasonable, quickly
	G3.6	NF	F	9	-
5	G5.1	F	F	10	-
	G5.2	F	NF	10	-
	G5.3	NF	NF	9	quickly
	G5.4	NF	NF	9	all
	G5.5	NF	NF	10	-
	G5.6	NF	NF	10	-
6	G6.1	F	F	10	-
	G6.2	F	F	10	-
	G6.3	F	F	10	-
	G6.4	NF	NF	10	-
	G6.5	NF	NF	10	-

Gemini Classification Ambiguity Analysis (continued)

	G6.6	NF	NF	10	-
7	G7.1	F	F	10	-
	G7.2	F	F	10	-
	G7.3	F	F	9	compliant
	G7.4	F	F	10	-
	G7.5	NF	NF	10	-
	G7.6	F	F	10	-
8	G8.1	F	F	10	-
	G8.2	F	F	9	all
	G8.3	F	F	9	all
	G8.4	F	F	10	-
	G8.5	NF	NF	9	reliable
	G8.6	F	F	10	-
9	G9.1	F	F	10	-
	G9.2	F	F	10	-
	G9.3	F	F	10	-
	G9.4	F	F	10	-
	G9.5	NF	NF	9	reasonable
	G9.6	NF	F	10	-
10	G10.1	F	F	10	-
	G10.2	F	F	10	-
	G10.3	F	F	10	-
	G10.4	F	F	10	-
	G10.5	NF	NF	10	-
	G10.6	NF	NF	10	-
11	G11.1	F	F	10	-
	G11.2	F	F	10	-
	G11.3	F	F	9	various
	G11.4	NF	NF	10	-
	G11.5	NF	NF	9	responsive
	G11.6	F	F	10	-
12	G12.1	F	F	10	-
	G12.2	F	F	10	-
	G12.3	F	F	10	-
	G12.4	NF	NF	10	-
	G12.5	NF	NF	10	-
	G12.6	NF	NF	10	-
13	G13.1	F	F	10	-
	G13.2	F	F	10	-
	G13.3	NF	NF	10	-
	G13.4	NF	NF	8	acceptable, real-time
	G13.5	F	F	10	-
	G13.6	F	F	9	all

Gemini Classification Ambiguity Analysis (continued)

14	G14.1	F	F	10	-
	G14.2	F	F	10	-
	G14.3	F	F	10	-
	G14.4	NF	NF	9	intuitive
	G14.5	NF	NF	9	all
	G14.6	F	F	9	acceptable
15	G15.1	F	F	10	-
	G15.2	F	F	9	various
	G15.3	F	F	10	-
	G15.4	NF	NF	10	-
	G15.5	F	F	10	-
	G15.6	F	F	10	-
16	G16.1	F	F	10	-
	G16.2	F	F	9	various
	G16.3	F	F	10	-
	G16.4	F	F	10	-
	G16.5	NF	NF	10	-
	G16.6	NF	NF	9	reasonable
17	G17.1	F	F	10	-
	G17.2	F	F	10	-
	G17.3	F	F	10	-
	G17.4	NF	NF	10	-
	G17.5	F	F	10	-
	G17.6	NF	F	10	-
18	G18.1	F	F	10	-
	G18.2	F	F	10	-
	G18.3	F	F	10	-
	G18.4	F	F	10	-
	G18.5	F	F	10	-
	G18.6	NF	NF	10	-
19	G19.1	F	F	10	-
	G19.2	F	F	10	-
	G19.3	F	F	10	-
	G19.4	F	F	10	-
	G19.5	F	F	10	-
	G19.6	NF	NF	10	-
20	G20.1	F	F	9	all
	G20.2	F	F	9	all
	G20.3	NF	F	10	-
	G20.4	NF	NF	10	-
	G20.5	NF	NF	10	-
	G20.6	F	F	10	-
	G21.1	F	F	10	-

Gemini Classification Ambiguity Analysis (continued)

21	G21.2	F	F	10	-
	G21.3	F	F	10	-
	G21.4	F	F	10	-
	G21.5	NF	NF	10	-
	G21.6	NF	NF	9	minimize
22	G22.1	F	F	10	-
	G22.2	F	F	10	-
	G22.3	NF	NF	10	-
	G22.4	F	F	10	-
	G22.5	F	F	10	-
	G22.6	F	F	10	-
23	G23.1	F	F	10	-
	G23.2	NF	NF	10	-
	G23.3	NF	F	10	-
	G23.4	F	F	10	-
	G23.5	NF	NF	10	-
	G23.6	F	F	10	-
24	G24.1	F	F	10	-
	G24.2	F	F	9	various
	G24.3	F	F	10	-
	G24.4	F	F	10	-
	G24.5	NF	NF	10	-
	G24.6	F	F	10	-
25	G25.1	F	F	10	-
	G25.2	F	F	10	-
	G25.3	F	F	10	-
	G25.4	F	F	10	-
	G25.5	NF	NF	10	-
	G25.6	NF	F	9	user-friendly
26	G26.1	NF	NF	10	-
	G26.2	NF	NF	9	all
	G26.3	NF	NF	10	-
	G26.4	F	F	9	all
	G26.5	F	F	10	-
	G26.6	NF	NF	10	-
27	G27.1	NF	NF	10	-
	G27.2	NF	NF	10	-
	G27.3	NF	NF	9	user-friendly
	G27.4	NF	NF	10	-
	G27.5	NF	NF	10	-
	G27.6	F	F	9	all
	G28.1	F	F	10	-
	G28.2	NF	NF	10	-

Gemini Classification Ambiguity Analysis (continued)

28	G28.3	F	F	10	-
	G28.4	NF	NF	10	-
	G28.5	F	F	10	-
	G28.6	F	F	10	-
29	G29.1	F	F	10	-
	G29.2	F	F	10	-
	G29.3	F	F	10	-
	G29.4	F	F	10	-
	G29.5	F	F	10	-
30	G29.6	F	F	10	-
	G30.1	F	F	10	-
	G30.2	F	F	10	-
	G30.3	F	F	10	-
	G30.4	F	F	10	-
	G30.5	F	F	10	-
31	G30.6	F	F	10	-
	G31.1	F	F	10	-
	G31.2	F	F	10	-
	G31.3	F	F	10	-
	G31.4	F	F	10	-
	G31.5	F	F	9	effective
32	G31.6	F	F	10	-
	G32.1	F	F	10	-
	G32.2	F	F	10	-
	G32.3	F	F	10	-
	G32.4	F	F	10	-
	G32.5	F	F	10	-
33	G32.6	F	F	10	-
	G33.1	F	F	10	-
	G33.2	F	F	9	all
	G33.3	F	F	10	-
	G33.4	F	F	10	-
	G33.5	NF	NF	10	-
34	G33.6	F	F	10	-
	G34.1	F	F	10	-
	G34.2	F	F	10	-
	G34.3	F	F	10	-
	G34.4	NF	NF	10	-
	G34.5	F	F	10	-
35	G34.6	F	F	10	-
	G35.1	F	F	9	all
	G35.2	NF	F	10	-
	G35.3	F	F	10	-

Gemini Classification Ambiguity Analysis (continued)

	G35.4	F	F	10	-
	G35.5	NF	F	10	-
	G35.6	NF	NF	9	intuitive
36	G36.1	F	F	10	-
	G36.2	F	F	10	-
	G36.3	F	F	10	-
	G36.4	F	F	10	-
	G36.5	NF	NF	10	-
	G36.6	NF	NF	10	-
37	G37.1	F	F	10	-
	G37.2	NF	NF	10	-
	G37.3	NF	NF	10	-
	G37.4	F	F	10	-
	G37.5	F	F	10	-
	G37.6	NF	NF	10	-
38	G38.1	F	F	10	-
	G38.2	F	F	9	all
	G38.3	F	F	9	all
	G38.4	F	F	9	all
	G38.5	NF	F	10	-
	G38.6	NF	NF	9	reasonable
39	G39.1	F	F	10	-
	G39.2	F	F	10	-
	G39.3	F	F	10	-
	G39.4	NF	NF	10	-
	G39.5	F	F	10	-
	G39.6	F	F	9	all
40	G40.1	F	F	10	-
	G40.2	F	F	10	-
	G40.3	F	F	9	all
	G40.4	F	F	10	-
	G40.5	NF	NF	10	-
	G40.6	F	F	10	-
41	G41.1	F	F	9	all
	G41.2	F	F	10	-
	G41.3	NF	F	10	-
	G41.4	NF	NF	10	-
	G41.5	F	F	10	-
	G41.6	F	F	9	all
42	G42.1	F	F	10	-
	G42.2	F	F	10	-
	G42.3	F	F	9	all
	G42.4	F	F	10	-

Gemini Classification Ambiguity Analysis (continued)

	G42.5	NF	F	10	-
	G42.6	F	F	10	-
43	G43.1	F	F	10	-
	G43.2	F	F	10	-
	G43.3	NF	NF	10	-
	G43.4	F	F	10	-
	G43.5	NF	F	10	-
	G43.6	F	F	10	-
44	G44.1	F	F	10	-
	G44.2	NF	NF	10	-
	G44.3	F	F	10	-
	G44.4	NF	NF	10	-
	G44.5	F	F	9	various
	G44.6	F	F	10	-
45	G45.1	F	F	10	-
	G45.2	F	F	10	-
	G45.3	F	F	10	-
	G45.4	F	F	10	-
	G45.5	NF	NF	9	all
	G45.6	F	F	10	-
46	G46.1	F	F	10	-
	G46.2	F	F	10	-
	G46.3	F	F	10	-
	G46.4	F	F	10	-
	G46.5	NF	NF	10	-
	G46.6	NF	NF	10	-
47	G47.1	F	F	9	all
	G47.2	F	F	10	-
	G67.3	F	F	10	-
	G47.4	F	F	10	-
	G47.5	NF	NF	10	-
	G47.6	F	F	9	all
48	G48.1	F	F	10	-
	G48.2	F	F	10	-
	G48.3	F	F	10	-
	G48.4	F	F	10	-
	G48.5	NF	NF	10	-
	G48.6	F	F	10	-
49	G49.1	F	F	10	-
	G49.2	F	F	10	-
	G49.3	F	F	10	-
	G49.4	F	F	10	-
	G49.5	F	F	10	-

Gemini Classification Ambiguity Analysis (continued)

	G49.6	NF	NF	10	-
50	G50.1	F	F	10	-
	G50.2	F	F	10	-
	G50.3	F	F	10	-
	G50.4	F	F	10	-
	G50.5	NF	NF	10	-
	G50.6	F	F	10	-



**APPENDIX DE**

**GEMINI SIMILARITY PASSIVENESS 5W1H ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>SS</b>	<b>Passive Voice</b>	<b>Completeness</b>	<b>Completeness Score (0-6)</b>
1	G1.1	0.633	no	Who, What	2
	G1.2	0.655	yes	What	1
	G1.3	0.693	no	Who, What, Where, How	4
	G1.4	0.722	yes	What, Where	2
	G1.5	0.664	yes	Who, What, When	3
	G1.6	0.738	no	Who, What, Where, How	4
2	G2.1	0.704	no	What, Where	2
	G2.2	0.714	no	What, Where	2
	G2.3	0.769	yes	What, When	2
	G2.4	0.676	no	Who, What, Where	3
	G2.5	0.680	no	What, Where, How	3
	G2.6	0.708	no	Who, What, How	3
3	G3.1	0.789	no	Who, What	2
	G3.2	0.743	no	Who, What	2
	G3.3	0.752	yes	What, Where	2
	G3.4	0.846	no	Who, What, When	3
	G3.5	0.787	no	Who, What, Why	3
	G3.6	0.804	no	Who, What, How	3
4	G3.1	0.855	no	Who, What	2
	G3.2	0.842	no	Who, What	2
	G3.3	0.776	no	What, Where	2
	G3.4	0.868	no	Who, What, How	3
	G3.5	0.891	no	What, Why	2
	G3.6	0.853	no	Who, What, Where	3
	G5.1	0.751	no	Who, What	2

Gemini Similarity Passiveness 5W1H Analysis (continued)

5	G5.2	0.703	no	What	1
	G5.3	0.886	no	What, Why	2
	G5.4	0.829	no	Who, What	2
	G5.5	0.849	yes	What, Why	2
	G5.6	0.783	yes	What, How	2
6	G6.1	0.868	no	Who, What, Why	3
	G6.2	0.766	yes	Who, What, Why	3
	G6.3	0.827	no	Who, What, How	3
	G6.4	0.733	no	Who, What, How	3
	G6.5	0.764	no	Who, What, How	3
	G6.6	0.763	yes	Who, What, When	3
7	G7.1	0.881	no	Who, What, When, Where	4
	G7.2	0.918	no	Who, What, When	3
	G7.3	0.780	no	Who, What	2
	G7.4	0.929	yes	Who, What, Why	3
	G7.5	0.899	yes	Who, What, How	3
	G7.6	0.903	no	Who, What, How	3
8	G8.1	0.803	no	Who, What, Where	3
	G8.2	0.813	no	Who, What, Where	3
	G8.3	0.710	no	Who, What, Where	3
	G8.4	0.741	no	Who, What, Where, How	4
	G8.5	0.723	no	What, Where	2
	G8.6	0.527	no	Who, What, How	3
	G9.1	0.796	no	Who, What	2
	G9.2	0.667	no	Who, What	2
	G9.3	0.675	no	Who, What	2
	G9.4	0.742	no	Who, What	2

Gemini Similarity Passiveness 5W1H Analysis (continued)

9	G9.5	0.771	no	What	1
	G9.6	0.768	yes	Who, What, Where	3
10	G10.1	0.858	no	Who, What, Where, How	4
	G10.2	0.884	no	Who, What, Where	3
	G10.3	0.777	no	What, Where	2
	G10.4	0.906	no	Who, What, Where	3
	G10.5	0.871	no	What, Where	2
	G10.6	0.870	yes	Who, What, Where	3
11	G11.1	0.860	no	Who, What, How	3
	G11.2	0.848	no	Who, What, How	3
	G11.3	0.756	no	Who, What, Where, How	4
	G11.4	0.701	no	Who, What, How	3
	G11.5	0.862	no	Who, What, When	3
	G11.6	0.866	no	Who, What, How	3
12	G12.1	0.843	no	Who, What	2
	G12.2	0.790	no	What	1
	G12.3	0.637	no	What, How	2
	G12.4	0.840	no	What, Where	2
	G12.5	0.909	no	What, Why	2
	G12.6	0.902	no	Who, What, How	3
13	G13.1	0.729	no	Who, What	2
	G13.2	0.742	no	Who, What	2
	G13.3	0.772	no	Who, What, Where, How	4
	G13.4	0.760	yes	Who, What, When	3
	G13.5	0.737	yes	Who, What, Why	3
	G13.6	0.727	no	Who, What, When	3
	G14.1	0.844	no	Who, What	2

Gemini Similarity Passiveness 5W1H Analysis (continued)

14	G14.2	0.737	no	Who, What	2
	G14.3	0.743	no	Who, What, Where, How	4
	G14.4	0.823	no	What, How	2
	G14.5	0.746	yes	Who, What, Where	3
	G14.6	0.583	no	Who, What	2
15	G15.1	0.814	no	Who, What	2
	G15.2	0.732	no	Who, What, Why, How	4
	G15.3	0.784	no	Who, What	2
	G15.4	0.853	no	Who, What	2
	G15.5	0.851	no	Who, What, Why, How	4
	G15.6	0.852	yes	Who, What, When	3
16	G16.1	0.683	no	Who, What, How	3
	G16.2	0.787	no	What, Why	2
	G16.3	0.652	no	Who, What, Where	3
	G16.4	0.689	no	What, Where	2
	G16.5	0.682	no	Who, What, How	3
	G16.6	0.811	yes	What, When	2
17	G17.1	0.844	no	Who, What	2
	G17.2	0.845	no	Who, What, How	3
	G17.3	0.795	no	Who, What, When	3
	G17.4	0.822	no	Who, What, How	3
	G17.5	0.878	no	Who, What, How	3
	G17.6	0.853	no	Who, What, When	3
	G18.1	0.900	no	Who, What	2
	G18.2	0.863	no	Who, What, Where, How	4
	G18.3	0.873	no	Who, What, When	3
	G18.4	0.870	no	Who, What, When, Why	4

Gemini Similarity Passiveness 5W1H Analysis (continued)

18	G18.5	0.853	no	Who, What, Where	3
	G18.6	0.885	no	Who, What, How	3
19	G19.1	0.901	no	Who, What	2
	G19.2	0.888	no	Who, What, When	3
	G19.3	0.909	no	Who, What, Why, How	4
	G19.4	0.875	no	Who, What, When	3
	G19.5	0.902	no	Who, What, How	3
	G19.6	0.932	no	Who, What, How	3
20	G20.1	0.831	yes	Who, What	2
	G20.2	0.835	yes	Who, What	2
	G20.3	0.783	no	What	1
	G20.4	0.852	no	Who, What, How	3
	G20.5	0.809	yes	Who, What, When	3
	G20.6	0.759	no	What, How	2
21	G21.1	0.775	no	Who, What	2
	G21.2	0.696	no	Who, What	2
	G21.3	0.703	no	Who, What	2
	G21.4	0.707	no	Who, What, How	3
	G21.5	0.719	no	Who, What, How	3
	G21.6	0.836	no	Who, What, When, Why	4
22	G22.1	0.813	no	Who, What, How	3
	G22.2	0.827	no	Who, What	2
	G22.3	0.886	no	Who, What, How	3
	G22.4	0.797	no	Who, What	2
	G22.5	0.869	no	Who, What, When	3
	G22.6	0.851	no	Who, What, When, Where	4

Gemini Similarity Passiveness 5W1H Analysis (continued)

23	G23.1	0.472	no	Who, What, How	3
	G23.2	0.719	no	Who, What, How	3
	G23.3	0.676	no	Who, What	2
	G23.4	0.638	no	Who, What, How	3
	G23.5	0.752	no	Who, What, How	3
	G23.6	0.679	no	Who, What	2
24	G24.1	0.833	no	Who, What, Where	3
	G24.2	0.728	no	Who, What	2
	G24.3	0.882	no	Who, What, Where	3
	G24.4	0.920	no	Who, What, Why	3
	G24.5	0.885	no	Who, What, How	3
	G24.6	0.912	no	Who, What, Where	3
25	G25.1	0.642	no	Who, What, Where	3
	G25.2	0.456	no	Who, What, Where	3
	G25.3	0.475	no	Who, What, Where, How	4
	G25.4	0.650	no	Who, What, Where	3
	G25.5	0.643	yes	Who, What, When	3
	G25.6	0.642	no	Who, What, How	3
26	G26.1	0.771	no	What, Where	2
	G26.2	0.759	yes	What, Where	2
	G26.3	0.835	yes	What, Where, Why, How	4
	G26.4	0.721	no	What, Where	2
	G26.5	0.758	no	Who, What, Where, Why	4
	G26.6	0.755	no	What, Where	2
	G27.1	0.789	no	Who, What	2

Gemini Similarity Passiveness 5W1H Analysis (continued)

27	G27.2	0.811	no	Who, What, How	3
	G27.3	0.818	yes	What, How	2
	G27.4	0.848	no	Who, What, Why	3
	G27.5	0.870	no	Who, What, When, How	4
	G27.6	0.811	no	Who, What, Where	3
28	G28.1	0.850	no	Who, What	2
	G28.2	0.760	no	Who, What, How	3
	G28.3	0.692	no	What	1
	G28.4	0.788	no	Who, What, How	3
	G28.5	0.797	no	Who, What, How	3
	G28.6	0.913	no	Who, What, Why	3
29	G29.1	0.914	no	Who, What	2
	G29.2	0.891	no	Who, What	2
	G29.3	0.719	no	Who, What, How	3
	G29.4	0.888	no	Who, What	2
	G29.5	0.835	no	Who, What	2
	G29.6	0.812	no	Who, What, Where, Why, How	5
30	G30.1	0.819	no	Who, What	2
	G30.2	0.773	no	Who, What, Where, How	4
	G30.3	0.815	no	Who, What	2
	G30.4	0.635	no	Who, What, How	3
	G30.5	0.778	no	Who, What, When	3
	G30.6	0.829	no	Who, What, Where	3
31	G31.1	0.834	no	Who, What	2
	G31.2	0.765	no	Who, What, How	3
	G31.3	0.805	no	Who, What, When	3

Gemini Similarity Passiveness 5W1H Analysis (continued)

	G31.4	0.757	no	Who, What, How	3
	G31.5	0.827	no	Who, What	2
	G31.6	0.851	no	Who, What	2
32	G32.1	0.824	no	Who, What, Why	3
	G32.2	0.832	no	Who, What, How	3
	G32.3	0.843	no	Who, What	2
	G32.4	0.808	no	Who, What, How	3
	G32.5	0.852	no	Who, What	2
	G32.6	0.745	no	Who, What, How	3
33	G33.1	0.854	no	Who, What, Where	3
	G33.2	0.797	no	Who, What, How	3
	G33.3	0.789	no	Who, What	2
	G33.4	0.844	no	Who, What, Where, How	4
	G33.5	0.812	yes	Who, What, Where	3
	G33.6	0.789	no	Who, What, Why, How	4
34	G34.1	0.681	no	Who, What, Where	3
	G34.2	0.869	yes	Who, What, When, Where	4
	G34.3	0.730	no	Who, What	2
	G34.4	0.508	no	Who, What, How	3
	G34.5	0.810	no	Who, What	2
	G34.6	0.673	no	Who, What, How	3
35	G35.1	0.635	no	Who, What	2
	G35.2	0.560	no	Who, What	2
	G35.3	0.780	no	Who, What, Where	3
	G35.4	0.612	no	Who, What	2
	G35.5	0.651	yes	Who, What	2
	G35.6	0.799	no	What, How	2

Gemini Similarity Passiveness 5W1H Analysis (continued)

36	G36.1	0.821	no	Who, What, Where	3
	G36.2	0.713	no	Who, What, Where	3
	G36.3	0.463	no	Who, What, How	3
	G36.4	0.870	no	Who, What	2
	G36.5	0.836	no	Who, What	2
	G36.6	0.805	no	Who, What, How	3
37	G37.1	0.805	yes	Who, What, When, Where	4
	G37.2	0.807	no	What, Where	2
	G37.3	0.707	no	Who, What, Where	3
	G37.4	0.785	no	Who, What, Where, Why	4
	G37.5	0.778	no	Who, What, Where	3
	G37.6	0.761	no	Who, What, Where, How	4
38	G38.1	0.755	no	Who, What, Where	3
	G38.2	0.730	no	Who, What, Where	3
	G38.3	0.623	no	Who, What, Where	3
	G38.4	0.610	no	Who, What, Where	3
	G38.5	0.786	no	Who, What, Where	3
	G38.6	0.741	no	Who, What, Why	3
39	G39.1	0.833	no	Who, What	2
	G39.2	0.825	no	Who, What	2
	G39.3	0.879	no	Who, What	2
	G39.4	0.684	no	Who, What, How	3
	G39.5	0.875	no	Who, What	2
	G39.6	0.876	yes	Who, What, Where	3
	G40.1	0.841	no	Who, What	2

Gemini Similarity Passiveness 5W1H Analysis (continued)

40	G40.2	0.739	no	Who, What, Where	3
	G40.3	0.733	no	Who, What, Where	3
	G40.4	0.717	no	Who, What, Where	3
	G40.5	0.837	yes	Who, What, Why	3
	G40.6	0.846	no	Who, What, Why	3
41	G41.1	0.786	no	Who, What, When	3
	G41.2	0.823	yes	Who, What, When, Where	4
	G41.3	0.784	no	Who, What, Where	3
	G41.4	0.815	no	Who, What, How	3
	G41.5	0.812	no	Who, What	2
	G41.6	0.881	no	Who, What	2
42	G42.1	0.864	no	Who, What, When	3
	G42.2	0.770	yes	Who, What	2
	G42.3	0.840	no	Who, What, Where	3
	G42.4	0.727	yes	Who, What, When	3
	G42.5	0.855	no	Who, What, How	3
	G42.6	0.804	no	Who, What, When	3
43	G43.1	0.778	no	Who, What	2
	G43.2	0.874	no	Who, What, How	3
	G43.3	0.828	no	Who, What, How	3
	G43.4	0.826	no	Who, What	2
	G43.5	0.818	no	Who, What, When	3
	G43.6	0.742	yes	Who, What, How	3
	G44.1	0.869	no	Who, What	2

Gemini Similarity Passiveness 5W1H Analysis (continued)

44	G44.2	0.834	no	Who, What, How	3
	G44.3	0.848	yes	Who, What, When, Where	4
	G44.4	0.892	no	Who, What, How	3
	G44.5	0.649	no	Who, What	2
	G44.6	0.815	no	Who, What	2
45	G45.1	0.855	no	Who, What	2
	G45.2	0.816	no	Who, What, How	3
	G45.3	0.857	no	Who, What, When, Where	4
	G45.4	0.827	no	Who, What, How	3
	G45.5	0.813	yes	Who, What, How	3
	G45.6	0.845	no	Who, What	2
46	G46.1	0.653	no	Who, What, When, How	4
	G46.2	0.840	no	Who, What, How	3
	G46.3	0.740	no	Who, What, How	3
	G46.4	0.788	no	Who, What, When, How	4
	G46.5	0.693	no	Who, What, How	3
	G46.6	0.751	no	Who, What, How	3
47	G47.1	0.739	no	Who, What	2
	G47.2	0.848	no	Who, What, How	3
	G67.3	0.890	no	Who, What, How	3
	G47.4	0.825	no	Who, What, When	3
	G47.5	0.724	no	Who, What, Where, How	4
	G47.6	0.856	no	Who, What, When, How	4
	G48.1	0.812	no	Who, What, Why	3

Gemini Similarity Passiveness 5W1H Analysis (continued)

48	G48.2	0.757	no	Who, What	2
	G48.3	0.845	no	Who, What, How	3
	G48.4	0.754	no	Who, What, How	3
	G48.5	0.753	yes	Who, What, How	3
	G48.6	0.799	no	Who, What, How	3
49	G49.1	0.833	no	Who, What, How	3
	G49.2	0.795	no	Who, What, Where, How	4
	G49.3	0.813	no	Who, What, Why	3
	G49.4	0.853	no	Who, What, Where	3
	G49.5	0.867	no	Who, What, When	3
	G49.6	0.638	no	Who, What, How	3
50	G50.1	0.888	no	Who, What, Where	3
	G50.2	0.723	no	Who, What, How	3
	G50.3	0.735	no	Who, What, Where	3
	G50.4	0.808	no	Who, What, Where	3
	G50.5	0.712	yes	Who, What, How	3
	G50.6	0.871	no	Who, What, Why	3

**APPENDIX DF**

**GEMINI READABILITY ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>Felsch-Kincaid Ease</b>	<b>Felsch-Kincaid Grade Level</b>	<b>Gunning Fog</b>
1	G1.1	31.89	12.3	17.03
	G1.2	26.47	12.3	18.95
	G1.3	26.81	14.2	18.13
	G1.4	17.34	15.8	22.0
	G1.5	7.86	17.4	19.83
	G1.6	-1.63	19.0	23.35
2	G2.1	64.71	8.0	11.33
	G2.2	64.71	8.0	11.33
	G2.3	34.26	13.5	16.0
	G2.4	53.21	10.3	13.87
	G2.5	25.96	12.5	15.03
	G2.6	42.72	12.3	12.0
3	G3.1	34.26	13.5	14.0
	G3.2	63.7	8.4	8.9
	G3.3	43.73	11.9	16.02
	G3.4	65.05	9.9	12.68
	G3.5	33.24	13.8	17.92
	G3.6	14.29	17.0	19.63
4	G3.1	64.71	8.0	8.67
	G3.2	21.4	14.3	16.4
	G3.3	-31.4	22.1	22.76
	G3.4	37.3	12.3	13.86
	G3.5	10.91	16.2	18.31
	G3.6	10.91	16.2	18.31
5	G5.1	31.89	12.3	11.31
	G5.2	-3.99	17.8	18.9
	G5.3	12.94	15.4	18.9
	G5.4	32.9	11.9	14.43
	G5.5	2.44	17.4	20.53
	G5.6	41.36	10.7	11.35
6	G6.1	54.22	9.9	11.51
	G6.2	58.79	8.2	11.4
	G6.3	51.18	11.1	14.0
	G6.4	63.36	6.4	8.2
	G6.5	29.86	13.1	16.4
	G6.6	56.59	11.1	12.68

Gemini Readability Analysis (continued)

7	G7.1	26.81	14.2	20.23
	G7.2	12.94	15.4	23.9
	G7.3	28.5	11.5	14.71
	G7.4	25.8	14.6	18.0
	G7.5	26.81	14.2	20.23
	G7.6	10.91	16.2	22.76
8	G8.1	14.97	14.7	19.89
	G8.2	23.43	13.5	17.03
	G8.3	24.44	13.1	14.43
	G8.4	12.94	15.4	16.4
	G8.5	-17.87	19.0	23.66
	G8.6	38.48	9.8	11.0
9	G9.1	56.25	9.1	11.33
	G9.2	46.44	8.8	8.2
	G9.3	37.98	10.0	13.2
	G9.4	27.83	13.9	18.31
	G9.5	32.9	11.9	14.43
	G9.6	24.78	15.0	17.92
10	G10.1	25.8	14.6	16.0
	G10.2	17.34	15.8	18.0
	G10.3	18.35	15.4	18.13
	G10.4	14.97	14.7	17.03
	G10.5	38.32	11.9	16.4
	G10.6	23.77	15.4	19.71
11	G11.1	35.27	13.1	16.02
	G11.2	24.78	15.0	21.73
	G11.3	23.93	13.3	17.25
	G11.4	43.73	11.9	11.81
	G11.5	28.84	13.5	18.56
	G11.6	2.44	17.4	18.31
12	G12.1	47.79	10.3	14.0
	G12.2	40.35	11.1	14.17
	G12.3	13.1	13.3	13.67
	G12.4	30.87	12.7	19.33
	G12.5	45.76	11.1	13.86
	G12.6	50.5	13.4	15.74
13	G13.1	62.68	8.7	9.15
	G13.2	49.15	11.9	14.25
	G13.3	29.18	15.4	19.6
	G13.4	44.75	11.5	11.64
	G13.5	39.67	13.4	14.42
	G13.6	77.23	5.2	9.85
	G14.1	38.32	11.9	13.9

Gemini Readability Analysis (continued)

14	G14.2	59.3	8.0	8.13
	G14.3	33.24	13.8	12.21
	G14.4	41.7	12.7	17.92
	G14.5	21.74	16.2	17.93
	G14.6	59.8	7.8	9.82
	15	G15.1	47.79	10.3
G15.2		51.85	8.8	11.67
G15.3		72.16	7.2	8.9
G15.4		56.25	9.1	8.67
G15.5		61.67	9.1	9.42
G15.6		51.18	11.1	12.0
16	G16.1	40.35	11.1	11.31
	G16.2	35.27	13.1	20.23
	G16.3	44.75	11.5	13.87
	G16.4	46.78	10.7	13.9
	G16.5	72.16	7.2	8.9
	G16.6	11.92	15.8	18.56
17	G17.1	32.9	11.9	17.51
	G17.2	34.26	13.5	16.0
	G17.3	-0.95	16.6	20.58
	G17.4	38.32	11.9	16.4
	G17.5	33.24	13.8	17.92
	G17.6	4.47	16.6	21.4
18	G18.1	28.84	13.5	18.56
	G18.2	25.8	14.6	18.0
	G18.3	43.73	11.9	11.81
	G18.4	31.21	14.6	19.63
	G18.5	53.21	10.3	11.64
	G18.6	36.28	12.7	11.64
19	G19.1	39.33	11.5	16.67
	G19.2	35.27	13.1	18.13
	G19.3	15.31	16.6	21.53
	G19.4	13.95	15.0	19.33
	G19.5	49.15	11.9	14.25
	G19.6	23.77	15.4	19.71
20	G20.1	74.19	6.4	8.46
	G20.2	65.73	7.6	11.31
	G20.3	44.75	11.5	11.64
	G20.4	57.27	8.8	8.46
	G20.5	38.32	11.9	11.4
	G20.6	27.83	13.9	16.09
	G21.1	34.93	11.1	11.67
	G21.2	50.84	9.2	11.47

Gemini Readability Analysis (continued)

21	G21.3	53.88	8.0	3.6
	G21.4	26.47	12.3	15.31
	G21.5	42.38	10.3	11.47
	G21.6	34.26	13.5	16.0
22	G22.1	6.5	15.8	19.89
	G22.2	59.3	8.0	11.47
	G22.3	34.26	13.5	18.0
	G22.4	52.87	8.4	12.0
	G22.5	2.44	17.4	22.76
	G22.6	11.92	15.8	20.92
23	G23.1	29.52	11.1	15.7
	G23.2	13.95	15.0	16.67
	G23.3	24.44	13.1	14.43
	G23.4	12.94	15.4	16.4
	G23.5	-1.63	19.0	19.71
	G23.6	30.87	12.7	11.33
24	G24.1	45.76	11.1	11.51
	G24.2	22.58	11.7	11.83
	G24.3	39.33	11.5	16.67
	G24.4	34.26	13.5	16.0
	G24.5	28.84	13.5	16.21
	G24.6	59.64	9.9	10.0
25	G25.1	63.7	8.4	8.9
	G25.2	53.37	8.2	10.12
	G25.3	43.9	9.7	13.72
	G25.4	42.72	12.3	14.0
	G25.5	53.21	10.3	11.64
	G25.6	34.26	13.5	14.0
26	G26.1	40.35	11.1	17.03
	G26.2	43.9	9.7	13.72
	G26.3	31.21	14.6	17.9
	G26.4	32.9	11.9	17.51
	G26.5	37.3	12.3	18.56
	G26.6	17.34	15.8	18.0
27	G27.1	38.32	11.9	13.9
	G27.2	55.24	9.5	13.9
	G27.3	10.91	16.2	18.31
	G27.4	52.19	10.7	9.71
	G27.5	43.73	11.9	13.92
	G27.6	29.86	13.1	16.4
28	G28.1	30.87	12.7	16.67
	G28.2	24.44	13.1	20.58
	G28.3	15.98	14.3	20.58

Gemini Readability Analysis (continued)

	G28.4	55.24	9.5	13.9
	G28.5	44.75	11.5	13.87
	G28.6	52.19	10.7	13.92
29	G29.1	81.63	5.6	6.0
	G29.2	57.27	8.8	5.6
	G29.3	47.79	10.3	11.33
	G29.4	41.36	10.7	11.35
	G29.5	54.22	9.9	13.86
	G29.6	52.36	8.6	13.72
	30	G30.1	59.3	8.0
G30.2		11.58	13.9	16.93
G30.3		56.25	9.1	11.33
G30.4		55.91	7.2	2.8
G30.5		14.97	14.7	19.89
G30.6		36.28	12.7	11.64
31	G31.1	5.49	16.2	16.67
	G31.2	26.98	12.1	15.63
	G31.3	18.01	13.5	18.95
	G31.4	27.83	13.9	18.31
	G31.5	36.28	12.7	16.09
	G31.6	46.78	10.7	11.4
32	G32.1	29.86	13.1	16.4
	G32.2	16.32	16.2	23.64
	G32.3	19.37	15.0	18.31
	G32.4	-7.04	19.0	22.34
	G32.5	35.27	13.1	18.13
	G32.6	34.26	13.5	16.0
33	G33.1	45.76	11.1	13.86
	G33.2	8.03	15.2	14.6
	G33.3	17.0	13.9	14.8
	G33.4	26.81	14.2	16.02
	G33.5	31.89	12.3	14.17
	G33.6	9.04	14.9	20.25
34	G34.1	13.28	17.4	19.6
	G34.2	52.19	10.7	11.81
	G34.3	31.89	12.3	14.17
	G34.4	35.95	10.7	12.0
	G34.5	37.3	12.3	13.86
	G34.6	42.72	12.3	14.0
35	G35.1	36.28	12.7	16.09
	G35.2	46.44	8.8	10.7
	G35.3	33.24	13.8	17.92
	G35.4	45.93	9.0	15.16

Gemini Readability Analysis (continued)

	G35.5	51.18	11.1	12.0
	G35.6	35.27	13.1	16.02
36	G36.1	12.94	15.4	18.9
	G36.2	10.56	14.3	12.0
	G36.3	65.39	5.6	5.73
	G36.4	-3.99	17.8	18.9
	G36.5	5.83	18.2	21.37
	G36.6	14.97	14.7	17.03
37	G37.1	66.07	9.5	10.62
	G37.2	40.35	11.1	14.17
	G37.3	55.24	9.5	13.9
	G37.4	38.32	11.9	13.9
	G37.5	43.73	11.9	16.02
	G37.6	59.64	9.9	12.0
38	G38.1	50.84	9.2	11.47
	G38.2	47.79	10.3	11.33
	G38.3	57.27	8.8	11.31
	G38.4	62.68	8.7	11.51
	G38.5	50.16	11.5	14.11
	G38.6	32.9	11.9	14.43
39	G39.1	39.67	13.4	17.9
	G39.2	31.21	14.6	17.9
	G39.3	27.83	13.9	18.31
	G39.4	45.42	9.2	12.49
	G39.5	38.32	11.9	11.4
	G39.6	43.06	14.2	16.91
40	G40.1	41.36	10.7	11.35
	G40.2	39.33	11.5	16.67
	G40.3	42.38	10.3	11.47
	G40.4	32.9	11.9	17.51
	G40.5	41.36	10.7	17.51
	G40.6	30.87	12.7	14.0
41	G41.1	52.19	10.7	11.81
	G41.2	35.27	13.1	16.02
	G41.3	62.68	8.7	11.51
	G41.4	52.19	10.7	13.92
	G41.5	46.78	10.7	13.9
	G41.6	31.21	14.6	16.16
42	G42.1	21.74	16.2	16.27
	G42.2	54.56	11.9	14.8
	G42.3	36.28	12.7	13.87
	G42.4	28.84	13.5	13.86
	G42.5	47.79	10.3	14.0

Gemini Readability Analysis (continued)

	G42.6	40.69	13.1	12.44
43	G43.1	38.32	11.9	13.9
	G43.2	23.77	15.4	19.71
	G43.3	37.3	12.3	18.56
	G43.4	39.67	13.4	12.68
	G43.5	12.94	15.4	18.9
	G43.6	44.75	11.5	11.64
44	G44.1	45.76	11.1	13.86
	G44.2	-1.96	17.0	19.89
	G44.3	47.79	10.3	14.0
	G44.4	12.94	15.4	16.4
	G44.5	37.47	10.1	15.16
	G44.6	21.4	14.3	16.4
45	G45.1	38.32	11.9	16.4
	G45.2	23.43	13.5	14.17
	G45.3	12.94	15.4	18.9
	G45.4	44.75	11.5	16.09
	G45.5	33.24	13.8	16.02
	G45.6	62.68	8.7	11.51
46	G46.1	-0.95	16.6	20.58
	G46.2	44.75	11.5	16.09
	G46.3	55.24	9.5	11.4
	G46.4	26.81	14.2	18.13
	G46.5	50.16	11.5	16.02
	G46.6	42.72	12.3	14.0
47	G47.1	60.31	7.6	8.04
	G47.2	30.2	15.0	14.6
	G67.3	41.7	12.7	14.11
	G47.4	51.18	11.1	12.0
	G47.5	37.3	12.3	13.86
	G47.6	38.66	13.8	14.6
48	G48.1	64.71	8.0	8.67
	G48.2	51.85	8.8	11.67
	G48.3	69.11	8.3	9.71
	G48.4	62.68	8.7	9.15
	G48.5	50.84	9.2	11.47
	G48.6	56.25	9.1	11.33
49	G49.1	37.3	12.3	16.21
	G49.2	37.3	12.3	18.56
	G49.3	47.79	10.3	14.0
	G49.4	57.61	10.7	14.25
	G49.5	41.7	12.7	16.02
	G49.6	55.4	7.4	8.33

Gemini Readability Analysis (continued)

50	G50.1	48.81	9.9	11.31
	G50.2	62.85	6.6	10.46
	G50.3	56.25	9.1	14.0
	G50.4	60.65	9.5	11.81
	G50.5	66.74	7.2	11.35
	G50.6	37.3	12.3	11.51



**APPENDIX DG**

**DEEPSEEK CLASSIFICATION AMBIGUITY ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>F/NF</b>	<b>Correct Categorization</b>	<b>Ambiguity Score (10-0)</b>	<b>Ambiguous Terms</b>
1	D1.1	F	F	10	-
	D1.2	F	F	10	-
	D1.3	F	F	10	-
	D1.4	NF	NF	10	-
	D1.5	NF	NF	10	-
	D1.6	F	F	10	-
2	D2.1	F	F	10	-
	D2.2	F	F	10	-
	D2.3	F	F	9	real-time
	D2.4	NF	NF	10	-
	D2.5	NF	NF	10	-
	D2.6	F	F	10	-
3	D3.1	F	F	9	all
	D3.2	F	F	9	secure
	D3.3	NF	NF	10	-
	D3.4	F	F	10	-
	D3.5	NF	NF	9	all
	D3.6	F	F	10	-
4	D3.1	F	F	10	-
	D3.2	NF	NF	10	-
	D3.3	F	F	10	-
	D3.4	NF	NF	9	all
	D3.5	F	F	10	-
	D3.6	NF	NF	10	-
5	D5.1	F	F	9	all
	D5.2	F	F	9	all
	D5.3	NF	NF	10	-
	D5.4	F	F	10	-
	D5.5	NF	NF	10	-
	D5.6	NF	NF	10	-
6	D6.1	F	F	10	-
	D6.2	NF	NF	10	-
	D6.3	NF	NF	8	secure, all
	D6.4	F	F	10	-
	D6.5	F	F	10	-

DeepSeek Classification Ambiguity Analysis (continued)

	D6.6	NF	NF	10	-
7	D7.1	F	F	8	all, compliant
	D7.2	F	F	10	-
	D7.3	NF	NF	10	-
	D7.4	NF	NF	9	all
	D7.5	F	F	9	all
	D7.6	NF	NF	9	real-time
8	D8.1	F	F	10	-
	D8.2	F	F	10	-
	D8.3	NF	NF	10	-
	D8.4	F	F	10	-
	D8.5	F	F	10	-
	D8.6	NF	NF	9	all
9	D9.1	F	F	10	-
	D9.2	NF	NF	10	-
	D9.3	F	F	10	-
	D9.4	F	F	10	-
	D9.5	F	F	10	-
	D9.6	NF	NF	9	all
10	D10.1	F	F	9	all
	D10.2	F	F	10	-
	D10.3	NF	NF	9	proper
	D10.4	NF	NF	10	-
	D10.5	NF	NF	10	-
	D10.6	F	F	10	-
11	D11.1	F	F	10	-
	D11.2	F	F	10	-
	D11.3	F	F	10	all
	D11.4	NF	NF	10	-
	D11.5	F	F	9	-
	D11.6	F	F	10	all
12	D12.1	F	F	10	-
	D12.2	F	F	10	-
	D12.3	NF	NF	10	-
	D12.4	NF	NF	9	responsive
	D12.5	F	F	10	-
	D12.6	F	F	9	all
13	D13.1	F	F	10	-
	D13.2	F	F	9	real-time
	D13.3	F	F	10	-
	D13.4	NF	NF	10	-
	D13.5	F	F	10	-
	D13.6	NF	NF	9	all

DeepSeek Classification Ambiguity Analysis (continued)

14	D14.1	F	F	10	-
	D14.2	NF	NF	8	immediately, all
	D14.3	F	F	10	-
	D14.4	F	F	10	-
	D14.5	NF	NF	9	all
	D14.6	F	F	10	-
15	D15.1	F	F	8	intuitive, all
	D15.2	F	F	9	all
	D15.3	F	F	9	significant
	D15.4	NF	NF	9	all
	D15.5	NF	NF	9	all
	D15.6	F	F	10	-
16	D16.1	F	F	10	-
	D16.2	F	F	10	-
	D16.3	NF	NF	10	-
	D16.4	F	F	10	-
	D16.5	F	F	10	-
	D16.6	F	F	9	all
17	D17.1	F	F	10	-
	D17.2	F	F	9	all
	D17.3	F	F	10	-
	D17.4	NF	NF	9	immediately
	D17.5	F	F	10	-
	D17.6	F	F	10	-
18	D18.1	F	F	10	-
	D18.2	NF	NF	10	-
	D18.3	F	F	10	-
	D18.4	F	F	10	-
	D18.5	NF	NF	9	all
	D18.6	F	F	10	-
19	D19.1	F	F	10	-
	D19.2	F	F	10	-
	D19.3	NF	NF	9	all
	D19.4	NF	NF	9	all
	D19.5	F	F	10	-
	D19.6	F	F	9	all
20	D20.1	F	F	9	all
	D20.2	F	F	10	-
	D20.3	NF	NF	10	-
	D20.4	F	F	10	-
	D20.5	NF	NF	10	-
	D20.6	F	F	10	-
	D21.1	F	F	9	all

DeepSeek Classification Ambiguity Analysis (continued)

21	D21.2	F	F	10	-
	D21.3	NF	NF	9	real-time
	D21.4	NF	NF	9	all
	D21.5	F	F	10	-
	D21.6	NF	NF	10	-
22	D22.1	F	F	10	-
	D22.2	NF	NF	9	real-time
	D22.3	F	F	10	-
	D22.4	F	F	10	-
	D22.5	F	F	10	-
	D22.6	NF	NF	9	all
23	D23.1	F	F	9	all
	D23.2	F	F	10	-
	D23.3	NF	NF	10	-
	D23.4	NF	NF	9	all
	D23.5	F	F	10	-
	D23.6	NF	NF	9	all
24	D24.1	F	F	9	all
	D24.2	F	F	9	appropriate
	D24.3	NF	NF	10	-
	D24.4	F	F	10	-
	D24.5	NF	NF	9	all
	D24.6	F	F	10	-
25	D25.1	F	F	10	-
	D25.2	F	F	10	-
	D25.3	NF	NF	9	all
	D25.4	F	F	9	real-time
	D25.5	NF	NF	10	-
	D25.6	F	F	10	-
26	D26.1	F	F	10	-
	D26.2	F	F	9	all
	D26.3	NF	NF	10	-
	D26.4	NF	NF	10	-
	D26.5	F	F	9	all
	D26.6	NF	NF	9	all
27	D27.1	F	F	9	user-friendly
	D27.2	F	F	10	-
	D27.3	NF	NF	10	-
	D27.4	NF	NF	9	all
	D27.5	F	F	10	-
	D27.6	NF	NF	9	all
	D28.1	F	F	10	-
	D28.2	F	F	9	all

DeepSeek Classification Ambiguity Analysis (continued)

28	D28.3	NF	NF	10	-
	D28.4	NF	NF	10	-
	D28.5	F	F	10	-
	D28.6	F	F	10	-
29	D29.1	F	F	10	-
	D29.2	F	F	7	optimal, all, real-time
	D29.3	NF	NF	10	-
	D29.4	F	F	9	all
	D29.5	F	F	10	-
	D29.6	NF	NF	9	all
30	D30.1	F	F	10	-
	D30.2	F	F	10	-
	D30.3	F	F	10	-
	D30.4	NF	NF	9	real-time
	D30.5	F	F	10	-
	D30.6	NF	NF	9	all
31	D31.1	F	F	9	all
	D31.2	F	F	10	-
	D31.3	F	F	9	all
	D31.4	NF	NF	9	secure
	D31.5	NF	NF	9	all
	D31.6	F	F	10	-
32	D32.1	F	F	10	-
	D32.2	F	F	10	-
	D32.3	F	F	10	-
	D32.4	NF	NF	10	-
	D32.5	NF	NF	8	all, real-time
	D32.6	F	F	10	-
33	D33.1	F	F	10	-
	D33.2	NF	NF	10	-
	D33.3	F	F	10	-
	D33.4	NF	NF	10	-
	D33.5	NF	NF	10	-
	D33.6	F	F	9	all
34	D34.1	F	F	10	-
	D34.2	F	F	10	-
	D34.3	NF	NF	10	-
	D34.4	NF	NF	10	-
	D34.5	F	F	10	-
	D34.6	NF	NF	9	all
35	D35.1	F	F	9	all
	D35.2	F	F	10	-
	D35.3	NF	NF	10	-

DeepSeek Classification Ambiguity Analysis (continued)

	D35.4	F	F	10	-
	D35.5	F	F	10	-
	D35.6	F	F	10	-
36	D36.1	F	F	9	all
	D36.2	NF	NF	10	-
	D36.3	NF	NF	9	compliant
	D36.4	F	F	10	-
	D36.5	F	F	10	-
	D36.6	F	F	9	all
37	D37.1	F	F	10	-
	D37.2	F	F	10	-
	D37.3	NF	NF	10	-
	D37.4	F	F	10	-
	D37.5	NF	NF	10	-
	D37.6	NF	NF	9	all
38	D38.1	F	F	10	-
	D38.2	NF	NF	10	-
	D38.3	F	F	10	-
	D38.4	F	F	10	-
	D38.5	NF	NF	9	all
	D38.6	F	F	10	-
39	D39.1	F	F	10	-
	D39.2	F	F	10	-
	D39.3	NF	NF	9	all
	D39.4	F	F	10	-
	D39.5	NF	NF	10	-
	D39.6	F	F	10	-
40	D40.1	F	F	9	all
	D40.2	F	F	10	-
	D40.3	NF	NF	10	-
	D40.4	NF	NF	9	proper
	D40.5	F	F	9	all
	D40.6	F	F	10	-
41	D41.1	F	F	9	all
	D41.2	F	F	10	-
	D41.3	NF	NF	10	-
	D41.4	F	F	10	-
	D41.5	F	F	10	-
	D41.6	NF	NF	10	-
42	D42.1	F	F	9	all
	D42.2	F	F	10	-
	D42.3	NF	NF	10	-
	D42.4	F	F	10	-

DeepSeek Classification Ambiguity Analysis (continued)

	D42.5	NF	NF	10	-
	D42.6	NF	NF	10	-
43	D43.1	F	F	10	-
	D43.2	F	F	10	-
	D43.3	NF	NF	8	immediately, all
	D43.4	F	F	10	-
	D43.5	NF	NF	9	all
	D43.6	F	F	10	-
44	D44.1	F	F	10	-
	D44.2	F	F	9	all
	D44.3	NF	NF	10	-
	D44.4	F	F	10	-
	D44.5	F	F	10	-
	D44.6	NF	NF	9	all
45	D45.1	F	F	10	-
	D45.2	F	F	10	-
	D45.3	NF	NF	9	all
	D45.4	F	F	10	-
	D45.5	NF	NF	10	-
	D45.6	F	F	9	all
46	D46.1	F	F	9	all
	D46.2	NF	NF	10	-
	D46.3	F	F	10	-
	D46.4	F	F	10	-
	D46.5	NF	NF	10	-
	D46.6	NF	NF	9	all
47	D47.1	F	F	9	all
	D47.2	F	F	10	-
	D67.3	NF	NF	10	-
	D47.4	NF	NF	10	-
	D47.5	F	F	9	all
	D47.6	F	F	9	quickly
48	D48.1	F	F	9	real-time
	D48.2	NF	NF	10	-
	D48.3	F	F	10	-
	D48.4	F	F	10	-
	D48.5	NF	NF	10	-
	D48.6	F	F	10	-
49	D49.1	F	F	10	-
	D49.2	NF	NF	10	-
	D49.3	F	F	10	-
	D49.4	NF	NF	10	-
	D49.5	F	F	10	-

DeepSeek Classification Ambiguity Analysis (continued)

	D49.6	NF	NF	10	-
50	D50.1	F	F	9	all
	D50.2	F	F	10	-
	D50.3	NF	NF	9	real-time
	D50.4	NF	NF	10	-
	D50.5	F	F	9	proper
	D50.6	NF	NF	10	-



**APPENDIX DH**

**DEEPSEEK SIMILARITY PASSIVENESS 5W1H ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>SS</b>	<b>Passive Voice</b>	<b>Completeness</b>	<b>Completeness Score (0-6)</b>
1	D1.1	0.573	no	Who, What, Where, How	4
	D1.2	0.582	no	Who, What, Where, How	4
	D1.3	0.447	no	Who, What, Where	3
	D1.4	0.712	no	Who, What, When, Why	4
	D1.5	0.405	no	Who, What, When, Where	4
	D1.6	0.551	no	Who, What, Where, Why	4
2	D2.1	0.728	no	Who, What, Where	3
	D2.2	0.843	yes	Who, What, Where, How	4
	D2.3	0.743	yes	Who, What, When, How	4
	D2.4	0.750	yes	Who, What, Where, Why, How	5
	D2.5	0.669	no	Who, What, When, Where	4
	D2.6	0.390	no	Who, What, How	3
	D3.1	0.800	no	Who, What, Where, Why, How	5
	D3.2	0.805	no	Who, What, Where, How	4
	D3.3	0.676	no	Who, What, When	3
	D3.4	0.672	no	Who, What, When, Why, How	5

DeepSeek Similarity Passiveness 5W1H Analysis (continued)

3	D3.5	0.789	yes	Who, What, When, Why	4
	D3.6	0.807	no	Who, What, Why	3
4	D3.1	0.881	no	Who, What, How	3
	D3.2	0.605	yes	What, When	2
	D3.3	0.750	no	Who, What, How	3
	D3.4	0.770	no	What, When	2
	D3.5	0.862	no	Who, What, How	3
	D3.6	0.786	no	Who, What, How	3
5	D5.1	0.620	no	Who, What, Where, How	4
	D5.2	0.598	no	What, Where	2
	D5.3	0.518	no	Who, What, When, Where	4
	D5.4	0.611	no	What, How	2
	D5.5	0.810	yes	Who, What, When, Where	4
	D5.6	0.714	no	What, How	2
6	D6.1	0.812	no	Who, What, Why	3
	D6.2	0.804	yes	Who, What, When	3
	D6.3	0.756	no	Who, What, How	3
	D6.4	0.790	no	Who, What, When, How	4
	D6.5	0.871	no	Who, What, When, How	4
	D6.6	0.769	no	Who, What, When	3
7	D7.1	0.862	no	Who, What, How	3
	D7.2	0.911	no	Who, What	2
	D7.3	0.844	yes	Who, What, When, How	4
	D7.4	0.902	no	Who, What, How	3
	D7.5	0.924	no	Who, What, When	3

DeepSeek Similarity Passiveness 5W1H Analysis (continued)

	D7.6	0.832	no	Who, What, Where, How	4
8	D8.1	0.803	no	Who, What, Where	3
	D8.2	0.583	no	Who, What, Where, How	4
	D8.3	0.713	yes	Who, What, When, Where	4
	D8.4	0.687	no	Who, What, How	3
	D8.5	0.871	no	Who, What	2
	D8.6	0.693	no	Who, What, Where	3
9	D9.1	0.739	no	Who, What, How	3
	D9.2	0.529	yes	Who, What, When, Where	4
	D9.3	0.674	no	Who, What, How	3
	D9.4	0.852	no	Who, What, How	3
	D9.5	0.822	no	Who, What, Why	3
	D9.6	0.723	yes	Who, What, When	3
10	D10.1	0.896	no	Who, What, Where	3
	D10.2	0.805	yes	Who, What, When, How	4
	D10.3	0.742	no	Who, What, Why	3
	D10.4	0.621	yes	Who, What, When	3
	D10.5	0.868	no	Who, What	2
	D10.6	0.855	no	Who, What, When, How	4
	D11.1	0.735	no	Who, What, How	3
	D11.2	0.837	no	Who, What, How	3
	D11.3	0.628	no	Who, What, How	3

DeepSeek Similarity Passiveness 5W1H Analysis (continued)

11	D11.4	0.550	no	What, When, Where	3
	D11.5	0.565	no	Who, What, When, Where	4
	D11.6	0.680	no	What, How	2
12	D12.1	0.810	no	Who, What, Where, How	4
	D12.2	0.579	no	What, How	2
	D12.3	0.443	no	What, When, Where, How	4
	D12.4	0.831	no	What, Where, How	3
	D12.5	0.736	no	Who, What, Where, How	4
	D12.6	0.806	no	What, Why, How	3
13	D13.1	0.726	no	Who, What, When, How	4
	D13.2	0.576	yes	What, When, Where	3
	D13.3	0.587	no	Who, What, Where, How	4
	D13.4	0.699	no	What, When, Where, Why	4
	D13.5	0.333	no	Who, What, Where, How	4
	D13.6	0.674	no	What, How	2
14	D14.1	0.490	no	Who, What, Where, How	4
	D14.2	0.730	no	What, When, Where	3
	D14.3	0.448	no	What, Where, How	3
	D14.4	0.833	no	Who, What, How	3
	D14.5	0.649	no	Who, What, How	3
	D14.6	0.517	no	What, When, How	3
	D15.1	0.781	no	Who, What, Where, How	4
	D15.2	0.756	yes	What, When, How	3

DeepSeek Similarity Passiveness 5W1H Analysis (continued)

15	D15.3	0.617	yes	Who, What, When, How	4
	D15.4	0.726	no	What, When, Where	3
	D15.5	0.752	no	Who, What, Where, How	4
	D15.6	0.768	no	Who, What, How	3
16	D16.1	0.684	yes	Who, What, Why, How	4
	D16.2	0.640	no	Who, What, Why	3
	D16.3	0.649	yes	Who, What, When, How	4
	D16.4	0.799	no	Who, What, When, Why	4
	D16.5	0.755	no	Who, What, Where, Why	4
	D16.6	0.754	no	Who, What, When, Where	4
17	D17.1	0.751	no	Who, What, Where, Why	4
	D17.2	0.862	no	Who, What, When	3
	D17.3	0.796	no	Who, What, When, How	4
	D17.4	0.857	no	Who, What, When, How	4
	D17.5	0.799	no	Who, What, Where, Why, How	5
	D17.6	0.808	yes	Who, What, When	3
18	D18.1	0.887	no	Who, What, When, Why	4
	D18.2	0.837	no	Who, What, When, How	4
	D18.3	0.900	no	Who, What, Where, Why	4
	D18.4	0.781	yes	Who, What, How	3
	D18.5	0.847	no	Who, What, How	3

DeepSeek Similarity Passiveness 5W1H Analysis (continued)

	D18.6	0.847	no	Who, What, Where, Why	4
19	D19.1	0.883	no	Who, What, How	3
	D19.2	0.827	no	Who, What, How	3
	D19.3	0.914	no	Who, What, How	3
	D19.4	0.883	no	Who, What, When, Why, How	5
	D19.5	0.864	no	What, Where	2
	D19.6	0.760	no	What, Why, How	3
20	D20.1	0.690	no	Who, What, How	3
	D20.2	0.587	no	Who, What, How	3
	D20.3	0.844	no	What, How	2
	D20.4	0.698	no	Who, What, How	3
	D20.5	0.857	no	What, When, Where, Why	4
	D20.6	0.790	no	What, How	2
21	D21.1	0.559	no	Who, What, How	3
	D21.2	0.719	no	What, How	2
	D21.3	0.711	no	What, When, How	3
	D21.4	0.684	no	What, When, How	3
	D21.5	0.714	no	Who, What, How	3
	D21.6	0.832	no	Who, What, Why	3
	D22.1	0.713	no	Who, What, When, Where, How	5
	D22.2	0.691	yes	Who, What, When	3
	D22.3	0.713	no	Who, What, How	3

DeepSeek Similarity Passiveness 5W1H Analysis (continued)

22	D22.4	0.872	no	Who, What, When, How	4
	D22.5	0.696	yes	Who, What, When, How	4
	D22.6	0.805	yes	What, Why, How	3
23	D23.1	0.595	no	Who, What, How	3
	D23.2	0.315	no	What, How	2
	D23.3	0.744	no	Who, What, How	3
	D23.4	0.495	no	What, Where, How	3
	D23.5	0.604	no	Who, What, When, Where, How	4
	D23.6	0.707	no	What, Why, How	3
24	D24.1	0.858	no	Who, What, How	3
	D24.2	0.799	no	Who, What, How	3
	D24.3	0.875	no	What, Why, How	3
	D24.4	0.819	no	Who, What, When, How	4
	D24.5	0.860	yes	What, How	2
	D24.6	0.760	no	What, Where, Why	3
25	D25.1	0.648	no	Who, What, Where, How	4
	D25.2	0.399	no	Who, What, How	3
	D25.3	0.432	no	Who, What, Where, Why, How	5
	D25.4	0.694	no	Who, What, When, How	4
	D25.5	0.356	no	Who, What, How	3
	D25.6	0.697	no	Who, What, Why, How	4

DeepSeek Similarity Passiveness 5W1H Analysis (continued)

26	D26.1	0.815	no	Who, What, How	3
	D26.2	0.724	yes	Who, What, How	3
	D26.3	0.434	no	What, Where, Why, How	4
	D26.4	0.609	no	What, Why, How	3
	D26.5	0.798	no	What, How	2
	D26.6	0.719	no	What, Why, How	3
27	D27.1	0.844	no	Who, What, How	3
	D27.2	0.384	no	What, Why, How	3
	D27.3	0.809	no	Who, What, Why, How	4
	D27.4	0.455	no	Who, What, Where, How	4
	D27.5	0.786	no	Who, What, How	3
	D27.6	0.535	no	What, Why, How	3
28	D28.1	0.848	no	Who, What, How	3
	D28.2	0.761	no	What, Why, How	3
	D28.3	0.664	no	Who, What, How	3
	D28.4	0.830	no	What, When, How	3
	D28.5	0.729	no	Who, What, How	3
	D28.6	0.831	no	Who, What, Where, Why, How	<b>5</b>
29	D29.1	0.816	no	Who, What, When, How	<b>4</b>
	D29.2	0.765	no	Who, What, How	3
	D29.3	0.761	yes	What, When, How	3

DeepSeek Similarity Passiveness 5W1H Analysis (continued)

	D29.4	0.847	no	Who, What, How	3
	D29.5	0.656	yes	Who, What, Where, How	4
	D29.6	0.736	no	What, When, Where, How	4
30	D30.1	0.849	no	Who, What, How	3
	D30.2	0.676	no	What, How	2
	D30.3	0.587	no	What, How	2
	D30.4	0.818	no	What, When, How	3
	D30.5	0.756	no	Who, What, How	3
	D30.6	0.862	yes	What, When, How	3
31	D31.1	0.856	no	Who, What, When, How	4
	D31.2	0.803	no	Who, What, How	3
	D31.3	0.728	no	What, Why, How	3
	D31.4	0.734	yes	Who, What, When, How	4
	D31.5	0.805	yes	What, When, How	3
	D31.6	0.717	no	Who, What, When, How	4
32	D32.1	0.828	no	Who, What, How	3
	D32.2	0.749	no	Who, What, How	3
	D32.3	0.642	no	What, Why, How	3
	D32.4	0.692	no	Who, What, How	3
	D32.5	0.712	yes	What, Where, How	3
	D32.6	0.795	no	What, When, How	3
	D33.1	0.767	no	Who, What, Where	3
	D33.2	0.844	no	What, How	2

DeepSeek Similarity Passiveness 5W1H Analysis (continued)

33	D33.3	0.865	no	Who, What, Why, How	4
	D33.4	0.732	yes	What, When	2
	D33.5	0.513	no	Who, What, How	3
	D33.6	0.684	no	Who, What, Why, How	4
34	D34.1	0.705	no	Who, What, How	3
	D34.2	0.760	no	What, Where, How	3
	D34.3	0.636	no	What, When, How	3
	D34.4	0.740	no	Who, What, How	3
	D34.5	0.548	no	What, When, Why, How	4
	D34.6	0.750	no	What, Why, How	3
35	D35.1	0.696	no	Who, What, Where, How	4
	D35.2	0.481	no	What, How	2
	D35.3	0.687	no	What, When, How	3
	D35.4	0.640	no	Who, What, How	3
	D35.5	0.643	no	What, How	2
	D35.6	0.580	no	What, Why, How	3
36	D36.1	0.470	no	Who, What, How	3
	D36.2	0.687	no	Who, What, When, Where, How	5
	D36.3	0.530	no	Who, What, Why, How	4
	D36.4	0.802	no	What, When, How	3
	D36.5	0.742	no	Who, What, How	3
	D36.6	0.747	no	What, Why, How	3

DeepSeek Similarity Passiveness 5W1H Analysis (continued)

37	D37.1	0.596	no	Who, What, When, Where, How	5
	D37.2	0.696	no	What, When, Where, How	4
	D37.3	0.374	no	What, When, Where, How	4
	D37.4	0.711	no	Who, What, When, How	4
	D37.5	0.373	no	What, When, Where, How	4
	D37.6	0.291	no	What, Where, How	3
38	D38.1	0.706	no	What, Where, How	3
	D38.2	0.563	yes	What, When, How	3
	D38.3	0.161	no	Who, What, Why, How	4
	D38.4	0.383	no	What, Where, How	3
	D38.5	0.592	yes	What, When, How	3
	D38.6	0.672	no	What, Why, How	3
39	D39.1	0.890	no	Who, What, How	3
	D39.2	0.853	no	Who, What, When, Where, How	5
	D39.3	0.824	yes	What, How	2
	D39.4	0.768	no	Who, What, How	3
	G39.5	0.805	no	What, When, Where, How	4
	D39.6	0.487	no	Who, What, How	3
40	D40.1	0.822	no	Who, What, Where, How	4
	D40.2	0.498	no	What, How	2
	D40.3	0.659	no	What, When, How	3

DeepSeek Similarity Passiveness 5W1H Analysis (continued)

	D40.4	0.641	no	What, Why, How	3
	D40.5	0.459	no	Who, What, When	3
	D40.6	0.571	no	Who, What, Where	3
41	D41.1	0.822	no	Who, What, When, How	4
	D41.2	0.438	yes	What, How	2
	D41.3	0.727	no	What, When, How	3
	D41.4	0.629	no	What, How	2
	D41.5	0.806	no	What, When, How	3
	D41.6	0.807	yes	What, When, How	3
42	G42.1	0.715	no	Who, What, When, How	4
	D42.2	0.682	yes	What, When, Where, How	4
	D42.3	0.736	no	What, When, How	3
	D42.4	0.787	no	What, How	2
	D42.5	0.615	no	Who, What, When	3
	D42.6	0.751	no	What, When, How	3
43	D43.1	0.734	no	Who, What, Where, How	4
	D43.2	0.621	no	Who, What, When	3
	D43.3	0.608	no	What, When, Where	3
	D43.4	0.521	yes	What, When, Where, How	4
	D43.5	0.781	yes	Who, What, How	3
	D43.6	0.809	no	Who, What, Where, Why, How	5
	D44.1	0.708	no	Who, What, How	3

DeepSeek Similarity Passiveness 5W1H Analysis (continued)

44	D44.2	0.916	yes	What, Where, How	3
	D44.3	0.669	yes	What, Why, How	3
	D44.4	0.879	no	Who, What, When, How	4
	D44.5	0.829	yes	Who, What, When, Why, How	5
	D44.6	0.887	yes	What, When, Where, How	4
45	D45.1	0.773	no	Who, What, How	3
	D45.2	0.669	no	Who, What, Why, How	4
	D45.3	0.856	yes	What, How	2
	D45.4	0.836	no	Who, What, When, Why, How	5
	D45.5	0.738	no	What, When, How	3
	D45.6	0.773	no	Who, What, When, How	4
46	D46.1	0.475	no	Who, What, How	3
	D46.2	0.453	no	Who, What, When, Where, How	5
	D46.3	0.665	no	What, Where	2
	D46.4	0.484	no	Who, What, Why, How	4
	D46.5	0.650	no	What, When, Where	3
	D46.6	0.410	no	Who, What, Why, How	4
47	D47.1	0.744	no	Who, What, How	3
	D47.2	0.737	no	Who, What, When, How	4
	D67.3	0.634	no	Who, What, When, How	4
	D47.4	0.751	no	What, How	2

DeepSeek Similarity Passiveness 5W1H Analysis (continued)

	D47.5	0.758	yes	Who, What, When, How	4
	D47.6	0.780	no	Who, What, Why, How	4
48	D48.1	0.695	no	What, When, How	3
	D48.2	0.747	yes	What, When, Why	3
	D48.3	0.514	no	Who, What, Where, How	4
	D48.4	0.626	no	Who, What, How	3
	D48.5	0.784	no	What, Where, How	3
	D48.6	0.633	no	What, When, Where, How	4
49	D49.1	0.733	no	Who, What, When, Where, How	5
	D49.2	0.728	no	What, When, How	3
	D49.3	0.868	no	Who, What, When, How	4
	D49.4	0.459	no	What, How	2
	D49.5	0.916	no	Who, What, When, How	4
	D49.6	0.482	no	Who, What, When, How	4
50	D50.1	0.767	no	Who, What, Where, How	4
	D50.2	0.614	no	What, How	2
	D50.3	0.782	yes	Who, What, When, How	4
	D50.4	0.885	no	What, Why, How	3
	D50.5	0.726	no	Who, What, Why, How	4
	D50.6	0.732	no	What, When, How	3

**APPENDIX DI**

**DEEPSEEK READABILITY ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>Felsch-Kincaid Ease</b>	<b>Felsch-Kincaid Grade Level</b>	<b>Gunning Fog</b>
1	D1.1	58.79	8.2	9.8
	D1.2	26.81	14.2	20.23
	D1.3	34.26	13.5	18.0
	D1.4	-10.42	18.2	25.6
	D1.5	28.84	13.5	16.21
	D1.6	-2.98	17.4	22.0
2	D2.1	44.75	11.5	13.87
	D2.2	75.54	7.9	8.4
	D2.3	11.92	15.8	16.21
	D2.4	21.4	14.3	18.9
	D2.5	37.47	10.1	10.46
	D2.6	59.8	7.8	4.6
3	D3.1	15.31	16.6	19.71
	D3.2	23.77	15.4	19.71
	D3.3	37.3	12.3	16.21
	D3.4	39.67	13.4	16.16
	D3.5	44.75	11.5	16.09
	D3.6	38.32	11.9	16.4
4	D3.1	50.16	11.5	12.21
	D3.2	63.7	8.4	6.4
	D3.3	27.49	11.9	14.0
	D3.4	36.28	12.7	13.87
	D3.5	55.24	9.5	11.4
	D3.6	7.52	15.4	17.51
5	D5.1	31.21	14.6	16.16
	D5.2	40.35	11.1	8.46
	D5.3	28.84	13.5	16.21
	D5.4	23.43	13.5	14.17
	D5.5	32.22	14.2	14.25
	D5.6	4.14	14.7	15.7
6	D6.1	27.83	13.9	16.09
	D6.2	25.8	14.6	16.0
	D6.3	49.15	11.9	12.44
	D6.4	34.93	11.1	13.49
	D6.5	28.84	13.5	16.21

DeepSeek Readability Analysis (continued)

	D6.6	30.87	12.7	14.0
7	D7.1	20.72	16.6	19.6
	D7.2	37.3	12.3	16.21
	D7.3	3.46	17.0	20.92
	D7.4	16.32	16.2	17.92
	D7.5	8.88	17.0	20.0
	D7.6	-5.68	20.5	21.17
8	D8.1	7.86	17.4	21.73
	D8.2	-0.61	18.6	19.83
	D8.3	29.86	13.1	16.4
	D8.4	46.78	10.7	8.9
	D8.5	22.41	13.9	14.0
	D8.6	22.41	13.9	14.0
9	D9.1	42.38	10.3	13.13
	D9.2	63.7	8.4	6.4
	D9.3	50.84	9.2	13.13
	D9.4	33.24	13.8	16.02
	D9.5	-5.01	18.2	18.56
	D9.6	27.83	13.9	18.31
10	D10.1	39.67	13.4	16.16
	D10.2	27.83	13.9	13.87
	D10.3	35.27	13.1	13.92
	D10.4	17.0	13.9	14.8
	D10.5	40.35	11.1	11.31
	D10.6	11.92	15.8	13.86
11	D11.1	17.0	13.9	18.13
	D11.2	16.32	16.2	17.92
	D11.3	36.96	10.3	12.49
	D11.4	19.03	13.1	16.0
	D11.5	12.6	13.5	13.2
	D11.6	-33.77	21.0	21.47
12	D12.1	17.34	15.8	18.0
	D12.2	12.09	13.7	17.52
	D12.3	44.75	11.5	13.87
	D12.4	-3.99	17.8	23.9
	D12.5	29.86	13.1	18.9
	D12.6	39.67	13.4	16.16
13	D13.1	43.06	14.2	15.49
	D13.2	31.21	14.6	16.16
	D13.3	36.28	12.7	16.09
	D13.4	15.31	16.6	16.07
	D13.5	9.89	16.6	20.23
	D13.6	19.37	15.0	16.09

DeepSeek Readability Analysis (continued)

14	D14.1	29.18	15.4	16.4
	D14.2	0.42	18.2	20.0
	D14.3	35.95	10.7	16.0
	D14.4	-5.01	18.2	23.27
	D14.5	27.83	13.9	16.09
	D14.6	34.42	11.3	13.3
15	D15.1	15.31	16.6	19.71
	D15.2	42.72	12.3	14.0
	D15.3	10.56	14.3	16.0
	D15.4	46.78	10.7	11.4
	D15.5	19.37	15.0	11.64
	D15.6	29.86	13.1	16.4
16	D16.1	58.79	8.2	8.2
	D16.2	20.38	14.6	13.86
	D16.3	36.28	12.7	13.87
	D16.4	44.75	11.5	11.64
	D16.5	60.65	9.5	7.6
	D16.6	22.41	13.9	16.67
17	D17.1	51.18	11.1	12.0
	D17.2	26.47	12.3	17.13
	D17.3	4.47	16.6	18.9
	D17.4	9.89	16.6	22.34
	D17.5	34.26	13.5	16.0
	D17.6	42.72	12.3	14.0
18	D18.1	14.29	17.0	19.63
	D18.2	16.32	16.2	19.83
	D18.3	-10.08	20.1	25.16
	D18.4	26.47	12.3	15.31
	D18.5	22.75	15.8	17.9
	D18.6	10.91	16.2	18.31
19	D19.1	16.32	16.2	19.83
	D19.2	4.47	16.6	21.4
	D19.3	35.27	13.1	13.92
	D19.4	18.35	15.4	20.23
	D19.5	14.97	14.7	22.74
	D19.6	3.46	17.0	20.92
20	D20.1	19.03	13.1	16.0
	D20.2	-24.97	21.7	26.0
	D20.3	-6.02	18.6	20.53
	D20.4	8.88	17.0	18.0
	D20.5	17.34	15.8	20.0
	D20.6	3.46	17.0	23.27
	D21.1	34.93	11.1	13.49

DeepSeek Readability Analysis (continued)

21	D21.2	7.86	17.4	21.73
	D21.3	27.83	13.9	13.87
	D21.4	24.78	15.0	17.92
	D21.5	-17.87	19.0	20.58
	D21.6	19.37	15.0	18.31
22	D22.1	2.44	17.4	18.31
	D22.2	26.81	14.2	20.23
	D22.3	2.61	15.3	14.33
	D22.4	25.8	14.6	18.0
	D22.5	12.09	13.7	17.52
	D22.6	21.4	14.3	18.9
23	D23.1	8.53	15.1	21.47
	D23.2	-95.02	30.0	28.46
	D23.3	-23.96	21.3	26.55
	D23.4	-6.02	18.6	22.76
	D23.5	6.84	17.8	21.53
	D23.6	-5.01	18.2	20.92
24	D24.1	10.23	18.5	21.17
	D24.2	18.01	13.5	15.31
	D24.3	-17.53	20.9	25.54
	D24.4	9.89	16.6	16.02
	D24.5	10.91	16.2	20.53
	D24.6	18.35	15.4	18.13
25	D25.1	21.74	16.2	19.6
	D25.2	24.78	15.0	16.02
	D25.3	10.91	16.2	16.09
	D25.4	18.35	15.4	16.02
	D25.5	19.03	13.1	14.0
	D25.6	35.27	13.1	13.92
26	D26.1	23.77	15.4	16.07
	D26.2	17.34	15.8	18.0
	D26.3	-2.98	17.4	19.33
	D26.4	41.7	12.7	12.21
	D26.5	-13.47	19.4	23.27
	D26.6	12.09	13.7	15.16
27	D27.1	41.7	12.7	14.11
	D27.2	34.42	11.3	11.56
	D27.3	14.29	17.0	19.63
	D27.4	43.9	9.7	11.82
	D27.5	26.81	14.2	16.02
	D27.6	12.94	15.4	21.4
	D28.1	16.32	16.2	14.11
	D28.2	35.27	13.1	13.92

DeepSeek Readability Analysis (continued)

28	D28.3	-36.82	22.1	24.67
	D28.4	-12.45	19.0	23.9
	D28.5	6.5	15.8	17.03
	D28.6	12.94	15.4	21.4
29	D29.1	33.24	13.8	16.02
	D29.2	1.43	17.8	22.34
	D29.3	7.86	17.4	17.92
	D29.4	18.35	15.4	20.23
	D29.5	19.53	12.9	16.43
	D29.6	25.8	14.6	18.0
30	D30.1	34.6	15.4	15.49
	D30.2	-14.32	17.6	22.75
	D30.3	44.91	9.4	10.12
	D30.4	32.22	14.2	14.25
	D30.5	7.86	17.4	21.73
	D30.6	38.66	13.8	12.93
31	D31.1	-1.63	19.0	25.16
	D31.2	13.28	17.4	17.93
	D31.3	9.89	16.6	20.23
	D31.4	30.2	15.0	17.93
	D31.5	12.26	17.8	21.2
	D31.6	17.34	15.8	22.0
32	D32.1	5.83	18.2	21.37
	D32.2	12.26	17.8	22.8
	D32.3	27.83	13.9	13.87
	D32.4	15.31	16.6	19.71
	D32.5	32.22	14.2	16.07
	D32.6	17.34	15.8	20.0
33	D33.1	10.23	18.5	22.65
	D33.2	9.89	16.6	20.23
	D33.3	0.42	18.2	24.0
	D33.4	10.91	16.2	18.31
	D33.5	2.44	17.4	16.09
	D33.6	-1.63	19.0	23.35
34	D34.1	40.69	13.1	14.25
	D34.2	15.31	16.6	19.71
	D34.3	11.92	15.8	11.51
	D34.4	23.77	15.4	16.07
	D34.5	25.96	12.5	15.03
	D34.6	9.89	16.6	18.13
35	D35.1	39.67	13.4	16.16
	D35.2	16.32	16.2	17.92
	D35.3	51.18	11.1	14.0

DeepSeek Readability Analysis (continued)

	D35.4	23.77	15.4	16.07
	D35.5	-16.51	20.5	24.0
	D35.6	-16.51	20.5	26.0
36	D36.1	24.78	15.0	17.92
	D36.2	2.44	17.4	18.31
	D36.3	2.61	15.3	18.54
	D36.4	45.76	11.1	11.51
	D36.5	-19.9	19.8	24.67
	D36.6	20.38	14.6	18.56
37	D37.1	49.15	11.9	12.44
	D37.2	17.34	15.8	20.0
	D37.3	43.73	11.9	16.02
	D37.4	21.4	14.3	21.4
	D37.5	62.85	6.6	12.81
	D37.6	-0.95	16.6	20.58
38	D38.1	25.8	14.6	16.0
	D38.2	61.83	7.0	10.12
	D38.3	39.33	11.5	11.33
	D38.4	31.89	12.3	8.46
	D38.5	22.41	13.9	14.0
	D38.6	61.83	7.0	8.01
39	D39.1	9.89	16.6	20.23
	D39.2	16.32	16.2	17.92
	D39.3	12.94	15.4	16.4
	D39.4	37.3	12.3	9.15
	D39.5	27.83	13.9	13.87
	D39.6	4.14	14.7	15.7
40	D40.1	9.22	18.9	22.63
	D40.2	33.92	11.5	13.13
	D40.3	58.62	10.3	12.21
	D40.4	-21.93	20.5	23.27
	D40.5	9.89	16.6	18.13
	D40.6	37.3	12.3	18.56
41	D41.1	49.15	11.9	14.25
	D41.2	46.44	8.8	13.2
	D41.3	50.16	11.5	14.11
	D41.4	3.46	17.0	23.27
	D41.5	21.4	14.3	13.9
	D41.6	35.27	13.1	16.02
42	D42.1	50.84	9.2	11.47
	D42.2	2.44	17.4	18.31
	D42.3	61.83	7.0	5.91
	D42.4	48.81	9.9	11.31

DeepSeek Readability Analysis (continued)

	D42.5	29.86	13.1	11.4
	D42.6	23.77	15.4	17.89
43	D43.1	25.8	14.6	20.0
	D43.2	2.44	17.4	22.76
	D43.3	-3.99	17.8	18.9
	D43.4	4.47	16.6	21.4
	D43.5	27.83	13.9	18.31
	D43.6	49.15	11.9	17.89
44	D44.1	29.21	11.2	14.52
	D44.2	55.58	11.5	12.93
	D44.3	46.44	8.8	13.2
	D44.4	27.83	13.9	18.31
	D44.5	2.44	17.4	18.31
	D44.6	8.88	17.0	18.0
45	D45.1	11.25	18.2	21.17
	D45.2	43.9	9.7	11.82
	D45.3	34.26	13.5	16.0
	D45.4	9.89	16.6	20.23
	D45.5	52.19	10.7	11.81
	D45.6	24.78	15.0	16.02
46	D46.1	16.49	14.1	17.8
	D46.2	-18.54	21.3	21.53
	D46.3	7.86	17.4	19.83
	D46.4	36.45	10.5	16.43
	D46.5	25.8	14.6	18.0
	D46.6	27.83	13.9	20.53
47	D47.1	33.24	13.8	16.02
	D47.2	20.38	14.6	16.21
	D47.3	43.73	11.9	16.02
	D47.4	35.27	13.1	16.02
	D47.5	33.24	13.8	16.02
	D47.6	50.16	11.5	12.21
48	D48.1	58.28	8.4	11.35
	D48.2	43.73	11.9	11.81
	D48.3	57.61	10.7	10.62
	D48.4	28.5	11.5	16.93
	D48.5	37.3	12.3	13.86
	D48.6	20.38	14.6	16.21
49	D49.1	15.31	16.6	21.53
	D49.2	15.31	16.6	19.71
	D49.3	28.84	13.5	18.56
	D49.4	-5.01	18.2	18.56
	D49.5	9.89	16.6	20.23

DeepSeek Readability Analysis (continued)

	D49.6	42.72	12.3	12.0
50	D50.1	15.31	16.6	21.53
	D50.2	26.81	14.2	18.13
	D50.3	28.84	13.5	13.86
	D50.4	-0.61	18.6	23.64
	D50.5	-6.02	18.6	22.76
	D50.6	27.83	13.9	16.09



**APPENDIX DJ**

**CLAUDE CLASSIFICATION AMBIGUITY ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>F/NF</b>	<b>Correct Categorization</b>	<b>Ambiguity Score (10-0)</b>	<b>Ambiguous Terms</b>
1	C1.1	F	F	10	-
	C1.2	F	F	10	-
	C1.3	F	F	9	all
	C1.4	F	F	10	-
	C1.5	F	F	10	-
	C1.6	NF	NF	10	-
2	C2.1	F	F	9	all
	C2.2	NF	NF	10	-
	C2.3	F	F	9	all
	C2.4	F	F	10	-
	C2.5	F	F	10	-
	C2.6	F	F	9	all
3	C3.1	F	F	10	-
	C3.2	F	F	9	secure
	C3.3	F	F	10	-
	C3.4	NF	NF	8	sufficient, all
	C3.5	F	F	10	-
	C3.6	F	F	9	all
4	C3.1	F	F	9	all
	C3.2	F	F	10	-
	C3.3	NF	NF	10	-
	C3.4	F	F	10	-
	C3.5	F	F	10	-
	C3.6	NF	NF	10	-
5	C5.1	F	F	9	all
	C5.2	F	F	10	-
	C5.3	F	F	10	-
	C5.4	F	F	10	-
	C5.5	NF	NF	9	various
	C5.6	F	F	10	-
6	C6.1	F	F	10	-
	C6.2	NF	NF	10	-
	C6.3	F	F	9	all
	C6.4	F	F	10	-
	C6.5	F	F	10	-

Claude Classification Ambiguity Analysis (continued)

	C6.6	F	F	10	-
7	C7.1	F	F	10	-
	C7.2	F	F	10	-
	C7.3	F	F	10	-
	C7.4	F	F	9	immediately
	C7.5	F	F	10	-
	C7.6	NF	NF	9	reliable
8	C8.1	F	F	9	all
	C8.2	F	F	10	-
	C8.3	F	F	10	-
	C8.4	F	F	9	all
	C8.5	F	F	10	-
	C8.6	NF	NF	10	-
9	C9.1	F	F	10	-
	C9.2	F	F	10	-
	C9.3	NF	NF	10	-
	C9.4	F	F	10	-
	C9.5	F	F	10	-
	C9.6	NF	NF	10	-
10	C10.1	F	F	10	-
	C10.2	F	F	9	all
	C10.3	F	F	9	appropriate
	C10.4	F	F	10	-
	C10.5	NF	NF	10	-
	C10.6	F	F	10	-
11	C11.1	F	F	10	-
	C11.2	F	F	10	-
	C11.3	F	F	10	-
	C11.4	NF	NF	10	-
	C11.5	F	F	10	-
	C11.6	F	F	10	-
12	C12.1	F	F	10	-
	C12.2	F	F	10	-
	C12.3	NF	NF	10	-
	C12.4	F	F	10	-
	C12.5	NF	NF	9	responsive
	C12.6	F	F	10	-
13	C13.1	F	F	10	-
	C13.2	F	F	10	-
	C13.3	F	F	10	-
	C13.4	NF	NF	10	-
	C13.5	F	F	10	-
	C13.6	NF	NF	10	-

Claude Classification Ambiguity Analysis (continued)

14	C14.1	F	F	10	-
	C14.2	F	F	10	-
	C14.3	F	F	10	-
	C14.4	NF	NF	10	-
	C14.5	F	F	10	-
	C14.6	F	F	9	all
15	C15.1	F	F	9	all
	C15.2	F	F	9	all
	C15.3	F	F	9	all
	C15.4	NF	NF	9	all
	C15.5	F	F	10	-
	C15.6	F	F	10	-
16	C16.1	F	F	10	-
	C16.2	F	F	10	-
	C16.3	NF	NF	10	-
	C16.4	F	F	10	-
	C16.5	F	F	10	-
	C16.6	NF	NF	10	-
17	C17.1	F	F	9	all
	C17.2	F	F	10	-
	C17.3	NF	NF	10	-
	C17.4	F	F	10	-
	C17.5	F	F	10	-
	C17.6	NF	NF	9	all
18	C18.1	F	F	10	-
	C18.2	F	F	10	-
	C18.3	F	F	9	all
	C18.4	F	F	10	-
	C18.5	F	F	10	-
	C18.6	NF	NF	9	all
19	C19.1	F	F	10	-
	C19.2	F	F	9	all
	C19.3	F	F	10	-
	C19.4	F	F	10	-
	C19.5	F	F	10	-
	C19.6	NF	NF	10	-
20	C20.1	F	F	9	all
	C20.2	F	F	10	-
	C20.3	F	F	10	-
	C20.4	F	F	10	-
	C20.5	F	F	9	appropriate
	C20.6	NF	NF	10	-
C21.1	F	F	10	-	

Claude Classification Ambiguity Analysis (continued)

21	C21.2	F	F	10	-
	C21.3	F	F	9	minimize
	C21.4	NF	NF	10	-
	C21.5	F	F	10	-
	C21.6	F	F	10	-
22	C22.1	F	F	10	-
	C22.2	F	F	10	-
	C22.3	F	F	10	-
	C22.4	F	F	10	-
	C22.5	NF	NF	10	-
	C22.6	F	F	10	-
23	C23.1	F	F	10	-
	C23.2	F	F	10	-
	C23.3	F	F	10	-
	C23.4	F	F	9	all
	C23.5	NF	NF	10	-
	C23.6	NF	NF	10	-
24	C24.1	F	F	10	-
	C24.2	F	F	10	-
	C24.3	F	F	10	-
	C24.4	F	F	9	all
	C24.5	NF	NF	9	all
	C24.6	F	F	10	-
25	C25.1	F	F	10	-
	C25.2	F	F	10	-
	C25.3	F	F	10	-
	C25.4	F	F	10	-
	C25.5	F	F	9	all
	C25.6	NF	F	10	-
26	C26.1	NF	NF	10	-
	C26.2	NF	NF	9	responsive
	C26.3	NF	NF	9	all
	C26.4	F	F	10	-
	C26.5	F	F	10	-
	C26.6	F	F	10	-
27	C27.1	F	F	10	-
	C27.2	F	F	10	-
	C27.3	F	F	10	-
	C27.4	F	F	10	-
	C27.5	F	F	10	-
	C27.6	NF	NF	10	-
	C28.1	F	F	9	all
	C28.2	F	F	10	-

Claude Classification Ambiguity Analysis (continued)

28	C28.3	NF	NF	9	all
	C28.4	F	F	10	-
	C28.5	F	F	10	-
	C28.6	F	F	<b>9</b>	all
29	C29.1	F	F	10	-
	C29.2	F	F	10	-
	C29.3	F	F	9	all
	C29.4	F	F	10	-
	C29.5	F	F	9	all
	C29.6	NF	NF	10	-
30	C30.1	F	F	10	-
	C30.2	F	F	10	-
	C30.3	F	F	10	-
	C30.4	F	F	10	-
	C30.5	F	F	10	-
	C30.6	NF	NF	9	reliable
31	C31.1	F	F	9	all
	C31.2	F	F	9	all
	C31.3	F	F	9	all
	C31.4	F	F	10	-
	C31.5	F	F	10	-
	C31.6	NF	NF	10	-
32	C32.1	F	F	10	-
	C32.2	F	F	10	-
	C32.3	F	F	10	-
	C32.4	F	F	10	-
	C32.5	F	F	9	all
	C32.6	NF	NF	9	all
33	C33.1	F	F	10	-
	C33.2	F	F	10	-
	C33.3	F	F	10	-
	C33.4	F	F	10	-
	C33.5	F	F	10	-
	C33.6	NF	NF	10	-
34	C34.1	F	F	10	-
	C34.2	F	F	9	immediately
	C34.3	F	F	9	all
	C34.4	F	F	10	-
	C34.5	F	F	10	-
	C34.6	NF	NF	10	-
35	C35.1	F	F	9	all
	C35.2	F	F	10	-
	C35.3	F	F	10	-

Claude Classification Ambiguity Analysis (continued)

	C35.4	F	F	10	-
	C35.5	F	F	9	significant
	C35.6	NF	NF	10	-
36	C36.1	F	F	10	-
	C36.2	F	F	10	-
	C36.3	F	F	10	-
	C36.4	F	F	10	-
	C36.5	NF	NF	10	-
	C36.6	NF	NF	10	-
	37	C37.1	F	F	10
C37.2		F	F	10	-
C37.3		F	F	10	-
C37.4		F	F	10	-
C37.5		F	F	10	-
C37.6		NF	NF	10	-
38	C38.1	F	F	10	-
	C38.2	F	F	10	-
	C38.3	F	F	10	-
	C38.4	F	F	9	quickly
	C38.5	F	F	10	-
	C38.6	NF	NF	10	-
39	C39.1	F	F	9	user-friendly
	C39.2	F	F	9	all
	C39.3	F	F	10	-
	C39.4	F	F	10	-
	C39.5	F	F	10	-
	C39.6	NF	NF	10	-
40	C40.1	F	F	10	-
	C40.2	F	F	9	all
	C40.3	F	F	9	appropriate
	C40.4	NF	NF	10	-
	C40.5	F	F	10	-
	C40.6	F	F	9	all
41	C41.1	F	F	9	all
	C41.2	F	F	10	-
	C41.3	F	F	9	all
	C41.4	NF	NF	10	-
	C41.5	F	F	10	-
	C41.6	F	F	10	-
42	C42.1	F	F	9	all
	C42.2	F	F	9	all
	C42.3	F	F	10	-
	C42.4	F	F	10	-

Claude Classification Ambiguity Analysis (continued)

	C42.5	NF	NF	9	all
	C42.6	F	F	9	all
43	C43.1	F	F	10	-
	C43.2	F	F	9	all
	C43.3	F	F	10	-
	C43.4	NF	NF	10	-
	C43.5	F	F	10	-
	C43.6	F	F	10	-
44	C44.1	F	F	10	-
	C44.2	F	F	9	all
	C44.3	F	F	10	-
	C44.4	F	F	10	-
	C44.5	F	F	10	-
	C44.6	NF	NF	9	all
45	C45.1	F	F	10	-
	C45.2	F	F	10	-
	C45.3	F	F	10	-
	C45.4	F	F	9	all
	C45.5	F	F	10	-
	C45.6	NF	NF	10	-
46	C46.1	F	F	8	immediately, all
	C46.2	F	F	10	-
	C46.3	F	F	10	-
	C46.4	F	F	10	-
	C46.5	F	F	10	-
	C46.6	NF	NF	10	-
47	C47.1	F	F	9	all
	C47.2	F	F	9	all
	C67.3	F	F	10	-
	C47.4	F	F	10	-
	C47.5	F	F	10	-
	C47.6	NF	NF	10	-
48	C48.1	F	F	10	-
	C48.2	F	F	10	-
	C48.3	F	F	10	-
	C48.4	NF	NF	10	-
	C48.5	F	F	10	-
	C48.6	F	F	10	-
49	C49.1	F	F	10	-
	C49.2	F	F	10	-
	C49.3	F	F	10	-
	C49.4	F	F	8	later, appropriate
	C49.5	NF	NF	10	-

Claude Classification Ambiguity Analysis (continued)

	C49.6	F	F	9	seamless
50	C50.1	F	F	9	all
	C50.2	F	F	10	-
	C50.3	F	F	10	-
	C50.4	F	F	10	-
	C50.5	NF	NF	10	-
	C50.6	F	F	10	-



**APPENDIX DK**

**CLAUDE SIMILARITY PASSIVENESS 5W1H ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>SS</b>	<b>Passive Voice</b>	<b>Completeness</b>	<b>Completeness Score (0-6)</b>
1	C1.1	0.678	no	Who, What, Where, How	4
	C1.2	0.681	no	Who, What, Where, How	4
	C1.3	0.708	no	Who, What, How	3
	C1.4	0.708	no	Who, What, When, How	4
	C1.5	0.661	no	Who, What, Why	3
	C1.6	0.479	yes	Who, What, When, How	4
2	C2.1	0.715	no	Who, What, Where, How	4
	C2.2	0.663	no	Who, What, When, Where, How	5
	C2.3	0.778	no	Who, What, Where, How	4
	C2.4	0.744	no	Who, What, How	3
	C2.5	0.765	yes	Who, What, When, Why, How	5
	C2.6	0.745	yes	Who, What, How	3
	C3.1	0.814	no	Who, What, Where, How	4
	C3.2	0.771	no	Who, What, When, Where, How	5
	C3.3	0.840	no	Who, What, How	3
	C3.4	0.777	no	Who, What, Why	3

Claude Similarity Passiveness 5W1H Analysis (continued)

3	C3.5	0.785	no	Who, What, Where, How	4
	C3.6	0.832	yes	Who, What, When, Why, How	5
4	C3.1	0.874	no	Who, What, How	3
	C3.2	0.886	no	Who, What, How	3
	C3.3	0.722	no	Who, What, When, How	4
	C3.4	0.883	no	Who, What, How	3
	C3.5	0.864	no	Who, What, Why, How	4
	C3.6	0.850	no	Who, What, Why, How	4
5	C5.1	0.584	no	Who, What, Where	3
	C5.2	0.707	no	Who, What, How	3
	C5.3	0.732	no	Who, What, Where, How	4
	C5.4	0.786	no	Who, What, Why, How	4
	C5.5	0.716	no	What, Why, How	3
	C5.6	0.775	no	Who, What, Why	3
6	C6.1	0.822	no	Who, What, How	3
	C6.2	0.700	no	Who, What, When	3
	C6.3	0.772	no	Who, What, How	3
	C6.4	0.819	no	Who, What, How	3
	C6.5	0.832	no	Who, What, How	3
	C6.6	0.850	no	Who, What, Where, Why, How	5
	C7.1	0.890	no	Who, What	2

Claude Similarity Passiveness 5W1H Analysis (continued)

7	C7.2	0.918	no	Who, What, How	3
	C7.3	0.666	no	Who, What, How	3
	C7.4	0.900	yes	Who, What, When	3
	C7.5	0.839	yes	Who, What, When, Where, Why, How	6
	C7.6	0.805	no	Who, What, When, Why	4
8	C8.1	0.801	no	Who, What, How	3
	C8.2	0.655	no	Who, What, How	3
	C8.3	0.765	no	Who, What	2
	C8.4	0.739	no	Who, What, How	3
	C8.5	0.793	no	Who, What, Why	3
	C8.6	0.541	no	Who, What, When	3
9	C9.1	0.857	no	Who, What	2
	C9.2	0.775	no	Who, What	2
	C9.3	0.698	no	Who, What, When	3
	C9.4	0.683	no	Who, What, Why	3
	C9.5	0.748	no	Who, What, When, Where, How	5
	C9.6	0.484	no	Who, What, When	3
10	C10.1	0.893	no	Who, What, Where	3
	C10.2	0.857	no	Who, What, How	3
	C10.3	0.847	no	Who, What, When, How	4
	C10.4	0.865	no	Who, What	2
	C10.5	0.818	no	Who, What	2
	C10.6	0.883	no	Who, What, When	3

Claude Similarity Passiveness 5W1H Analysis (continued)

11	C11.1	0.834	no	Who, What, How	3
	C11.2	0.868	no	Who, What	2
	C11.3	0.785	no	Who, What, How	3
	C11.4	0.772	no	Who, What, When	3
	C11.5	0.881	no	Who, What, Why	3
	C11.6	0.821	no	Who, What, Why, How	4
12	C12.1	0.830	no	Who, What, Where	3
	C12.2	0.709	no	What, Why, How	3
	C12.3	0.236	no	What, When	2
	C12.4	0.811	no	Who, What, Why, How	4
	C12.5	0.805	no	What, Where	2
	C12.6	0.803	no	Who, What, How	3
13	C13.1	0.728	no	Who, What	2
	C13.2	0.595	no	Who, What	2
	C13.3	0.764	no	Who, What, How	3
	C13.4	0.644	no	Who, What, When, Where	4
	C13.5	0.735	no	Who, What, How	3
	C13.6	0.575	no	Who, What	2
14	C14.1	0.608	no	Who, What, How	3
	C14.2	0.794	no	Who, What, Where	3
	C14.3	0.770	no	Who, What, Where, How	4
	C14.4	0.701	yes	Who, What, When	3
	C14.5	0.800	no	Who, What	2
	C14.6	0.738	no	Who, What, When, How	4
	C15.1	0.832	no	Who, What	2

Claude Similarity Passiveness 5W1H Analysis (continued)

15	C15.2	0.668	yes	Who, What, When	3
	C15.3	0.878	no	Who, What, Why	3
	C15.4	0.769	no	Who, What, When, Where	4
	C15.5	0.809	no	Who, What, When, Why	4
	C15.6	0.783	no	Who, What, When, Why	4
16	C16.1	0.699	no	Who, What, How	3
	C16.2	0.686	no	Who, What, Why, How	4
	C16.3	0.633	no	Who, What, When	3
	C16.4	0.723	no	Who, What, Why	3
	C16.5	0.780	no	Who, What, Why	3
	C16.6	0.750	no	What, Why, How	3
17	C17.1	0.825	no	Who, What, Where	3
	C17.2	0.799	yes	Who, What, When	3
	C17.3	0.752	yes	Who, What, When	3
	C17.4	0.886	no	Who, What, When, Why	4
	C17.5	0.853	no	Who, What, When, Where, How	5
	C17.6	0.677	no	Who, What, When, Where	4
	C18.1	0.913	yes	Who, What	2
	C18.2	0.888	no	Who, What, How	3
	C18.3	0.727	no	Who, What, Why, How	4
	C18.4	0.825	no	Who, What, How	3

Claude Similarity Passiveness 5W1H Analysis (continued)

18	C18.5	0.873	no	Who, What, When	3
	C18.6	0.835	yes	Who, What, When	3
19	C19.1	0.929	no	Who, What	2
	C19.2	0.900	no	Who, What	2
	C19.3	0.879	yes	Who, What, When, How	4
	C19.4	0.902	no	Who, What, How	3
	C19.5	0.926	no	Who, What	2
	C19.6	0.638	no	Who, What, When	3
20	C20.1	0.851	yes	Who, What, Where	3
	C20.2	0.541	no	Who, What, How	3
	C20.3	0.799	yes	Who, What, When, Where	4
	C20.4	0.848	no	Who, What	2
	C20.5	0.842	no	Who, What, How	3
	C20.6	0.668	no	Who, What	2
21	C21.1	0.621	no	Who, What	2
	C21.2	0.636	no	Who, What, Why	3
	C21.3	0.741	no	Who, What, Why	3
	C21.4	0.667	no	Who, What, When	3
	C21.5	0.723	no	Who, What, Why	3
	C21.6	0.787	no	Who, What, When, Why, How	5
22	C22.1	0.806	no	Who, What, How	3
	C22.2	0.863	no	Who, What, Why	3
	C22.3	0.819	no	Who, What, When, Why	4
	C22.4	0.733	no	Who, What	2
	C22.5	0.743	no	Who, What	2

Claude Similarity Passiveness 5W1H Analysis (continued)

	C22.6	0.913	yes	Who, What, Why, How	4
23	C23.1	0.660	no	Who, What	2
	C23.2	0.653	no	Who, What, Why	3
	C23.3	0.701	no	Who, What, How	3
	C23.4	0.682	no	Who, What, When, How	4
	C23.5	0.562	no	Who, What, When	3
	C23.6	0.557	no	Who, What, How	3
24	C24.1	0.872	no	Who, What	2
	C24.2	0.876	no	Who, What	2
	C24.3	0.902	no	Who, What, When	3
	C24.4	0.889	no	Who, What, Why	3
	C24.5	0.831	no	Who, What	2
	C24.6	0.844	yes	Who, What, When, Why	4
25	C25.1	0.615	no	Who, What, Why	3
	C25.2	0.672	no	Who, What	2
	C25.3	0.490	no	Who, What	2
	C25.4	0.574	no	Who, What	2
	C25.5	0.587	no	Who, What, When	3
	C25.6	0.407	no	Who, What	2
26	C26.1	0.823	no	Who, What, Where	3
	C26.2	0.836	no	Who, What, Where	3
	C26.3	0.826	no	Who, What, Why	3
	C26.4	0.772	no	Who, What	2
	C26.5	0.763	yes	Who, What, When	3
	C26.6	0.719	no	Who, What, When, Why	4
	C27.1	0.843	no	Who, What	2
	C27.2	0.850	no	Who, What	2

Claude Similarity Passiveness 5W1H Analysis (continued)

27	C27.3	0.860	no	Who, What, Where	3
	C27.4	0.872	yes	Who, What, When	3
	C27.5	0.817	no	Who, What	2
	C27.6	0.712	no	Who, What, When	3
28	C28.1	0.811	no	Who, What	1
	C28.2	0.855	yes	Who, What, When	2
	C28.3	0.860	no	Who, What, Why	3
	C28.4	0.901	no	Who, What	2
	C28.5	0.821	no	Who, What, Why	3
	C28.6	0.753	no	Who, What	2
29	C29.1	0.840	no	Who, What	2
	C29.2	0.804	yes	Who, What	2
	C29.3	0.846	no	Who, What, Where	3
	C29.4	0.862	no	Who, What	2
	C29.5	0.755	no	Who, What, When	3
	C29.6	0.781	no	Who, What	2
30	C30.1	0.847	no	Who, What, Where	3
	C30.2	0.853	no	Who, What	2
	C30.3	0.781	no	Who, What, How	3
	C30.4	0.779	no	Who, What, When	3
	C30.5	0.783	no	Who, What	2
	C30.6	0.730	no	Who, What, When, Why	4
31	C31.1	0.887	yes	Who, What, When	3
	C31.2	0.864	no	Who, What	2
	C31.3	0.815	no	Who, What	2
	C31.4	0.762	yes	Who, What, When, Where	4
	C31.5	0.871	no	Who, What	2
	C31.6	0.735	no	Who, What, When	3

Claude Similarity Passiveness 5W1H Analysis (continued)

32	C32.1	0.826	no	Who, What	2
	C32.2	0.864	no	Who, What	2
	C32.3	0.817	no	Who, What, Where	3
	C32.4	0.764	no	Who, What	2
	C32.5	0.816	no	Who, What	2
	C32.6	0.721	no	Who, What	2
33	C33.1	0.796	no	Who, What, Where	3
	C33.2	0.771	no	Who, What, How	3
	C33.3	0.883	yes	Who, What, How	3
	C33.4	0.842	no	Who, What, Why	3
	C33.5	0.873	no	Who, What	2
	C33.6	0.678	no	Who, What	2
34	C34.1	0.637	no	Who, What, Where	3
	C34.2	0.715	yes	Who, What, When, Where	4
	C34.3	0.724	yes	Who, What, When	3
	C34.4	0.822	no	Who, What	2
	C34.5	0.752	no	Who, What, How	3
	C34.6	0.581	no	Who, What, When	3
35	C35.1	0.761	no	Who, What, Where	3
	C35.2	0.743	no	Who, What	2
	C35.3	0.755	no	Who, What, How	3
	C35.4	0.704	no	Who, What	2
	C35.5	0.740	no	Who, What	2
	C35.6	0.681	no	Who, What, When	3
36	C36.1	0.827	no	Who, What, How	3
	C36.2	0.731	no	Who, What, Why, How	4
	C36.3	0.873	yes	Who, What	2

Claude Similarity Passiveness 5W1H Analysis (continued)

	C36.4	0.818	no	Who, What, How	3
	C36.5	0.810	no	Who, What	2
	C36.6	0.798	no	Who, What, When	3
37	C37.1	0.825	no	Who, What, When, Where	4
	C37.2	0.765	no	Who, What, When, Where	4
	C37.3	0.702	yes	Who, What, When, Where	4
	C37.4	0.772	yes	Who, What, When, Where	4
	C37.5	0.713	no	Who, What, When	3
	C37.6	0.527	no	Who, What, When, Where	4
38	C38.1	0.814	no	Who, What, How	3
	C38.2	0.693	no	Who, What	2
	C38.3	0.584	no	Who, What	2
	C38.4	0.759	no	Who, What, Where, Why	4
	C38.5	0.745	no	Who, What	2
	C38.6	0.440	no	Who, What, When	3
39	C39.1	0.869	no	Who, What, How	3
	C39.2	0.844	no	Who, What	2
	C39.3	0.789	no	Who, What, How	3
	C39.4	0.766	no	Who, What, How	3
	C39.5	0.905	no	Who, What, When, Where	4
	C39.6	0.722	no	Who, What, When	3
40	C40.1	0.792	no	Who, What, Where	3
	C40.2	0.793	no	Who, What	2
	C40.3	0.804	no	Who, What, Why, How	4

Claude Similarity Passiveness 5W1H Analysis (continued)

	C40.4	0.717	no	Who, What, When	3
	C40.5	0.820	no	Who, What	2
	C40.6	0.788	yes	Who, What	2
41	C41.1	0.765	no	Who, What	2
	C41.2	0.786	no	Who, What, How	3
	C41.3	0.829	no	Who, What, When	3
	C41.4	0.746	no	Who, What, When	3
	C41.5	0.850	no	Who, What, Where	3
	C41.6	0.752	no	Who, What	2
	42	C42.1	0.811	no	Who, What, When
C42.2		0.780	no	Who, What	2
C42.3		0.850	no	Who, What, When	3
C42.4		0.818	no	Who, What, When, Why	4
C42.5		0.856	yes	Who, What, When, Where, Why	5
C42.6		0.857	no	Who, What, Why	3
43	C43.1	0.725	no	Who, What, Where	3
	C43.2	0.704	yes	Who, What, When, Where	4
	C43.3	0.781	no	Who, What, When	3
	C43.4	0.684	no	Who, What, When	3
	C43.5	0.810	no	Who, What	2
	C43.6	0.827	yes	Who, What, When	3
44	C44.1	0.763	no	Who, What	2
	C44.2	0.833	no	Who, What, Where	3
	C44.3	0.871	no	Who, What, How	3

Claude Similarity Passiveness 5W1H Analysis (continued)

	C44.4	0.906	yes	Who, What, When	3
	C44.5	0.815	no	Who, What	2
	C44.6	0.731	no	Who, What, Where	3
45	C45.1	0.821	no	Who, What	2
	C45.2	0.657	no	Who, What, How	3
	C45.3	0.754	no	Who, What, Why	3
	C45.4	0.788	no	Who, What	2
	C45.5	0.793	no	Who, What	2
	C45.6	0.486	no	Who, What, When	3
46	C46.1	0.672	no	Who, What, When	3
	C46.2	0.643	no	Who, What	2
	C46.3	0.551	yes	Who, What, When, Where	4
	C46.4	0.679	no	Who, What	2
	C46.5	0.712	no	Who, What, Why	3
	C46.6	0.381	no	Who, What, When	3
47	C47.1	0.702	no	Who, What	2
	C47.2	0.798	no	Who, What	2
	C67.3	0.809	no	Who, What, When	3
	C47.4	0.819	no	Who, What, How	3
	C47.5	0.727	yes	Who, What, When	3
	C47.6	0.617	no	Who, What, When	3
48	C48.1	0.863	no	Who, What, Why	3
	C48.2	0.646	no	Who, What, Why	3
	C48.3	0.829	no	Who, What, Where, Why	4
	C48.4	0.755	no	Who, What, When	3

Claude Similarity Passiveness 5W1H Analysis (continued)

	C48.5	0.805	no	Who, What, When	3
	C48.6	0.798	no	Who, What, Why	3
49	C49.1	0.759	no	Who, What, Where	3
	C49.2	0.790	no	Who, What, When, Where	4
	C49.3	0.775	no	Who, What, Where, How	4
	C49.4	0.855	no	Who, What, Why, How	4
	C49.5	0.706	no	Who, What, When	3
	C49.6	0.778	no	Who, What, When, Why	4
50	C50.1	0.751	no	Who, What	2
	C50.2	0.899	no	Who, What, When	3
	C50.3	0.813	no	Who, What, When, How	4
	C50.4	0.741	no	Who, What	2
	C50.5	0.553	no	Who, What, When	3
	C50.6	0.821	no	Who, What, Where	3

**APPENDIX DL**

**CLAUDE READABILITY ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>Felsch-Kincaid Ease</b>	<b>Felsch-Kincaid Grade Level</b>	<b>Gunning Fog</b>
1	C1.1	47.12	12.7	14.6
	C1.2	55.58	11.5	12.93
	C1.3	33.24	13.8	16.02
	C1.4	36.28	12.7	16.09
	C1.5	18.35	15.4	18.13
	C1.6	47.12	12.7	14.6
2	C2.1	57.61	10.7	12.44
	C2.2	24.78	15.0	14.11
	C2.3	30.2	15.0	17.93
	C2.4	41.7	12.7	12.21
	C2.5	48.13	12.3	12.68
	C2.6	52.19	10.7	11.81
3	C3.1	28.17	15.8	18.09
	C3.2	47.12	12.7	16.27
	C3.3	43.06	14.2	16.91
	C3.4	-8.05	19.3	26.0
	C3.5	-16.51	20.5	22.0
	C3.6	23.77	15.4	17.89
4	C3.1	29.86	13.1	13.9
	C3.2	14.29	17.0	17.9
	C3.3	46.78	10.7	8.9
	C3.4	14.29	17.0	21.37
	C3.5	-6.02	18.6	22.76
	C3.6	26.47	12.3	11.67
5	C5.1	27.83	13.9	16.09
	C5.2	4.47	16.6	18.9
	C5.3	17.34	15.8	18.0
	C5.4	-22.94	20.9	24.98
	C5.5	18.69	17.4	19.69
	C5.6	27.83	13.9	16.09
6	C6.1	24.78	15.0	16.02
	C6.2	28.84	13.5	16.21
	C6.3	46.1	13.0	13.2
	C6.4	27.83	13.9	18.31
	C6.5	8.88	17.0	20.0
	C6.6	31.21	14.6	17.9

Claude Readability Analysis (continued)

7	C7.1	8.88	17.0	20.0
	C7.2	15.31	16.6	19.71
	C7.3	41.7	12.7	16.02
	C7.4	-5.01	18.2	20.92
	C7.5	5.83	18.2	21.37
	C7.6	44.91	9.4	10.12
8	C8.1	-33.43	22.9	22.0
	C8.2	-21.93	20.5	23.27
	C8.3	3.46	17.0	18.56
	C8.4	15.31	16.6	17.89
	C8.5	18.35	15.4	13.92
	C8.6	0.42	18.2	22.0
9	C9.1	43.73	11.9	11.81
	C9.2	19.71	17.0	22.71
	C9.3	34.26	13.5	12.0
	C9.4	43.73	11.9	13.92
	C9.5	34.26	13.5	18.0
	C9.6	54.39	7.8	5.75
10	C10.1	28.17	15.8	18.09
	C10.2	23.09	17.7	22.72
	C10.3	8.88	17.0	18.0
	C10.4	12.94	15.4	18.9
	C10.5	54.22	9.9	13.86
	C10.6	12.94	15.4	16.4
11	C11.1	16.32	16.2	16.02
	C11.2	25.8	14.6	18.0
	C11.3	1.43	17.8	22.34
	C11.4	40.69	13.1	12.44
	C11.5	38.32	11.9	11.4
	C11.6	-1.63	19.0	23.35
12	C12.1	30.2	15.0	19.6
	C12.2	23.09	17.7	20.14
	C12.3	57.27	8.8	11.31
	C12.4	27.15	16.2	19.69
	C12.5	53.21	10.3	16.09
	C12.6	22.75	15.8	21.37
13	C13.1	66.74	7.2	8.28
	C13.2	38.66	13.8	14.6
	C13.3	41.7	12.7	14.11
	C13.4	45.76	11.1	9.15
	C13.5	30.87	12.7	16.67
	C13.6	48.47	8.0	5.73
	C14.1	26.14	16.6	15.49

Claude Readability Analysis (continued)

14	C14.2	25.8	14.6	18.0
	C14.3	18.69	17.4	18.21
	C14.4	51.18	11.1	10.0
	C14.5	-14.48	19.8	24.98
	C14.6	14.29	17.0	16.16
15	C15.1	25.12	17.0	19.88
	C15.2	3.46	17.0	25.62
	C15.3	41.7	12.7	12.21
	C15.4	43.73	11.9	13.92
	C15.5	31.89	12.3	11.31
	C15.6	37.3	12.3	13.86
16	C16.1	27.15	16.2	19.69
	C16.2	19.37	15.0	16.09
	C16.3	38.66	13.8	14.6
	C16.4	43.73	11.9	13.92
	C16.5	40.69	13.1	14.25
	C16.6	19.53	12.9	18.54
17	C17.1	59.98	11.8	14.06
	C17.2	21.74	16.2	16.27
	C17.3	26.81	14.2	16.02
	C17.4	24.78	15.0	14.11
	C17.5	50.16	11.5	14.11
	C17.6	51.34	9.0	9.82
18	C18.1	25.12	17.0	19.88
	C18.2	24.78	15.0	17.92
	C18.3	24.78	15.0	17.92
	C18.4	-7.04	19.0	24.44
	C18.5	26.81	14.2	18.13
	C18.6	39.67	13.4	14.42
19	C19.1	14.29	17.0	21.37
	C19.2	16.32	16.2	17.92
	C19.3	32.22	14.2	17.89
	C19.4	3.8	18.9	22.8
	C19.5	-0.61	18.6	25.54
	C19.6	3.63	14.9	15.16
20	C20.1	-5.68	20.5	22.71
	C20.2	-6.7	20.9	25.61
	C20.3	41.7	12.7	16.02
	C20.4	9.89	16.6	18.13
	C20.5	7.86	17.4	21.73
	C20.6	6.17	13.9	12.4
	C21.1	56.59	11.1	14.42
	C21.2	-8.39	17.4	18.13

Claude Readability Analysis (continued)

21	C21.3	12.94	15.4	18.9
	C21.4	58.62	10.3	14.11
	C21.5	-14.48	19.8	18.31
	C21.6	23.77	15.4	17.89
22	C22.1	0.76	20.1	22.63
	C22.2	12.26	17.8	19.6
	C22.3	44.75	11.5	11.64
	C22.4	7.86	17.4	21.73
	C22.5	12.94	15.4	16.4
	C22.6	14.29	17.0	21.37
23	C23.1	-25.82	20.0	21.0
	C23.2	-12.11	20.9	26.27
	C23.3	-12.11	20.9	22.93
	C23.4	6.84	17.8	21.53
	C23.5	33.24	13.8	16.02
	C23.6	-0.61	18.6	23.64
24	C24.1	-5.01	18.2	18.56
	C24.2	15.31	16.6	14.25
	C24.3	8.88	17.0	20.0
	C24.4	15.31	16.6	19.71
	C24.5	52.19	10.7	13.92
	C24.6	7.86	17.4	17.92
25	C25.1	6.84	17.8	21.53
	C25.2	55.58	11.5	12.93
	C25.3	11.92	15.8	16.21
	C25.4	13.95	15.0	14.0
	C25.5	3.46	17.0	16.21
	C25.6	66.07	9.5	10.62
26	C26.1	35.27	13.1	13.92
	C26.2	25.8	14.6	14.0
	C26.3	28.17	15.8	19.63
	C26.4	45.42	9.2	10.27
	C26.5	14.29	17.0	19.63
	C26.6	31.21	14.6	17.9
27	C27.1	19.37	15.0	18.31
	C27.2	14.29	17.0	19.63
	C27.3	26.81	14.2	18.13
	C27.4	38.66	13.8	16.27
	C27.5	26.81	14.2	16.02
	C27.6	29.86	13.1	13.9
28	C28.1	32.22	14.2	14.25
	C28.2	36.63	14.6	18.09
	C28.3	10.91	16.2	20.53

Claude Readability Analysis (continued)

	C28.4	17.34	15.8	16.0
	C28.5	4.82	18.6	21.27
	C28.6	14.29	17.0	19.63
29	C29.1	23.77	15.4	19.71
	C29.2	-3.99	17.8	18.9
	C29.3	12.26	17.8	16.4
	C29.4	28.84	13.5	18.56
	C29.5	34.26	13.5	14.0
	C29.6	34.26	13.5	14.0
	30	C30.1	32.22	14.2
C30.2		9.89	16.6	20.23
C30.3		25.8	14.6	16.0
C30.4		-3.99	17.8	21.4
C30.5		40.69	13.1	14.25
C30.6		12.09	13.7	10.46
31	C31.1	9.22	18.9	22.63
	C31.2	10.23	18.5	24.13
	C31.3	44.07	13.8	13.76
	C31.4	9.89	16.6	18.13
	C31.5	15.31	16.6	19.71
	C31.6	27.83	13.9	18.31
32	C32.1	-15.16	22.1	27.1
	C32.2	-2.64	19.3	24.85
	C32.3	7.86	17.4	21.73
	C32.4	-10.08	20.1	23.35
	C32.5	4.82	18.6	22.93
	C32.6	15.31	16.6	21.53
33	C33.1	11.92	15.8	20.92
	C33.2	16.32	16.2	16.02
	C33.3	27.83	13.9	16.09
	C33.4	2.44	17.4	20.53
	C33.5	8.88	17.0	20.0
	C33.6	45.09	13.4	13.48
34	C34.1	18.69	17.4	19.69
	C34.2	42.72	12.3	12.0
	C34.3	25.8	14.6	16.0
	C34.4	25.8	14.6	18.0
	C34.5	16.32	16.2	16.02
	C34.6	21.4	14.3	13.9
35	C35.1	9.22	18.9	22.63
	C35.2	-5.68	20.5	24.25
	C35.3	-23.62	23.3	28.58
	C35.4	14.29	17.0	19.63

Claude Readability Analysis (continued)

	C35.5	18.69	17.4	21.17
	C35.6	39.67	13.4	12.68
36	C36.1	3.8	18.9	21.2
	C36.2	-16.51	20.5	24.0
	C36.3	16.32	16.2	17.92
	C36.4	15.31	16.6	17.89
	C36.5	36.45	10.5	12.22
	C36.6	3.46	17.0	20.92
37	C37.1	70.13	8.0	9.42
	C37.2	25.8	14.6	18.0
	C37.3	51.18	11.1	12.0
	C37.4	33.24	13.8	16.02
	C37.5	38.66	13.8	16.27
	C37.6	42.72	12.3	14.0
38	C38.1	21.74	16.2	14.6
	C38.2	69.11	8.3	9.71
	C38.3	26.81	14.2	16.02
	C38.4	44.75	11.5	11.64
	C38.5	33.24	13.8	14.11
	C38.6	54.22	9.9	9.15
39	C39.1	8.88	17.0	20.0
	C39.2	14.29	17.0	21.37
	C39.3	36.63	14.6	18.09
	C39.4	7.52	15.4	19.05
	C39.5	29.18	15.4	16.4
	C39.6	35.27	13.1	16.02
40	C40.1	25.8	14.6	16.0
	C40.2	14.29	17.0	21.37
	C40.3	-3.65	19.7	22.93
	C40.4	43.73	11.9	11.81
	C40.5	51.18	11.1	12.0
	C40.6	31.21	14.6	17.9
41	C41.1	43.06	14.2	15.49
	C41.2	-17.53	20.9	25.54
	C41.3	1.43	17.8	18.13
	C41.4	38.66	13.8	14.6
	C41.5	32.22	14.2	16.07
	C41.6	-14.14	21.7	24.25
42	C42.1	32.22	14.2	16.07
	C42.2	30.2	15.0	17.93
	C42.3	20.72	16.6	18.0
	C42.4	12.94	15.4	21.4
	C42.5	23.77	15.4	16.07

Claude Readability Analysis (continued)

	C42.6	10.91	16.2	18.31
43	C43.1	8.88	17.0	20.0
	C43.2	4.82	18.6	19.6
	C43.3	23.77	15.4	16.07
	C43.4	17.34	15.8	18.0
	C43.5	53.21	10.3	11.64
	C43.6	9.89	16.6	22.34
44	C44.1	48.81	9.9	11.31
	C44.2	13.28	17.4	19.6
	C44.3	50.16	11.5	12.21
	C44.4	39.67	13.4	16.16
	C44.5	-40.88	23.7	24.44
	C44.6	10.91	16.2	20.53
45	C45.1	21.74	16.2	17.93
	C45.2	7.86	17.4	21.73
	C45.3	-1.63	19.0	23.35
	C45.4	20.72	16.6	19.6
	C45.5	-22.94	20.9	22.76
	C45.6	3.46	17.0	18.56
46	C46.1	-15.5	20.1	20.23
	C46.2	-13.47	19.4	20.92
	C46.3	5.83	18.2	21.37
	C46.4	-23.96	21.3	24.44
	C46.5	-8.05	19.3	22.0
	C46.6	33.24	13.8	16.02
47	C47.1	43.73	11.9	13.92
	C47.2	23.77	15.4	16.07
	C67.3	43.73	11.9	13.92
	C47.4	38.66	13.8	12.93
	C47.5	39.67	13.4	17.9
	C47.6	58.62	10.3	10.3
48	C48.1	55.58	11.5	12.93
	C48.2	0.42	18.2	22.0
	C48.3	52.19	10.7	11.81
	C48.4	34.26	13.5	12.0
	C48.5	27.83	13.9	16.09
	C48.6	52.53	12.6	13.76
49	C49.1	16.32	16.2	19.83
	C49.2	21.74	16.2	21.27
	C49.3	-3.99	17.8	18.9
	C49.4	14.29	17.0	21.37
	C49.5	57.61	10.7	12.44
	C49.6	19.37	15.0	20.53

Claude Readability Analysis (continued)

50	C50.1	47.12	12.7	14.6
	C50.2	16.32	16.2	17.92
	C50.3	35.27	13.1	13.92
	C50.4	3.46	17.0	23.27
	C50.5	44.41	9.6	6.0
	C50.6	35.27	13.1	16.02



## APPENDIX DM

### QWEN CLASSIFICATION AMBIGUITY ANALYSIS

US#	REQ#	F/NF	Correct Categorization	Ambiguity Score (10-0)	Ambiguous Terms
1	Q1.1	F	F	10	-
	Q1.2	F	F	10	-
	Q1.3	F	F	10	-
	Q1.4	F	F	9	all
	Q1.5	NF	NF	9	appropriate
	Q1.6	NF	NF	10	-
2	Q2.1	F	F	10	-
	Q2.2	F	F	10	-
	Q2.3	F	F	10	-
	Q2.4	F	F	9	compliant
	Q2.5	NF	NF	10	-
	Q2.6	NF	NF	9	real-time
3	Q3.1	F	F	10	-
	Q3.2	F	F	10	-
	Q3.3	F	F	9	secure
	Q3.4	F	F	10	-
	Q3.5	NF	NF	10	-
	Q3.6	NF	NF	10	-
4	Q3.1	F	F	10	-
	Q3.2	F	F	10	-
	Q3.3	F	F	10	-
	Q3.4	F	F	10	-
	Q3.5	NF	NF	9	acceptable
	Q3.6	NF	NF	10	-
5	Q5.1	F	F	10	-
	Q5.2	F	F	10	-
	Q5.3	F	F	10	-
	Q5.4	F	F	10	-
	Q5.5	NF	NF	10	-
	Q5.6	NF	NF	9	all
6	Q6.1	F	F	10	-
	Q6.2	F	F	10	-
	Q6.3	F	F	10	-
	Q6.4	F	F	9	all
	Q6.5	NF	NF	10	-

Qwen Classification Ambiguity Analysis (continued)

	Q6.6	NF	NF	10	-
7	Q7.1	F	F	10	-
	Q7.2	F	F	10	-
	Q7.3	F	F	10	-
	Q7.4	F	F	10	-
	Q7.5	NF	NF	9	in a timely manner
	Q7.6	NF	NF	10	-
8	Q8.1	F	F	10	-
	Q8.2	F	F	10	-
	Q8.3	F	F	10	-
	Q8.4	F	F	10	-
	Q8.5	NF	NF	10	-
	Q8.6	NF	NF	10	-
9	Q9.1	F	F	10	-
	Q9.2	F	F	10	-
	Q9.3	F	F	10	-
	Q9.4	F	F	10	-
	Q9.5	NF	NF	10	-
	Q9.6	NF	NF	10	-
10	Q10.1	F	F	10	-
	Q10.2	F	F	10	-
	Q10.3	F	F	9	all
	Q10.4	F	F	10	-
	Q10.5	NF	NF	10	-
	Q10.6	NF	NF	9	proper
11	Q11.1	F	F	10	-
	Q11.2	F	F	10	-
	Q11.3	F	F	10	-
	Q11.4	F	F	9	intuitive
	Q11.5	NF	NF	9	real-time
	Q11.6	NF	NF	9	responsive
12	Q12.1	F	F	10	-
	Q12.2	F	F	10	-
	Q12.3	F	F	9	real-time
	Q12.4	F	F	10	-
	Q12.5	NF	NF	10	-
	Q12.6	NF	NF	9	responsive
13	Q13.1	F	F	10	-
	Q13.2	F	F	9	real-time
	Q13.3	F	F	10	-
	Q13.4	F	F	10	-
	Q13.5	NF	NF	9	timely
	Q13.6	NF	NF	10	-

Qwen Classification Ambiguity Analysis (continued)

14	Q14.1	F	F	10	-
	Q14.2	F	F	10	-
	Q14.3	F	F	10	-
	Q14.4	F	F	10	-
	Q14.5	NF	NF	10	-
	Q14.6	NF	NF	10	-
15	Q15.1	F	F	9	intuitive
	Q15.2	F	F	10	-
	Q15.3	F	F	10	-
	Q15.4	F	F	8	immediately, all
	Q15.5	NF	NF	9	efficient
	Q15.6	NF	NF	9	appropriate
16	Q16.1	F	F	10	-
	Q16.2	F	F	10	-
	Q16.3	F	F	10	-
	Q16.4	F	F	10	-
	Q16.5	NF	NF	10	-
	Q16.6	NF	NF	10	-
17	Q17.1	F	F	10	-
	Q17.2	F	F	9	later
	Q17.3	F	F	9	immediately
	Q17.4	F	F	10	-
	Q17.5	NF	NF	10	-
	Q17.6	NF	NF	10	-
18	Q18.1	F	F	10	-
	Q18.2	F	F	10	-
	Q18.3	F	F	10	-
	Q18.4	F	F	10	-
	Q18.5	NF	NF	10	-
	Q18.6	NF	NF	10	-
19	Q19.1	F	F	10	-
	Q19.2	F	F	9	real-time
	Q19.3	F	F	10	-
	Q19.4	F	F	10	-
	Q19.5	NF	NF	9	all
	Q19.6	NF	NF	10	-
20	Q20.1	F	F	9	-
	Q20.2	F	F	10	-
	Q20.3	F	F	10	-
	Q20.4	F	F	10	-
	Q20.5	NF	NF	9	timely
	Q20.6	NF	NF	10	-
	Q21.1	F	F	10	-

Qwen Classification Ambiguity Analysis (continued)

21	Q21.2	F	F	10	-
	Q21.3	F	F	10	-
	Q21.4	F	F	10	-
	Q21.5	NF	NF	10	-
	Q21.6	NF	NF	10	-
22	Q22.1	F	F	10	-
	Q22.2	F	F	10	-
	Q22.3	F	F	10	-
	Q22.4	F	F	10	-
	Q22.5	NF	NF	9	acceptable
	Q22.6	NF	NF	10	-
23	Q23.1	F	F	10	-
	Q23.2	F	F	10	-
	Q23.3	F	F	9	all
	Q23.4	F	F	9	appropriate
	Q23.5	NF	NF	10	-
	Q23.6	NF	NF	10	-
24	Q24.1	F	F	10	-
	Q24.2	F	F	10	-
	Q24.3	F	F	10	-
	Q24.4	F	F	10	-
	Q24.5	NF	NF	10	-
	Q24.6	NF	NF	10	-
25	Q25.1	F	F	10	-
	Q25.2	F	F	10	-
	Q25.3	F	F	10	-
	Q25.4	F	F	9	real-time
	Q25.5	NF	NF	10	-
	Q25.6	NF	NF	9	appropriate
26	Q26.1	F	F	10	-
	Q26.2	F	F	8	responsive, all
	Q26.3	F	F	9	all
	Q26.4	F	F	10	-
	Q26.5	NF	NF	10	-
	Q26.6	NF	NF	10	-
27	Q27.1	F	F	9	user-friendly
	Q27.2	F	F	10	-
	Q27.3	F	F	10	-
	Q27.4	F	F	10	-
	Q27.5	NF	NF	10	-
	Q27.6	NF	NF	10	-
	Q28.1	F	F	10	-
	Q28.2	F	F	10	-

Qwen Classification Ambiguity Analysis (continued)

28	Q28.3	F	F	9	all
	Q28.4	F	F	10	-
	Q28.5	NF	NF	10	-
	Q28.6	NF	NF	9	appropriate
29	Q29.1	F	F	10	-
	Q29.2	F	F	9	all
	Q29.3	F	F	10	-
	Q29.4	F	F	10	-
	Q29.5	NF	NF	10	-
	Q29.6	NF	NF	9	appropriate
30	Q30.1	F	F	10	-
	Q30.2	F	F	9	all
	Q30.3	F	F	10	-
	Q30.4	F	F	10	-
	Q30.5	NF	NF	10	-
	Q30.6	NF	NF	10	-
31	Q31.1	F	F	9	all
	Q31.2	F	F	9	effective
	Q31.3	F	F	10	-
	Q31.4	F	F	10	-
	Q31.5	NF	NF	9	efficient
	Q31.6	NF	NF	9	appropriate
32	Q32.1	F	F	10	-
	Q32.2	F	F	9	proper
	Q32.3	F	F	10	-
	Q32.4	F	F	10	-
	Q32.5	NF	NF	9	timely
	Q32.6	NF	NF	9	appropriate
33	Q33.1	F	F	10	-
	Q33.2	F	F	10	-
	Q33.3	F	F	10	-
	Q33.4	F	F	10	-
	Q33.5	NF	NF	10	-
	Q33.6	NF	NF	10	-
34	Q34.1	F	F	10	-
	Q34.2	F	F	10	-
	Q34.3	F	F	10	-
	Q34.4	F	F	9	all
	Q34.5	NF	NF	9	immediately
	Q34.6	NF	NF	10	-
35	Q35.1	F	F	10	-
	Q35.2	F	F	10	-
	Q35.3	F	F	10	-

Qwen Classification Ambiguity Analysis (continued)

	Q35.4	F	F	10	-
	Q35.5	NF	NF	10	-
	Q35.6	NF	NF	10	-
36	Q36.1	F	F	10	-
	Q36.2	F	F	10	-
	Q36.3	F	F	10	-
	Q36.4	F	F	10	-
	Q36.5	NF	NF	9	responsive
	Q36.6	NF	NF	10	-
	37	Q37.1	F	F	9
Q37.2		F	F	10	-
Q37.3		F	F	10	-
Q37.4		F	F	10	-
Q37.5		NF	NF	10	-
Q37.6		NF	NF	10	-
38	Q38.1	F	F	10	-
	Q38.2	F	F	10	-
	Q38.3	F	F	10	-
	Q38.4	F	F	10	-
	Q38.5	NF	NF	10	-
	Q38.6	NF	NF	10	-
39	Q39.1	F	F	10	-
	Q39.2	F	F	10	-
	Q39.3	F	F	9	immediately
	Q39.4	F	F	10	-
	Q39.5	NF	NF	10	-
	Q39.6	NF	NF	9	appropriate
40	Q40.1	F	F	9	all
	Q40.2	F	F	10	-
	Q40.3	F	F	9	all
	Q40.4	F	F	10	-
	Q40.5	NF	NF	10	-
	Q40.6	NF	NF	10	-
41	Q41.1	F	F	9	all
	Q41.2	F	F	10	-
	Q41.3	F	F	10	-
	Q41.4	F	F	10	-
	Q41.5	NF	NF	9	efficient
	Q41.6	NF	NF	10	-
42	Q42.1	F	F	10	-
	Q42.2	F	F	9	all
	Q42.3	F	F	10	-
	Q42.4	F	F	10	-

Qwen Classification Ambiguity Analysis (continued)

	Q42.5	NF	NF	10	-
	Q42.6	NF	NF	9	appropriate
43	Q43.1	F	F	10	-
	Q43.2	F	F	8	immediately, all
	Q43.3	F	F	10	-
	Q43.4	F	F	10	-
	Q43.5	NF	NF	9	responsive
	Q43.6	NF	NF	9	appropriate
44	Q44.1	F	F	10	-
	Q44.2	F	F	10	-
	Q44.3	F	F	10	-
	Q44.4	F	F	10	-
	Q44.5	NF	NF	10	-
	Q44.6	NF	NF	9	appropriate
45	Q45.1	F	F	10	-
	Q45.2	F	F	10	-
	Q45.3	F	F	9	all
	Q45.4	F	F	10	-
	Q45.5	NF	NF	10	-
	Q45.6	NF	NF	9	appropriate
46	Q46.1	F	F	10	-
	Q46.2	F	F	10	-
	Q46.3	F	F	9	all
	Q46.4	F	F	10	-
	Q46.5	NF	NF	10	-
	Q46.6	NF	NF	9	appropriate
47	Q47.1	F	F	10	-
	Q47.2	F	F	10	-
	Q67.3	F	F	10	-
	Q47.4	F	F	10	-
	Q47.5	NF	NF	9	responsive
	Q47.6	NF	NF	10	-
48	Q48.1	F	F	10	-
	Q48.2	F	F	10	-
	Q48.3	F	F	10	-
	Q48.4	F	F	10	-
	Q48.5	NF	NF	10	-
	Q48.6	NF	NF	10	-
49	Q49.1	F	F	10	-
	Q49.2	F	F	10	-
	Q49.3	F	F	9	later
	Q49.4	F	F	10	-
	Q49.5	NF	NF	10	-

Qwen Classification Ambiguity Analysis (continued)

	Q49.6	NF	NF	9	appropriate
50	Q50.1	F	F	10	-
	Q50.2	F	F	10	-
	Q50.3	F	F	10	-
	Q50.4	F	F	10	-
	Q50.5	NF	NF	9	efficient
	Q50.6	NF	NF	10	-



**APPENDIX DN**

**QWEN SIMILARITY PASSIVENESS 5W1H ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>SS</b>	<b>Passive Voice</b>	<b>Completeness</b>	<b>Completeness Score (0-6)</b>
1	Q1.1	0.661	no	Who, What	2
	Q1.2	0.556	no	Who, What, Where	3
	Q1.3	0.713	yes	Who, What, When	3
	Q1.4	0.696	no	Who, What	2
	Q1.5	0.656	yes	Who, What, Why	3
	Q1.6	0.666	no	Who, What, When	3
2	Q2.1	0.679	no	Who, What, Where	3
	Q2.2	0.682	no	Who, What, Where	3
	Q2.3	0.740	yes	Who, What, When, Where, How	5
	Q2.4	0.485	yes	Who, What, Where, How	4
	Q2.5	0.738	no	Who, What, Where, How	4
	Q2.6	0.746	no	Who, What, When, Where	4
3	Q3.1	0.788	no	Who, What	2
	Q3.2	0.810	no	Who, What, When, Why	4
	Q3.3	0.826	no	Who, What, Where	3
	Q3.4	0.843	no	Who, What, When, Where	4
	Q3.5	0.683	yes	Who, What, Why	3
	Q3.6	0.849	yes	Who, What, Why	3
	Q4.1	0.862	no	Who, What	2
	Q4.2	0.895	no	Who, What	2

Qwen Similarity Passiveness 5W1H Analysis (continued)

4	Q4.3	0.913	no	What	1
	Q4.4	0.877	no	Who, What	2
	Q4.5	0.768	no	What, When, Why	3
	Q4.6	0.835	no	What, Where, Why	3
5	Q5.1	0.813	no	Who, What, Where, How	4
	Q5.2	0.774	yes	What, Why	2
	Q5.3	0.752	no	What, Why	2
	Q5.4	0.819	no	Who, What	2
	Q5.5	0.736	no	What, Where	2
	Q5.6	0.795	yes	Who, What, When, Why	4
6	Q6.1	0.821	no	Who, What, Where	3
	Q6.2	0.818	no	Who, What	2
	Q6.3	0.805	yes	What, When	2
	Q6.4	0.769	no	Who, What	2
	Q6.5	0.807	no	Who, What, Why	3
	Q6.6	0.884	yes	What	1
7	Q7.1	0.922	no	Who, What	2
	Q7.2	0.896	no	Who, What, When, Why	4
	Q7.3	0.899	no	Who, What, When, Why	4
	Q7.4	0.848	no	Who, What	2
	Q7.5	0.880	no	What, When	2
	Q7.6	0.872	no	Who, What, When, Where, Why	5
8	Q8.1	0.791	no	Who, What	2
	Q8.2	0.662	no	What, Where	2
	Q8.3	0.817	no	Who, What	2
	Q8.4	0.778	no	Who, What, Why	3
	Q8.5	0.657	yes	What, When	2
	Q8.6	0.821	yes	What	1
	Q9.1	0.835	no	Who, What	2
	Q9.2	0.741	no	Who, What	2
	Q9.3	0.735	no	Who, What	2
	Q9.4	0.604	no	What	1

Qwen Similarity Passiveness 5W1H Analysis (continued)

9	Q9.5	0.730	no	What, When, Why	3
	Q9.6	0.693	no	What, Where, How	3
10	Q10.1	0.862	no	Who, What, Where	3
	Q10.2	0.837	yes	What, When, Where, How	4
	Q10.3	0.855	no	Who, What, Where	3
	Q10.4	0.815	no	What, Why	2
	Q10.5	0.724	no	What, When	2
	Q10.6	0.745	no	Who, What, Where	3
11	Q11.1	0.844	no	Who, What	2
	Q11.2	0.861	no	Who, What	2
	Q11.3	0.682	no	Who, What	2
	Q11.4	0.853	no	What, How	2
	Q11.5	0.724	no	Who, What, When	3
	Q11.6	0.876	no	What, How	2
12	Q12.1	0.820	no	Who, What	2
	Q12.2	0.779	no	What	1
	Q12.3	0.825	no	What, When, Why	3
	Q12.4	0.778	no	Who, What, Why	3
	Q12.5	0.793	no	What, When, Why	3
	Q12.6	0.815	no	What, Where, How	3
13	Q13.1	0.689	no	Who, What	2
	Q13.2	0.727	no	Who, What, When	3
	Q13.3	0.762	yes	What, Where, Why	3
	Q13.4	0.830	no	Who, What, Why	3
	Q13.5	0.752	yes	What, When, Why	3
	Q13.6	0.786	yes	What	1
	Q14.1	0.721	no	Who, What, Where	3

Qwen Similarity Passiveness 5W1H Analysis (continued)

14	Q14.2	0.730	yes	What, Where, How	3
	Q14.3	0.785	yes	Who, What, When, Where, How	5
	Q14.4	0.769	yes	What, When	2
	Q14.5	0.712	no	What, When	2
	Q14.6	0.788	yes	What	1
15	Q15.1	0.794	no	Who, What, Where	3
	Q15.2	0.841	no	Who, What, Why	3
	Q15.3	0.788	no	Who, What	2
	Q15.4	0.765	yes	Who, What, When, Where	4
	Q15.5	0.710	no	What, When, Why	3
	Q15.6	0.809	yes	What	1
16	Q16.1	0.766	no	Who, What	2
	Q16.2	0.752	no	Who, What	2
	Q16.3	0.734	no	What, Why	2
	Q16.4	0.783	no	Who, What	2
	Q16.5	0.670	no	What, When, Why	3
	Q16.6	0.702	no	What, Where, How	3
17	Q17.1	0.856	no	Who, What, Where	3
	Q17.2	0.872	no	Who, What, When, How	4
	Q17.3	0.835	yes	What, When, Where	3
	Q17.4	0.796	no	Who, What, When, Where	4
	Q17.5	0.741	no	What, When	2
	Q17.6	0.875	yes	What	1
	Q18.1	0.865	no	Who, What	2
	Q18.2	0.854	no	Who, What, Why	3
	Q18.3	0.870	yes	What, When, Why	3
	Q18.4	0.883	no	Who, What, Why	3

Qwen Similarity Passiveness 5W1H Analysis (continued)

18	Q18.5	0.837	no	What, When	2
	Q18.6	0.882	yes	What	1
19	Q19.1	0.892	no	Who, What, Where	3
	Q19.2	0.891	no	Who, What, When	3
	Q19.3	0.829	no	What	1
	Q19.4	0.904	yes	What, Where	2
	Q19.5	0.894	yes	What	1
	Q19.6	0.893	no	What	1
20	Q20.1	0.882	yes	Who, What, Where	3
	Q20.2	0.876	yes	Who, What, When	3
	Q20.3	0.769	no	Who, What, Why	3
	Q20.4	0.896	no	What, Why	2
	Q20.5	0.794	no	What, When, Why	3
	Q20.6	0.894	no	What	1
21	Q21.1	0.772	no	Who, What	2
	Q21.2	0.771	no	Who, What, When, Why	4
	Q21.3	0.771	yes	What, Where, Why	3
	Q21.4	0.820	yes	Who, What	2
	Q21.5	0.600	no	What, When	2
	Q21.6	0.821	yes	What	1
22	Q22.1	0.750	no	Who, What, How	3
	Q22.2	0.860	yes	What, Where	2
	Q22.3	0.880	no	Who, What	2
	Q22.4	0.821	yes	What, When, Why	3
	Q22.5	0.865	no	What, When	2
	Q22.6	0.886	no	What	1
	Q23.1	0.530	no	Who, What, Why	3
	Q23.2	0.657	no	What	1
	Q23.3	0.736	no	Who, What, Where	3
	Q23.4	0.697	no	Who, What, How	3

Qwen Similarity Passiveness 5W1H Analysis (continued)

23	Q23.5	0.625	no	What, When	2
	Q23.6	0.751	yes	What	1
24	Q24.1	0.783	no	Who, What, Why	3
	Q24.2	0.859	no	Who, What	2
	Q24.3	0.824	no	What, Why	2
	Q24.4	0.886	no	Who, What, Why	3
	Q24.5	0.764	no	What, When	2
	Q24.6	0.817	yes	What	1
25	Q25.1	0.644	no	Who, What, Where	3
	Q25.2	0.682	no	Who, What, Where, Why	4
	Q25.3	0.587	no	What, Where	2
	Q25.4	0.641	no	What, When, How	3
	Q25.5	0.602	no	What, When, Why	3
	Q25.6	0.661	yes	What	1
26	Q26.1	0.798	no	Who, What, Where	3
	Q26.2	0.814	no	What, Where	2
	Q26.3	0.665	no	What, Where	2
	Q26.4	0.865	no	Who, What, When	3
	Q26.5	0.693	no	What, When, Where	3
	Q26.6	0.813	yes	What, Where	2
27	Q27.1	0.825	no	Who, What, Why	3
	Q27.2	0.823	no	What, Why	2
	Q27.3	0.795	yes	What, Where, Why	3
	Q27.4	0.852	no	Who, What, When, Why	4
	Q27.5	0.723	no	What, When, How	3
	Q27.6	0.841	yes	What	1
28	Q28.1	0.782	no	Who, What, Where	3
	Q28.2	0.838	no	What, Why	2
	Q28.3	0.845	yes	What, When	2

Qwen Similarity Passiveness 5W1H Analysis (continued)

	Q28.4	0.811	no	Who, What, When, Why	4
	Q28.5	0.667	no	What, When, How	3
	Q28.6	0.835	yes	What	1
29	Q29.1	0.839	no	Who, What	2
	Q29.2	0.841	no	Who, What, When	3
	Q29.3	0.772	no	Who, What, Why, How	4
	Q29.4	0.791	no	Who, What, When	3
	Q29.5	0.748	no	What, When	2
	Q29.6	0.826	yes	What	1
30	Q30.1	0.853	no	Who, What	2
	Q30.2	0.726	no	Who, What, Where	3
	Q30.3	0.599	no	Who, What, When, Where	4
	Q30.4	0.805	yes	What, Why	2
	Q30.5	0.763	no	What, When	2
	Q30.6	0.848	no	What	1
31	Q31.1	0.870	no	Who, What, When	3
	Q31.2	0.887	no	Who, What	2
	Q31.3	0.784	yes	What, Why	2
	Q31.4	0.853	no	Who, What, When, How	4
	Q31.5	0.777	no	What, When, Why	3
	Q31.6	0.870	yes	What	1
32	Q32.1	0.840	no	Who, What	2
	Q32.2	0.859	yes	What, Why	2
	Q32.3	0.816	no	Who, What, Why	3
	Q32.4	0.878	yes	Who, What, How	3
	Q32.5	0.800	no	What, When, Why	3
	Q32.6	0.855	yes	What	1
	Q33.1	0.809	no	Who, What, Where, How	4
	Q33.2	0.750	no	What, Why	2

Qwen Similarity Passiveness 5W1H Analysis (continued)

33	Q33.3	0.890	yes	Who, What, Where, Why, How	5
	Q33.4	0.875	no	What, Why	2
	Q33.5	0.788	no	What, When, Why	3
	Q33.6	0.915	yes	What	1
34	Q34.1	0.750	no	Who, What, Where	3
	Q34.2	0.780	no	What, Where	2
	Q34.3	0.719	yes	Who, What, When	3
	Q34.4	0.777	no	Who, What, How	3
	Q34.5	0.700	no	What, When	2
	Q34.6	0.762	yes	What	1
35	Q35.1	0.778	no	Who, What, Where	3
	Q35.2	0.704	no	What	1
	Q35.3	0.774	no	Who, What, Where	3
	Q35.4	0.601	no	What, Why	2
	Q35.5	0.701	no	What, When	2
	Q35.6	0.780	no	What	1
36	Q36.1	0.817	no	Who, What, Where, How	4
	Q36.2	0.870	yes	What, When, Where, How	4
	Q36.3	0.746	no	Who, What, Why	3
	Q36.4	0.805	no	What, Why	2
	Q36.5	0.819	no	What, When, Why	3
	Q36.6	0.840	yes	What	1
37	Q37.1	0.788	no	Who, What, Where	3
	Q37.2	0.783	yes	What, When, Where	3
	Q37.3	0.781	no	Who, What, Where, Why	4
	Q37.4	0.701	no	What, Where, Why	3

Qwen Similarity Passiveness 5W1H Analysis (continued)

	Q37.5	0.797	no	What, When, Where, Why	4
	Q37.6	0.696	no	What, Where	2
38	Q38.1	0.806	no	Who, What, How	3
	Q38.2	0.623	no	What, How	2
	Q38.3	0.589	no	Who, What, Why	3
	Q38.4	0.725	no	What, Why	2
	Q38.5	0.632	no	What, When, Why	3
	Q38.6	0.668	no	What, Where	2
39	Q39.1	0.740	no	Who, What, Where, How	4
	Q39.2	0.502	yes	What, When, How	3
	Q39.3	0.862	yes	What, When, How	3
	Q39.4	0.764	no	Who, What, When	3
	Q39.5	0.796	no	What, When, Why	3
	Q39.6	0.843	yes	What	1
40	Q40.1	0.832	no	Who, What, How	3
	Q40.2	0.736	yes	What, Where, Why	3
	Q40.3	0.793	no	What	1
	Q40.4	0.858	no	Who, What, Where, How	4
	Q40.5	0.670	no	What, When	2
	Q40.6	0.787	yes	What	1
41	Q41.1	0.651	no	Who, What, When	3
	Q41.2	0.782	yes	What, Why	2
	Q41.3	0.691	no	Who, What	2
	Q41.4	0.650	no	What, Why	2
	Q41.5	0.794	no	What, When, Why	3
	Q41.6	0.835	yes	What, When	2
	Q42.1	0.833	no	Who, What, When	3

Qwen Similarity Passiveness 5W1H Analysis (continued)

42	Q42.2	0.852	no	What, When, Why	3
	Q42.3	0.632	no	Who, What, Where	3
	Q42.4	0.757	yes	What, When	2
	Q42.5	0.765	no	What, When, Why	3
	Q42.6	0.833	yes	What, Where	2
43	Q43.1	0.767	no	Who, What, Where, How	4
	Q43.2	0.801	yes	Who, What, When, Where	4
	Q43.3	0.627	no	Who, What, When	3
	Q43.4	0.755	yes	What, When	2
	Q43.5	0.754	no	What, When, Why	3
	Q43.6	0.702	yes	What	1
44	Q44.1	0.774	no	Who, What, When	3
	Q44.2	0.742	yes	What, Why, How	3
	Q44.3	0.845	yes	What, Where, Why	3
	Q44.4	0.801	no	Who, What, Why	3
	Q44.5	0.751	no	What, When, Why	3
	Q44.6	0.787	yes	What	1
45	Q45.1	0.797	no	Who, What, How	3
	Q45.2	0.681	no	Who, What, Why	3
	Q45.3	0.755	yes	What, Where	2
	Q45.4	0.800	yes	Who, What, When	3
	Q45.5	0.756	no	What, When, Why	3
	Q45.6	0.826	yes	What	1
	Q46.1	0.368	no	Who, What, When, How	4

Qwen Similarity Passiveness 5W1H Analysis (continued)

46	Q46.2	0.809	no	Who, What, When, Where, Why	5
	Q46.3	0.684	no	What, Why	2
	Q46.4	0.675	no	Who, What	2
	Q46.5	0.638	no	What, When, Why	3
	Q46.6	0.757	yes	What	1
47	Q47.1	0.800	no	Who, What, How	3
	Q47.2	0.822	no	Who, What, Where	3
	Q47.3	0.742	no	What, Why	2
	Q47.4	0.739	yes	What, When	2
	Q47.5	0.656	no	What, When, Why	3
	Q47.6	0.764	yes	What	1
48	Q48.1	0.765	no	Who, What, Where	3
	Q48.2	0.762	no	Who, What, Why	3
	Q48.3	0.804	no	What, When, How	3
	Q48.4	0.798	no	Who, What	2
	Q48.5	0.731	no	What, When, Why	3
	Q48.6	0.774	no	What, Where	2
49	Q49.1	0.898	no	Who, What, Where	3
	Q49.2	0.822	yes	What, When	2
	Q49.3	0.846	no	Who, What, When, Where	4
	Q49.4	0.506	no	What, Why	2
	Q49.5	0.595	no	What, When	2
	Q49.6	0.828	yes	What, Where	2
50	Q50.1	0.792	no	Who, What, Where	3
	Q50.2	0.810	no	What, Why	2
	Q50.3	0.744	yes	Who, What, When, Where	4
	Q50.4	0.877	no	Who, What, Why	3

Qwen Similarity Passiveness 5W1H Analysis (continued)

Q50.5	0.825	yes	What, When, Why	3
Q50.6	0.827	no	What, How	2



**APPENDIX DO**

**QWEN READABILITY ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>Felsch-Kincaid Ease</b>	<b>Felsch-Kincaid Grade Level</b>	<b>Gunning Fog</b>
1	Q1.1	38.32	11.9	16.4
	Q1.2	33.24	13.8	16.02
	Q1.3	48.13	12.3	14.42
	Q1.4	40.69	13.1	14.25
	Q1.5	-10.08	20.1	25.16
	Q1.6	-6.02	18.6	22.76
2	Q2.1	59.64	9.9	12.0
	Q2.2	57.61	10.7	12.44
	Q2.3	33.24	13.8	16.02
	Q2.4	57.61	10.7	14.25
	Q2.5	56.59	11.1	10.94
	Q2.6	42.72	12.3	10.0
3	Q3.1	52.19	10.7	11.81
	Q3.2	11.92	15.8	18.56
	Q3.3	25.8	14.6	20.0
	Q3.4	35.27	13.1	16.02
	Q3.5	35.44	10.9	11.82
	Q3.6	-8.05	19.3	24.0
4	Q3.1	33.24	13.8	14.11
	Q3.2	34.26	13.5	16.0
	Q3.3	-3.99	17.8	18.9
	Q3.4	39.67	13.4	14.42
	Q3.5	38.32	11.9	11.4
	Q3.6	44.75	11.5	11.64
5	Q5.1	35.27	13.1	13.92
	Q5.2	37.3	12.3	13.86
	Q5.3	35.27	13.1	13.92
	Q5.4	38.32	11.9	11.4
	Q5.5	8.88	17.0	18.0
	Q5.6	10.91	16.2	16.09
6	Q6.1	41.7	12.7	14.11
	Q6.2	24.78	15.0	16.02
	Q6.3	45.76	11.1	13.86
	Q6.4	38.32	11.9	13.9
	Q6.5	3.46	17.0	18.56
	Q6.6	30.87	12.7	14.0

Qwen Readability Analysis (continued)

7	Q7.1	25.8	14.6	20.0
	Q7.2	24.78	15.0	17.92
	Q7.3	26.81	14.2	18.13
	Q7.4	3.46	17.0	23.27
	Q7.5	21.4	14.3	18.9
	Q7.6	8.88	17.0	18.0
8	Q8.1	16.32	16.2	21.73
	Q8.2	16.32	16.2	17.92
	Q8.3	34.26	13.5	14.0
	Q8.4	8.88	17.0	16.0
	Q8.5	12.94	15.4	16.4
	Q8.6	10.91	16.2	20.53
9	Q9.1	41.7	12.7	14.11
	Q9.2	11.92	15.8	23.27
	Q9.3	33.24	13.8	17.92
	Q9.4	20.04	12.7	16.93
	Q9.5	19.37	15.0	13.87
	Q9.6	35.27	13.1	13.92
10	Q10.1	16.32	16.2	16.02
	Q10.2	41.7	12.7	14.11
	Q10.3	35.27	13.1	18.13
	Q10.4	26.81	14.2	18.13
	Q10.5	70.13	8.0	9.42
	Q10.6	9.89	16.6	20.23
11	Q11.1	25.8	14.6	16.0
	Q11.2	35.27	13.1	18.13
	Q11.3	53.37	8.2	12.22
	Q11.4	17.34	15.8	18.0
	Q11.5	33.24	13.8	14.11
	Q11.6	20.38	14.6	20.92
12	Q12.1	16.32	16.2	23.64
	Q12.2	2.44	17.4	18.31
	Q12.3	27.83	13.9	13.87
	Q12.4	51.85	8.8	13.49
	Q12.5	27.83	13.9	16.09
	Q12.6	26.81	14.2	16.02
13	Q13.1	25.8	14.6	16.0
	Q13.2	27.83	13.9	13.87
	Q13.3	3.46	17.0	23.27
	Q13.4	-12.45	19.0	18.9
	Q13.5	34.26	13.5	12.0
	Q13.6	13.95	15.0	19.33
	Q14.1	50.84	9.2	13.13

Qwen Readability Analysis (continued)

14	Q14.2	25.8	14.6	14.0
	Q14.3	34.26	13.5	14.0
	Q14.4	47.79	10.3	8.67
	Q14.5	36.28	12.7	11.64
	Q14.6	20.38	14.6	20.92
15	Q15.1	16.32	16.2	17.92
	Q15.2	-0.61	18.6	19.83
	Q15.3	46.1	13.0	13.2
	Q15.4	34.26	13.5	18.0
	Q15.5	20.38	14.6	16.21
	Q15.6	21.4	14.3	16.4
16	Q16.1	27.15	16.2	18.21
	Q16.2	30.2	15.0	14.6
	Q16.3	42.72	12.3	16.0
	Q16.4	65.73	7.6	8.46
	Q16.5	35.27	13.1	11.81
	Q16.6	41.7	12.7	16.02
17	Q17.1	50.16	11.5	12.21
	Q17.2	51.52	13.0	15.49
	Q17.3	18.35	15.4	22.34
	Q17.4	27.83	13.9	18.31
	Q17.5	-3.99	17.8	18.9
	Q17.6	34.26	13.5	18.0
18	Q18.1	31.21	14.6	16.16
	Q18.2	29.18	15.4	18.0
	Q18.3	38.66	13.8	16.27
	Q18.4	48.13	12.3	16.16
	Q18.5	49.15	11.9	12.44
	Q18.6	37.3	12.3	16.21
19	Q19.1	34.26	13.5	14.0
	Q19.2	17.34	15.8	16.0
	Q19.3	22.41	13.9	16.67
	Q19.4	27.83	13.9	20.53
	Q19.5	9.89	16.6	18.13
	Q19.6	27.83	13.9	18.31
20	Q20.1	43.73	11.9	13.92
	Q20.2	-13.47	19.4	23.27
	Q20.3	26.47	12.3	15.31
	Q20.4	1.43	17.8	22.34
	Q20.5	33.24	13.8	12.21
	Q20.6	25.8	14.6	18.0
	Q21.1	12.94	15.4	16.4
	Q21.2	26.81	14.2	16.02

Qwen Readability Analysis (continued)

21	Q21.3	9.89	16.6	22.34
	Q21.4	25.8	14.6	16.0
	Q21.5	28.84	13.5	11.51
	Q21.6	-3.99	17.8	18.9
22	Q22.1	9.04	14.9	18.51
	Q22.2	17.34	15.8	18.0
	Q22.3	25.8	14.6	20.0
	Q22.4	36.28	12.7	13.87
	Q22.5	-7.04	19.0	20.23
	Q22.6	15.31	16.6	21.53
23	Q23.1	11.07	14.1	18.54
	Q23.2	-45.28	23.3	27.33
	Q23.3	8.88	17.0	18.0
	Q23.4	17.34	15.8	18.0
	Q23.5	-30.39	21.7	20.92
	Q23.6	3.46	17.0	20.92
24	Q24.1	-7.04	19.0	22.34
	Q24.2	13.95	15.0	19.33
	Q24.3	3.46	17.0	18.56
	Q24.4	41.7	12.7	14.11
	Q24.5	37.3	12.3	9.15
	Q24.6	29.86	13.1	18.9
25	Q25.1	41.7	12.7	12.21
	Q25.2	21.74	16.2	17.93
	Q25.3	-3.99	17.8	21.4
	Q25.4	47.79	10.3	11.33
	Q25.5	18.35	15.4	18.13
	Q25.6	13.95	15.0	19.33
26	Q26.1	50.33	9.3	9.8
	Q26.2	39.67	13.4	19.63
	Q26.3	20.04	12.7	16.93
	Q26.4	40.69	13.1	14.25
	Q26.5	54.22	9.9	13.86
	Q26.6	36.28	12.7	18.31
27	Q27.1	48.13	12.3	12.68
	Q27.2	24.78	15.0	16.02
	Q27.3	67.76	6.8	8.13
	Q27.4	23.77	15.4	16.07
	Q27.5	10.91	16.2	13.87
	Q27.6	19.37	15.0	16.09
28	Q28.1	33.24	13.8	16.02
	Q28.2	9.89	16.6	22.34
	Q28.3	56.59	11.1	16.16

Qwen Readability Analysis (continued)

	Q28.4	12.94	15.4	16.4
	Q28.5	20.38	14.6	18.56
	Q28.6	12.94	15.4	21.4
29	Q29.1	39.67	13.4	16.16
	Q29.2	12.94	15.4	16.4
	Q29.3	10.91	16.2	16.09
	Q29.4	18.35	15.4	18.13
	Q29.5	31.89	12.3	11.31
	Q29.6	14.97	14.7	17.03
30	Q30.1	23.77	15.4	16.07
	Q30.2	29.18	15.4	14.8
	Q30.3	34.93	11.1	11.67
	Q30.4	28.84	13.5	13.86
	Q30.5	27.83	13.9	11.64
	Q30.6	43.73	11.9	13.92
31	Q31.1	-15.5	20.1	20.23
	Q31.2	24.78	15.0	19.83
	Q31.3	9.89	16.6	18.13
	Q31.4	8.88	17.0	22.0
	Q31.5	29.86	13.1	13.9
	Q31.6	4.47	16.6	18.9
32	Q32.1	12.26	17.8	22.8
	Q32.2	26.81	14.2	13.92
	Q32.3	15.31	16.6	23.35
	Q32.4	5.83	18.2	21.37
	Q32.5	25.8	14.6	14.0
	Q32.6	8.88	17.0	22.0
33	Q33.1	41.36	10.7	12.89
	Q33.2	-24.97	21.7	24.0
	Q33.3	31.21	14.6	16.16
	Q33.4	2.44	17.4	18.31
	Q33.5	9.89	16.6	16.02
	Q33.6	17.34	15.8	18.0
34	Q34.1	29.18	15.4	18.0
	Q34.2	31.21	14.6	16.16
	Q34.3	27.15	16.2	16.73
	Q34.4	23.77	15.4	16.07
	Q34.5	12.94	15.4	13.9
	Q34.6	15.31	16.6	21.53
35	Q35.1	39.67	13.4	14.42
	Q35.2	16.32	16.2	19.83
	Q35.3	22.75	15.8	19.63
	Q35.4	44.91	9.4	12.22

Qwen Readability Analysis (continued)

	Q35.5	58.62	10.3	12.21
	Q35.6	24.78	15.0	17.92
36	Q36.1	8.88	17.0	18.0
	Q36.2	18.35	15.4	13.92
	Q36.3	11.92	15.8	16.21
	Q36.4	20.38	14.6	11.51
	Q36.5	18.35	15.4	13.92
	Q36.6	9.89	16.6	18.13
37	Q37.1	25.8	14.6	16.0
	Q37.2	39.67	13.4	17.9
	Q37.3	25.8	14.6	18.0
	Q37.4	10.91	16.2	24.98
	Q37.5	32.22	14.2	16.07
	Q37.6	15.31	16.6	17.89
38	Q38.1	36.63	14.6	15.02
	Q38.2	37.3	12.3	16.21
	Q38.3	46.78	10.7	11.4
	Q38.4	38.32	11.9	13.9
	Q38.5	28.84	13.5	11.51
	Q38.6	41.7	12.7	14.11
39	Q39.1	19.71	17.0	19.63
	Q39.2	28.5	11.5	12.49
	Q39.3	36.28	12.7	11.64
	Q39.4	41.7	12.7	14.11
	Q39.5	36.28	12.7	9.42
	Q39.6	13.95	15.0	19.33
40	Q40.1	15.31	16.6	23.35
	Q40.2	44.41	9.6	12.0
	Q40.3	33.24	13.8	16.02
	Q40.4	33.24	13.8	16.02
	Q40.5	26.81	14.2	13.92
	Q40.6	8.88	17.0	20.0
41	Q41.1	13.28	17.4	19.6
	Q41.2	27.83	13.9	18.31
	Q41.3	17.34	15.8	20.0
	Q41.4	19.53	12.9	16.43
	Q41.5	41.7	12.7	12.21
	Q41.6	18.35	15.4	16.02
42	Q42.1	42.72	12.3	14.0
	Q42.2	2.44	17.4	20.53
	Q42.3	36.96	10.3	12.49
	Q42.4	17.34	15.8	16.0
	Q42.5	19.37	15.0	16.09

Qwen Readability Analysis (continued)

	Q42.6	0.42	18.2	22.0
43	Q43.1	49.31	9.7	12.81
	Q43.2	25.8	14.6	14.0
	Q43.3	8.88	17.0	22.0
	Q43.4	5.83	18.2	21.37
	Q43.5	29.86	13.1	13.9
	Q43.6	3.46	17.0	23.27
44	Q44.1	33.92	11.5	13.13
	Q44.2	27.49	11.9	14.0
	Q44.3	50.16	11.5	10.3
	Q44.4	29.86	13.1	13.9
	Q44.5	25.8	14.6	14.0
	Q44.6	2.44	17.4	22.76
45	Q45.1	19.71	17.0	21.17
	Q45.2	9.55	14.7	15.31
	Q45.3	8.88	17.0	20.0
	Q45.4	55.58	11.5	16.27
	Q45.5	15.31	16.6	16.07
	Q45.6	-6.02	18.6	24.98
46	Q46.1	11.58	13.9	19.16
	Q46.2	28.17	15.8	16.55
	Q46.3	23.77	15.4	17.89
	Q46.4	27.83	13.9	16.09
	Q46.5	27.83	13.9	11.64
	Q46.6	2.44	17.4	20.53
47	Q47.1	43.73	11.9	13.92
	Q47.2	49.15	11.9	14.25
	Q67.3	25.8	14.6	16.0
	Q47.4	57.61	10.7	12.44
	Q47.5	4.47	16.6	16.4
	Q47.6	17.34	15.8	20.0
48	Q48.1	58.79	8.2	11.4
	Q48.2	50.16	11.5	14.11
	Q48.3	24.78	15.0	16.02
	Q48.4	35.27	13.1	11.81
	Q48.5	12.94	15.4	16.4
	Q48.6	37.3	12.3	16.21
49	Q49.1	22.75	15.8	17.9
	Q49.2	55.58	11.5	16.27
	Q49.3	39.67	13.4	19.63
	Q49.4	60.82	7.4	8.01
	Q49.5	28.84	13.5	11.51
	Q49.6	15.31	16.6	19.71

Qwen Readability Analysis (continued)

50	Q50.1	43.73	11.9	13.92
	Q50.2	25.8	14.6	20.0
	Q50.3	27.83	13.9	16.09
	Q50.4	50.16	11.5	14.11
	Q50.5	34.26	13.5	16.0
	Q50.6	41.7	12.7	17.92



**APPENDIX EA**

**CHATGPT WITHOUT PROMPT PATTERN CLASSIFICATION  
 AMBIGUITY ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>F/NF</b>	<b>Correct Categorization</b>	<b>Ambiguity Score (10-0)</b>	<b>Ambiguous Terms</b>
2	CH2.1	F	F	10	-
	CH2.2	F	F	10	-
	CH2.3	F	F	10	-
	CH2.4	F	F	10	-
	CH2.5	NF	NF	10	-
	CH2.6	NF	NF	9	all
6	CH6.1	F	F	10	-
	CH6.2	F	F	10	-
	CH6.3	F	F	8	appropriate, all
	CH6.4	F	F	9	all
	CH6.5	NF	NF	10	-
	CH6.6	NF	NF	10	-
14	CH14.1	F	F	10	-
	CH14.2	F	F	10	-
	CH14.3	F	F	9	proper
	CH14.4	F	F	10	-
	CH14.5	NF	NF	10	-
	CH14.6	NF	NF	9	immediately
20	CH20.1	F	F	9	all
	CH20.2	F	F	10	-
	CH20.3	F	F	9	real-time
	CH20.4	F	F	10	-
	CH20.5	NF	NF	8	appropriate, all
	CH20.6	NF	NF	10	-

**APPENDIX EB**

**CHATGPT WITHOUT PROMPT PATTERN SIMILARITY PASSIVENESS  
5WIH ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>SS</b>	<b>Passive Voice</b>	<b>Completeness</b>	<b>Completeness Score (0-6)</b>
2	CH2.1	0.265	no	What, Where, How	3
	CH2.2	0.724	yes	What, When, Where, How	4
	CH2.3	0.654	no	What	1
	CH2.4	0.754	no	What, Where, How	3
	CH2.5	0.569	no	What When	2
	CH2.6	0.724	no	What Why	2
6	CH6.1	0.881	yes	Who, What, Where	3
	CH6.2	0.813	yes	Who, What, When, How	4
	CH6.3	0.736	yes	What, How	2
	CH6.4	0.811	yes	Who What	2
	CH6.5	0.832	no	Who, What, How	3
	CH6.6	0.811	yes	What, Why	2
14	CH14.1	0.719	no	Who, What, When, How	4
	CH14.2	0.712	yes	What, Where, How	3
	CH14.3	0.783	yes	What, When, Why	3
	CH14.4	0.813	no	Who, What, When, Where	4
	CH14.5	0.765	no	Who, What	2
	CH14.6	0.523	no	What, When	2
20	CH20.1	0.765	no	Who, What	2
	CH20.2	0.732	no	What	1
	CH20.3	0.905	no	Who, What, When, Where	4
	CH20.4	0.788	no	What, Why, How	3
	CH20.5	0.818	yes	What, Why	2

ChatGPT Without Prompt Pattern Similarity Passiveness 5W1H Analysis (continued)

	CH20.6	0.866	yes	What, When, How	3
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**APPENDIX EC**

**CHATGPT WITHOUT PROMPT PATTERN READABILITY ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>Felsch-Kincaid Ease</b>	<b>Felsch-Kincaid Grade Level</b>	<b>Gunning Fog</b>
2	CH2.1	52.19	10.7	11.81
	CH2.2	3.46	17.0	16.21
	CH2.3	66.74	7.2	8.28
	CH2.4	42.72	12.3	18.0
	CH2.5	57.27	8.8	8.46
	CH2.6	68.77	6.4	9.85
6	CH6.1	41.7	12.7	14.11
	CH6.2	33.24	13.8	16.02
	CH6.3	32.22	14.2	17.89
	CH6.4	55.58	11.5	12.93
	CH6.5	23.77	15.4	21.53
	CH6.6	39.67	13.4	12.68
14	CH14.1	42.88	10.1	15.03
	CH14.2	41.7	12.7	12.21
	CH14.3	33.24	13.8	12.21
	CH14.4	50.16	11.5	14.11
	CH14.5	34.26	13.5	16.0
	CH14.6	9.89	16.6	16.02
20	CH20.1	33.92	11.5	14.8
	CH20.2	34.93	11.1	13.49
	CH20.3	36.28	12.7	13.87
	CH20.4	25.96	12.5	16.77
	CH20.5	26.47	12.3	17.13
	CH20.6	29.18	15.4	16.4

**APPENDIX ED**

**GEMINI WITHOUT PROMPT PATTERN CLASSIFICATION AMBIGUITY  
ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>F/NF</b>	<b>Correct Categorization</b>	<b>Ambiguity Score (10-0)</b>	<b>Ambiguous Terms</b>
2	G2.1	F	F	10	-
	G2.2	F	F	10	-
	G2.3	F	F	10	-
	G2.4	NF	NF	9	few
	G2.5	NF	NF	10	-
	G2.6	NF	NF	9	all
6	G6.1	F	F	10	-
	G6.2	F	F	10	-
	G6.3	F	F	10	-
	G6.4	F	F	10	-
	G6.5	NF	NF	9	efficient
	G6.6	NF	NF	9	all
14	G14.1	F	F	10	-
	G14.2	F	F	10	-
	G14.3	F	F	10	-
	G14.4	F	F	10	-
	G14.5	NF	NF	9	intuitive
	G14.6	NF	NF	9	efficient
20	G20.1	F	F	9	all
	G20.2	F	F	10	-
	G20.3	F	F	9	where applicable
	G20.4	NF	NF	9	all
	G20.5	NF	NF	10	-
	G20.6	NF	NF	10	-

**APPENDIX EE**

**GEMINI WITHOUT PROMPT PATTERN SIMILARITY PASSIVENESS**

**5WIH ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>SS</b>	<b>Passive Voice</b>	<b>Completeness</b>	<b>Completeness Score (0-6)</b>
2	G2.1	0.753	yes	What, Where	2
	G2.2	0.611	yes	What	1
	G2.3	0.746	yes	What, When, Where, How	4
	G2.4	0.648	no	What, How	2
	G2.5	0.411	yes	What, Why, How	3
	G2.6	0.744	yes	What, Where, How	3
6	G6.1	0.884	yes	Who, What, Why	3
	G6.2	0.801	no	Who, What Where	3
	G6.3	0.758	no	Who, What, Where, How	4
	G6.4	0.835	no	Who, What, How	3
	G6.5	0.850	no	What, How	2
	G6.6	0.727	no	Who, What	2
14	G14.1	0.799	no	Who, What, Where	3
	G14.2	0.522	no	Who, What	2
	G14.3	0.717	no	Who, What, Where	3
	G14.4	0.820	yes	Who, What, How	3
	G14.5	0.822	no	Who, What, How	3
	G14.6	0.793	no	What, How	2
20	G20.1	0.737	no	What, How	2
	G20.2	0.786	yes	What	1
	G20.3	0.593	no	What, How	2
	G20.4	0.882	yes	Who, What, How	3

Gemini Without Prompt Pattern Similarity Passiveness 5W1H Analysis (continued)

G20.5	0.892	yes	Who, What, When	3
G20.6	0.867	no	What, Why	2



**APPENDIX EF**

**GEMINI WITHOUT PROMPT PATTERN READABILITY ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>Felsch-Kincaid Ease</b>	<b>Felsch-Kincaid Grade Level</b>	<b>Gunning Fog</b>
2	G1.1	48.81	9.9	11.31
	G2.2	36.28	12.7	13.87
	G2.3	9.22	18.9	18.34
	G2.4	56.25	9.1	11.33
	G2.5	56.25	9.1	11.33
	G2.6	26.14	16.6	19.77
6	G6.1	43.73	11.9	16.02
	G6.2	12.94	15.4	13.9
	G6.3	37.3	12.3	15.04
	G6.4	27.83	13.9	16.09
	G6.5	7.86	17.4	19.83
	G6.6	28.17	15.8	16.55
14	G14.1	33.24	13.8	19.6
	G14.2	51.85	8.8	9.25
	G14.3	56.25	9.1	11.33
	G14.4	24.11	17.4	11.95
	G14.5	34.26	13.5	16.47
	G14.6	40.69	13.1	18.09
20	G20.1	41.36	10.7	13.41
	G20.2	41.36	10.7	12.89
	G20.3	41.87	10.5	9.8
	G20.4	27.83	13.9	18.31
	G20.5	9.22	18.9	19.77
	G20.6	25.8	14.6	16.0

**APPENDIX EG**

**DEEPSEEK WITHOUT PROMPT PATTERN CLASSIFICATION  
 AMBIGUITY ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>F/NF</b>	<b>Correct Categorization</b>	<b>Ambiguity Score (10-0)</b>	<b>Ambiguous Terms</b>
2	D2.1	F	10	10	-
	D2.2	F	F	10	-
	D2.3	F	F	10	-
	D2.4	NF	NF	10	-
	D2.5	NF	NF	10	-
	D2.6	NF	NF	10	-
6	D6.1	F	F	10	-
	D6.2	F	F	10	-
	D6.3	F	F	10	-
	D6.4	NF	NF	10	-
	D6.5	NF	NF	10	-
	D6.6	NF	NF	9	all
14	D14.1	F	F	10	-
	D14.2	F	F	10	-
	D14.3	F	F	10	-
	D14.4	NF	NF	10	-
	D14.5	NF	NF	10	-
	D14.6	NF	NF	10	-
20	D20.1	F	F	9	all
	D20.2	F	F	10	-
	D20.3	F	F	10	-
	D20.4	NF	NF	10	-
	D20.5	NF	NF	9	proper
	D20.6	NF	NF	10	-

## APPENDIX EH

### DEEPSEEK WITHOUT PROMPT PATTERN SIMILARITY PASSIVENESS

#### 5WIH ANALYSIS

US#	REQ#	SS	Passive Voice	Completeness	Completeness Score (0-6)
2	D2.1	0.706	no	What, Where, How	3
	D2.2	0.710	yes	Who, What, When, Where	4
	D2.3	0.407	no	What, How	2
	D2.4	0.751	yes	What, Where, Why	3
	D2.5	0.738	no	What	1
	D2.6	0.710	no	What	1
6	D6.1	0.835	no	Who, What, Why	3
	D6.2	0.866	no	Who, What, How	3
	D6.3	0.857	no	Who, What, Where	3
	D6.4	0.758	no	What, How	2
	D6.5	0.834	no	What	1
	D6.6	0.683	yes	What	1
14	D14.1	0.715	no	Who, What	2
	D14.2	0.738	no	Who, What	2
	D14.3	0.816	no	Who, What	2
	D14.4	0.360	no	What, Why	2
	D14.5	0.700	no	What	1
	D14.6	0.799	yes	What, Why	2
20	D20.1	0.753	no	Who, What	2
	D20.2	0.680	no	Who, What	2
	D20.3	0.829	no	Who, What, Why	3
	D20.4	0.838	yes	What, When	2
	D20.5	0.805	yes	What, Why	2
	D20.6	0.702	no	What, Why	2

**APPENDIX EI**

**DEEPSEEK WITHOUT PROMPT PATTERN READABILITY ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>Felsch-Kincaid Ease</b>	<b>Felsch-Kincaid Grade Level</b>	<b>Gunning Fog</b>
2	D2.1	59.64	9.9	12.0
	D2.2	22.41	13.9	14.0
	D2.3	63.36	6.4	8.2
	D2.4	58.28	8.4	8.28
	D2.5	41.36	10.7	11.35
	D2.6	41.7	12.7	16.02
6	D6.1	47.79	10.3	11.33
	D6.2	37.3	12.3	11.51
	D6.3	61.67	9.1	11.64
	D6.4	19.37	15.0	16.09
	D6.5	63.7	8.4	13.9
	D6.6	44.75	11.5	11.64
14	D14.1	54.39	7.8	10.46
	D14.2	24.78	15.0	16.02
	D14.3	40.35	11.1	14.17
	D14.4	44.91	9.4	8.01
	D14.5	72.16	7.2	11.4
	D14.6	43.73	11.9	13.92
20	D20.1	34.42	11.3	13.3
	D20.2	69.28	6.2	9.91
	D20.3	30.87	12.7	14.0
	D20.4	29.86	13.1	13.9
	D20.5	35.95	10.7	12.0
	D20.6	45.42	9.2	12.49

## APPENDIX EJ

### CLAUDE WITHOUT PROMPT PATTERN CLASSIFICATION AMBIGUITY ANALYSIS

US#	REQ#	F/NF	Correct Categorization	Ambiguity Score (10-0)	Ambiguous Terms
2	C2.1	F	F	10	-
	C2.2	F	F	10	-
	C2.3	F	F	10	-
	C2.4	F	F	10	-
	C2.5	NF	NF	10	-
	C2.6	NF	NF	10	-
6	C6.1	F	F	10	-
	C6.2	F	F	10	-
	C6.3	F	F	10	-
	C6.4	F	F	10	-
	C6.5	NF	NF	10	-
	C6.6	NF	NF	9	quickly
14	C14.1	F	F	10	-
	C14.2	F	F	10	-
	C14.3	F	F	9	as needed
	C14.4	F	F	10	-
	C14.5	NF	NF	9	immediately
	C14.6	NF	NF	9	all
20	C20.1	F	F	9	all
	C20.2	F	F	10	-
	C20.3	F	F	10	-
	C20.4	F	F	10	-
	C20.5	NF	NF	10	-
	C20.6	NF	NF	10	-

**APPENDIX EK**

**CLAUDE WITHOUT PROMPT PATTERN SIMILARITY PASSIVENESS**

**5WIH ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>SS</b>	<b>Passive Voice</b>	<b>Completeness</b>	<b>Completeness Score (0-6)</b>
2	C2.1	0.618	yes	Who, What	2
	C2.2	0.641	yes	Who, What	2
	C2.3	0.747	yes	What, When	2
	C2.4	0.792	yes	What	1
	C2.5	0.650	no	What, Why	2
	C2.6	0.719	no	What, Where	2
6	C6.1	0.890	yes	Who, What	2
	C6.2	0.785	no	Who, What How	3
	C6.3	0.877	yes	Who, What, When	3
	C6.4	0.509	no	Who, What, Why, How	4
	C6.5	0.910	no	Who, What, When, Where	4
	C6.6	0.792	no	Who, What, How	3
14	C14.1	0.830	no	Who, What, Where	3
	C14.2	0.675	no	Who, What, Where, How	4
	C14.3	0.830	no	Who, What, When, Why	4
	C14.4	0.378	no	What, How	2
	C14.5	0.800	yes	What, When, How	3
	C14.6	0.796	no	Who, What, When, Why	4
20	C20.1	0.902	yes	Who, What	2
	C20.2	0.891	yes	What	1
	C20.3	0.853	no	Who, What, Why	3
	C20.4	0.936	yes	What	1
	C20.5	0.862	yes	What, When	2
	C20.6	0.900	yes	What	1

**APPENDIX EL**

**CLAUDE WITHOUT PROMPT PATTERN READABILITY ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>Felsch-Kincaid Ease</b>	<b>Felsch-Kincaid Grade Level</b>	<b>Gunning Fog</b>
2	C2.1	64.71	8.0	11.33
	C2.2	47.79	10.3	14.0
	C2.3	1.09	15.8	15.31
	C2.4	38.32	11.9	13.9
	C2.5	13.95	15.0	19.33
	C2.6	30.87	12.7	14.0
6	C6.1	34.26	13.5	16.0
	C6.2	25.8	14.6	16.0
	C6.3	37.64	14.2	16.4
	C6.4	46.74	8.7	11.78
	C6.4	31.21	14.6	14.42
	C6.5	8.88	17.0	18.0
14	C14.1	41.7	12.7	16.02
	C14.2	25.46	12.7	14.8
	C14.3	15.31	16.6	19.71
	C14.4	19.53	12.9	16.43
	C14.5	-7.04	19.0	22.34
	C14.6	7.86	17.4	21.73
20	C20.1	39.67	13.4	16.16
	C20.2	24.78	15.0	16.02
	C20.3	1.43	17.8	20.23
	C20.4	37.64	14.2	19.6
	C20.5	15.31	16.6	17.89
	C20.6	17.34	15.8	20.0

**APPENDIX EM**

**QWEN WITHOUT PROMPT PATTERN CLASSIFICATION AMBIGUITY  
ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>F/NF</b>	<b>Correct Categorization</b>	<b>Ambiguity Score (10-0)</b>	<b>Ambiguous Terms</b>
2	Q2.1	F	F	10	-
	Q2.2	F	F	10	-
	Q2.3	F	F	10	-
	Q2.4	NF	NF	10	-
	Q2.5	NF	NF	10	-
	Q2.6	NF	NF	8	proper, all
6	Q6.1	F	F	10	-
	Q6.2	F	F	10	-
	Q6.3	F	F	9	all
	Q6.4	NF	NF	10	-
	Q6.5	NF	NF	10	-
	Q6.6	NF	NF	9	secure
14	Q14.1	F	F	9	intuitive
	Q14.2	F	F	9	-
	Q14.3	F	F	10	-
	Q14.4	F	F	10	immediately
	Q14.5	NF	NF	9	responsive
	Q14.6	NF	NF	10	-
20	Q20.1	F	F	9	all
	Q20.2	F	F	10	-
	Q20.3	F	F	10	-
	Q20.4	F	F	9	all
	Q20.5	NF	NF	10	-
	Q20.6	NF	NF	9	real-time

**APPENDIX EN**

**QWEN WITHOUT PROMPT PATTERN SIMILARITY PASSIVENESS  
5WIH ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>SS</b>	<b>Passive Voice</b>	<b>Completeness</b>	<b>Completeness Score (0-6)</b>
2	Q2.1	0.323	no	What, Where, How	3
	Q2.2	0.676	no	Who, What, When, Where	4
	Q2.3	0.775	no	What, Why	2
	Q2.4	0.657	no	What, Why	2
	Q2.5	0.646	no	Who, What, When	3
	Q2.6	0.710	no	Who, What, How	3
6	Q6.1	0.760	no	Who, What	2
	Q6.2	0.872	yes	What, When, Where	3
	Q6.3	0.810	no	Who, What, Why	3
	Q6.4	0.848	no	Who, What, Where, How	4
	Q6.5	0.813	no	What, Where, Why, How	4
	Q6.6	0.778	no	Who, What, How	3
14	Q14.1	0.611	no	Who, What, Where	3
	Q14.2	0.647	no	Who, What, Where, How	4
	Q14.3	0.829	no	Who, What, Why	3
	Q14.4	0.823	no	Who, What, When, How	4
	Q14.5	0.777	yes	Who, What, Why, How	4
	Q14.6	0.770	no	Who, What, How	3
	Q20.1	0.807	yes	Who, What, When	3

Qwen Without Prompt Pattern Similarity Passiveness 5W1H Analysis (continued)

20	Q20.2	0.766	no	Who, What, Why, How	4
	Q20.3	0.858	no	Who, What, Why	3
	Q20.4	0.812	no	Who, What, Why	3
	Q20.5	0.812	yes	Who, What, Why, How	4
	Q20.6	0.786	no	Who, What, Why, How	4



**APPENDIX EO**

**QWEN WITHOUT PROMPT PATTERN READABILITY ANALYSIS**

<b>US#</b>	<b>REQ#</b>	<b>Felsch-Kincaid Ease</b>	<b>Felsch-Kincaid Grade Level</b>	<b>Gunning Fog</b>
2	Q2.1	66.23	7.4	9.84
	Q2.2	39.67	13.4	14.42
	Q2.3	52.19	10.7	11.81
	Q2.4	35.61	15.0	19.69
	Q2.5	51.18	11.1	14.0
	Q2.6	11.25	18.2	22.71
6	Q6.1	61.33	7.2	10.0
	Q6.2	46.44	15.0	14.41
	Q6.3	29.18	15.4	18.0
	Q6.4	27.83	13.9	16.09
	Q6.5	25.8	14.6	16.0
	Q6.6	58.79	8.2	6.6
14	Q14.1	45.93	9.0	9.28
	Q14.2	57.27	8.8	9.89
	Q14.3	59.64	9.9	10.0
	Q14.4	36.63	14.6	16.55
	Q14.5	22.75	15.8	17.9
	Q14.6	1.43	17.8	22.34
20	Q20.1	45.42	9.2	12.49
	Q20.2	47.28	10.5	12.65
	Q20.3	55.58	11.5	14.6
	Q20.4	38.82	11.7	13.94
	Q20.5	49.31	9.7	12.81
	Q20.6	31.38	12.5	14.08