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Improving Clarity and Accessibility in Public Procurement Documents: An AI–Powered Approach to Plain Writing Compliance

December 2023

Capt Mayra Hernandez, USAF

Thesis Advisors: Lt Col Daniel Finkenstadt, USAF
Dr. Erik Helzer, Associate Professor

Department of Defense Management

Naval Postgraduate School

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Prepared for the Naval Postgraduate School, Monterey, CA 93943

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ABSTRACT

This research addressed the pervasive issue of complex and unclear communication in Department of Defense procurement processes, which hinders transparency and poses a barrier to entry in public sector markets. Utilizing a two-phase approach, this research sought to enhance public procurement communications and align them with the Plain Writing Act. Phase 1 utilized text analysis software and artificial intelligence (AI) tools to refine procurement documents, focusing on clarity and adherence to Plain Writing Principles. The analysis revealed substantial variations in complexity and readability levels, with most Original documents not easily understood by the general public. AI-Refined versions effectively improved readability and comprehension, demonstrating AI's potential to simplify complex language and enhance document accessibility.

Phase 2 assessed stakeholder perceptions of Original, AI-Refined, and AI/Human-Refined documents through surveys. A key finding was the universal preference for AI-enhanced versions over Original documents. Purely AI-driven revisions were perceived as more effective and better aligned with plain writing standards than those involving human collaboration. Overall, the research highlights AI's potential as an innovative approach to improve the clarity and effectiveness of public procurement communications, making complex information more understandable and accessible to a broader audience.

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ABOUT THE AUTHORS

Captain Mayra Hernandez is a Contracting Officer in the United States Air Force, commissioned through Officer Training School in September 2019. Her career has spanned diverse assignments in Virginia, Texas, Washington, and Nebraska, contributing to her expertise in military procurement and operations. Upon graduation from the Naval Postgraduate School, Capt Hernandez will join the 773rd Enterprise Sourcing Squadron in San Antonio, Texas. Outside of her professional life, she is supported by her husband, Jocef, and together they are proud parents of their son, Caleb.

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LIST OF ACRONYMS AND ABBREVIATIONS

AI	Artificial Intelligence
ASPA	Armed Services Procurement Act
B2B	Business-to-Business
B2G	Business-to-Government
CICA	Competition in Contracting Act
CPL	Center for Plain Language
DoD	Department of Defense
DoDI	Department of Defense Instruction
FAR	Federal Acquisition Regulation
FARA	Federal Acquisition Reform Act
FASA	Federal Acquisition Streamlining Act
FDIC	Federal Deposit Insurance Corporation
FPASA	Federal Property and Administrative Services Act
GAO	Government Accountability Office
GPT	Generative Pre-Trained Transformer
LLM	Large Language Model
M	Mean
MANOVA	Multivariate Analysis of Variance
NAAL	National Assessment of Adult Literacy
NCES	National Center for Education Statistics
NLI	National Literacy Institute
NLP	Natural Language Processing
NPS	Naval Postgraduate School
ODAM	Office of the Director of Administration and Management
OECD	Organization for Economic Cooperation and Development
OMB	Office of Management and Budget
PIA	Procurement Integrity Act

PIAAC	Program for the International Assessment of Adult Competencies
PLAIN	Plain Language Action and Information Network
PSF	Public Spend Forum
PWA	Plain Writing Act of 2010
PWS	Performance Work Statement
RFP	Request for Proposal
RFQ	Request for Quotation
SD	Standard Deviation
SOW	Statement of Work
TINA	Truth in Negotiations Act
U.S.C.	United States Code
VT	VisibleThread
WHS	Washington Headquarters Services

I. INTRODUCTION

The Department of Defense (DoD) has been grappling with a significant challenge within its procurement processes, stemming from poor communication. This challenge is characterized by unclear contracting language, convoluted terminology, and vague guidance, as highlighted by a 2021 Public Spend Forum report. The ramifications of these communication deficiencies extend beyond the DoD itself, affecting the vendor markets it engages with and impeding the department's ability to comprehensively grasp and effectively communicate requirements, expectations, and concerns.

This issue is far from being an isolated incident; rather, it is a widely acknowledged predicament with profound implications. The magnitude of this challenge has been extensively discussed in numerous *Contract Management* articles, as well as in insights gleaned from interviews conducted by the Government Accountability Office (GAO; Barton, 2015a, 2015b; GAO, 2010, 2011a, 2013a, 2013b, 2015a, 2017; Jeffery, 2017; Lohier et al., 2019; Salmeri et al., 2015). Furthermore, the 2021 Public Spend Forum report titled *Barriers to Entry in Public Sector Markets* prominently identifies this problem as one of the top five obstacles encountered by new entrants in public sector markets, as reported by a respondent pool of 1,116 suppliers (R. Sharma, email to author, September 17, 2023).

The consequences of these communication deficiencies extend throughout various facets of the defense industry, impacting more than just the procurement process. They hinder the understanding and navigation of the contracting landscape for potential contractors, acting as a barrier to entry (Office of the Under Secretary of Defense for Acquisition and Sustainment [OUSD(A&S)], 2022). Consequently, this barrier contributes to consolidation among aerospace and defense prime contractors, resulting in diminished competition, elevated sourcing risks, and vulnerabilities in the supply chain (OUSD[A&S], 2022). Furthermore, the lack of clarity in procurement documents results in unnecessary costs and post-selection (post-award) problems, affecting both established enterprises and smaller businesses alike (Barton, 2015a, 2015b).

Addressing this communication challenge is imperative, as it plays a critical role in promoting fair competition, ensuring a resilient supply chain, fostering innovation, and safeguarding national security (OUSD(A&S)], 2022).

In recognizing the paramount importance of clear and effective communication, it is crucial to appreciate its role as the cornerstone of successful interactions within the intricate landscape of DoD procurement. The desire to improve the clarity of government documents has been a concern since before the 1970s and reached a significant milestone in 2010 with the passage of Public Law No. 111-274 by the 111th Congress. This legislation, commonly referred to as the Plain Writing Act of 2010 (PWA), underscores the importance of clarity in communication (PWA, 2010). Moreover, recent advancements in the realm of plain writing and public engagement with government communications have culminated in the introduction of the Clear and Concise Content Act of 2023 by the Homeland Security and Government Affairs committee during the tenure of the 118th Congress (Senate Committee on Homeland Security & Governmental Affairs, 2023).

As delineated in the Plain Writing Act itself, the principal objective of the legislation is to enhance the effectiveness and accountability of federal agencies by promoting "clear Government communication that the public can understand and use" (PWA, 2010). This fundamental purpose is further reinforced by the legislative history of the act. The report (H.R. Rep. No. 111-432, 2010) accompanying the bill's introduction by the House of Representatives, specifically the section titled "Background and Need for Legislation," highlights a prevalent issue: government documents that are often complex and challenging to comprehend without clear writing (H.R. Rep. No. 111-432, 2010). Despite previous intermittent efforts by agencies to adopt plain language in public documents, the momentum for such initiatives has been inconsistent. The introduction of H.R. 946, the Plain Writing Act of 2010, proposed a more comprehensive approach. The bill aimed to standardize the use of plain language across a wide array of government documents, ensuring that communications such as letters, forms, and other documents received by the public are "written in a clear, understandable way" (PWA, 2010).

Despite these legislative efforts, the DoD continues to grapple with inadequate communication practices within its procurement procedures, a situation confirmed by the 2021 Public Spend Forum report. This predicament hinders collaborative efforts, undermines potential contractors' abilities to navigate the contracting landscape, and acts as a formidable barrier to entry in public sector markets (Barton 2015a, 2015b; OUSD(A&S)], 2022; Josephson et al., 2018; Lohier et al., 2019; Public Spend Forum [PSF], 2021).

In addressing this issue of unclear communications, Chapter II presents a condensed set of principles derived from the Federal Plain Language Guidelines. Analyzing procurement communications through these principles reveals the degree of alignment with plain writing standards and identifies avenues for improvement. This framework distills core tenets into six key areas: audience-focused writing, clear organization, simple language, concise language, active voice, and reader-friendly design (as seen in Table 1). This approach establishes a methodology for assessing and enhancing clarity in DoD communications.

Table 1. Plain Writing Principles. Adapted from The Plain Language Action Network (n.d.-b).

Plain Writing Principle	Description
Audience-Focused Writing	Write using the language your intended audience understands and relates to. Consider their knowledge level.
Clear Organization	Present information logically starting with the main point and purpose. Use headings to guide readers through sections.
Simple Language	Use simple, commonly understood words and phrases. Avoid unnecessary jargon. Use present-tense verbs. Use "must" for clarity. Place words carefully to prevent ambiguity.
Concise Language	Use short sections, sentences, and words. Eliminate unnecessary language. Lead with key details.
Active Voice	Use active voice. Avoid turning verbs into nouns. Make clear who is performing the action.
Reader-Friendly Design	Incorporate lists, tables, and visual elements to simplify and clarify complex information. Use easy-to-scan formatting.

A. PROJECT OBJECTIVES AND PURPOSE

This research serves a dual purpose: it addresses the pervasive communication challenges in government procurement processes and proposes viable, actionable solutions aligned with the directives of the Plain Writing Act of 2010. By analyzing the effectiveness of official communications as mandated by the act, this study identifies significant areas for enhancement according to the principles of plain writing.

Drawing from diverse insights in government and industry reports, as well as prior scholarly work, this study examines and tackles the complexities in government procurement communication (Center for Plain Language [CPL], 2018, 2019, 2020, 2021, 2022; OUSD(A&S)], 2022; GAO, 2010, 2011a, 2011b, 2011c, 2013a, 2013b, 2013c,

2014a, 2014b, 2014c, 2014d, 2015a, 2015b, 2017; Josephson et al., 2018; PSF, 2021). In this endeavor, a comprehensive suite of objectives is set forth to elevate the perceived effectiveness of communication in this domain.

The principal objective of this research is to determine and validate the perceived effectiveness of public procurement communications based on the six Plain Writing Principles. This is achieved through a two-phase methodology.

Ultimately, empirical evidence is presented in this study regarding stakeholder perceptions of communication effectiveness and the synergistic potential of artificial intelligence (AI) tools and human expertise in refining procurement communications. By exploring how these tools collaboratively address communicative shortcomings and implement corrective measures, the study seeks to establish a streamlined, consistent approach, that ensures government procurement communications adhere to the tenets of the Plain Writing Act.

To achieve these objectives, the research addresses the following pivotal questions:

1. a. How does public procurement communication score in terms of readability and comprehension when analyzed by leading text analysis software using commercial standard measures?

   b. How does text generated by commercially available Large Language Models (LLMs), prompted with the six Plain Writing Principles, impact the readability and comprehension scores of these communications, as determined by the same text analysis software used in Research Question 1a?
2. What is the rate of perceived effectiveness in public procurement communications according to the six Plain Writing Principles?
3. What is the comparative impact of AI-driven and human-involved refinements on the perceived effectiveness of public procurement communications?
4. How do job role and education level influence perceived effectiveness across human-generated (Original), AI-Refined, and AI/Human-Refined public procurement communications?

B. METHODOLOGY

This research adopts a comprehensive and structured methodology to evaluate and enhance the communication challenges in the DoD procurement processes, aligned with

the Plain Writing Act of 2010. The methodology is divided into two distinct phases, each focused on addressing specific research questions and contributing to a holistic understanding of the communication challenges and opportunities in this domain. This section presents an overview of the research approach and sets the stage for comprehensive analyses and discussions in subsequent chapters.

1. Phase 1: Empirical Text Analysis

The first phase employs empirical text analysis to assess the readability and comprehension of DoD procurement documents. This begins with the use of VisibleThread's text analysis software to establish a quantitative baseline for document readability against commercial standards. The study then leverages LLMs, specifically ChatGPT, to refine these documents. These AI-enhanced documents are re-analyzed using the same text analysis software to gauge the impact of the AI modifications. The final stage involves subject matter expert editors' review of the AI-Refined documents for contextual accuracy and completeness, ensuring the reliability of AI interventions. The documents undergo a subsequent automated analysis post-review, providing a comprehensive understanding of the cumulative effects of AI and human refinements on readability and comprehension.

2. Phase 2: Survey-Based Analysis of Plain Writing Principles

The second phase entails conducting a survey-based analysis to ascertain the perceptions regarding the application of Plain Writing Principles in public procurement communications. The research team gathered insights by distributing a survey to field experts and stakeholders. The survey is designed to evaluate the combined effect of AI and human contributions on the quality and adherence of government procurement documents to the principles of plain writing. Additionally, this phase delves into other research questions, such as the influence of professional background and education level on perceived communication effectiveness, the comparative impact of AI-driven versus human-involved refinements, and the overall effectiveness of integrating AI and human efforts in improving document quality.

Employing this phased approach seeks to bridge the gap between prescribed Plain Writing Principles and the actual communication practices in government procurement. The findings from these phases inform strategies for improving clarity and compliance in government communications, ultimately fostering a more transparent, efficient, and equitable procurement process.

C. BENEFITS

The anticipated benefits of this research are substantial and far-reaching, offering significant advancements in government procurement communication strategies. This study bridges the gap between the theoretical tenets of the Plain Writing Act of 2010 and their practical implementation in procurement processes, thus equipping agencies with actionable insights for communication enhancement. This systematic evaluation and refinement approach targets specific areas for improvement, fostering more transparent and efficient interactions.

A key benefit arises from the detailed investigation of LLMs and text analysis software. This research underscores the significant impact that AI-driven refinements can have on the perceived effectiveness of public procurement communications. By harnessing these technologies, the study provides government entities with innovative means to adhere to the Plain Writing Act's mandates and achieve commercial readability and complexity standards, thereby elevating the quality of documentation and enhancing stakeholder engagement.

Furthermore, this research is focused on exploring how individual job roles and education levels influence communication perceptions, with an expectation to uncover variations in effectiveness across diverse groups. This aspect is instrumental in cultivating a more inclusive and accessible procurement environment, thus promoting effective communication for all stakeholders, ensuring fair competition, and facilitating collaboration.

The integration of AI and human expertise in refining communications presents significant cost benefits. This synergy minimizes misunderstandings and sharpens the

accuracy of procurement documents, leading to more efficient use of resources. Such improvements underscore fiscal responsibility and advance operational excellence.

Serving as a crucial resource for government agencies, this study lays out a strategic roadmap for utilizing advanced tools and techniques to refine procurement communication practices. The insights garnered from this research are pivotal in fostering innovation and underscoring a commitment to transparency, efficiency, and excellence in public service.

D. SUMMARY

In summarizing the context, challenges, and objectives outlined in this chapter, the research conducts a methodical investigation into the communication practices within the DoD's procurement processes. Utilizing a dual-phase methodology, the study seeks to dissect and refine these practices, aligning them with the principles of the Plain Writing Act and commercial communication standards, through the use of text analysis software and LLMs.

Chapter II offers a thorough Background and Literature Review, delving into the historical and current challenges in procurement communication. This review provides a foundation for understanding the evolution of the Plain Writing Act and the pivotal role of technology in enhancing communicative clarity. Following this, the Methods and Data chapter details the study's two-phased analytical approach, beginning with empirical text analysis focused on readability and comprehension, and proceeding to a survey-based analysis aligned with Plain Writing Principles.

The Results and Analysis chapter presents the empirical findings from this two-phased approach. It details a comparative analysis of the effects of AI and human intervention on public procurement communications. Additionally, this chapter explores how job roles and education levels influence perceptions of communication effectiveness, offering a comprehensive view of audience engagement.

Through this strategic approach, outlined in subsequent chapters, the study strives to transcend mere compliance with plain language mandates. It seeks to foster a culture where clarity, efficiency, and transparency are cornerstones to procurement

communications. This commitment upholds the principles of fair competition and drives innovation, playing a crucial role in safeguarding the integrity of national security efforts.

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II. BACKGROUND AND LITERATURE REVIEW

This chapter presents an in-depth analysis of the factors impacting communication in the public procurement process. It delves into the intricacies of regulatory frameworks and organizational factors that contribute to communication challenges, highlighting the inherent barriers to entry within the business-to-government (B2G) market. This review methodically traces the evolution of the plain language movement, beginning from its early advocates before the 1970s to the expansive commitment seen in the 2020s. A critical examination of key legislation, including the Plain Writing Act of 2010 and the Clear and Concise Content Act of 2023, highlights the ongoing efforts to enhance clarity in government communication. The chapter further elucidates the concept of plain writing, analyzing its pivotal role in enhancing readability and comprehension, particularly in the context of adult literacy in the United States. Additionally, it underscores the transformative potential of LLMs in text analysis, exploring the integration of natural language processing and software tools such as the Flesch Scoring Method. This thorough review establishes a foundational understanding of the complexities and evolving dynamics of communication within public procurement.

A. FACTORS CONTRIBUTING TO POOR COMMUNICATION WITHIN THE PUBLIC PROCUREMENT PROCESS

Effective communication is essential for the success of any process, and public procurement is no exception. In this section, the discussion highlights and examines key factors contributing to poor communication within the public procurement process. This analysis involves scrutinizing precedent events and structural variables, leading to the uncovering of complexities that hinder effective communication and underscoring the importance of addressing these challenges.

1. Regulatory Framework and Communication Constraints

In today's landscape of public procurement, regulatory frameworks wield significant influence, shaping the nature and extent of communication between vendors and procurement officers (Josephson et al., 2018). These frameworks, exemplified by the Federal Acquisition Regulation (FAR), define the rules of engagement for

communication within procurement processes (Josephson et al., 2018; Lohier et al., 2019). However, these regulations can also introduce challenges to effective communication strategies by limiting opportunities for relationship-building and marketing efforts (Josephson et al., 2018; Lohier et al., 2019).

From 1815 to 1860, government contracting underwent a significant transformation, leading to a more structured contracting process (Nagle, 1992). To ensure accountability and reasonable prices, Congress and various government departments implemented formalized procedures (Nagle, 1992). This emphasis on accountability necessitated meticulous recordkeeping and the creation of multiple copies of procurement-related documents (Nagle, 1992). Similarly, the quest for reasonable prices led to mandates for competition and advertisement, with only rare exceptions (Nagle, 1992). During this era, a symbiotic relationship evolved between the executive branch's regulatory guidelines and Congressional statutes, fostering an ongoing exchange of ideas that continues to shape modern procurement practices (Nagle, 1992).

Within the U.S. federal procurement system, a multitude of statutes and international agreements govern the landscape (Kovacic, 1992). The FAR, codified in Title 48 of the Code of Federal Regulations, predominates over federal procurements (Halchin, 2015). Its scope extends to executive departments, military departments, and independent establishments as defined by relevant statutes, along with wholly owned government corporations (FAR 1.104, 2023; Federal Deposit Insurance Corporation [FDIC], n.d.). Each of these entities also has distinct supplements to the FAR, catering to their specific procurement needs (FAR 1.3, 2023; FDIC, n.d.).

The foundational statutes underpinning modern federal procurement practices include several key acts that have significantly shaped the landscape. Thai et al. (2007) underscore the pivotal role of these statutes in guiding and refining the procurement process.

The Federal Property and Administrative Services Act of 1949 (FPASA) offers a streamlined framework for federal procurement and associated functions, playing a crucial role in enhancing communication between government agencies and suppliers. By defining processes for contracting, inspections, specification development, and more,

FPASA ensures efficient and well-structured communication in the procurement process. This, in turn, promotes transparency and effective dialogue between government entities and suppliers, facilitating smoother procurement operations (FPASA, 1949).

Similarly, the Armed Services Procurement Act of 1981 (ASPA), significantly impacts communication in federal procurement. Aimed at improving contracting within the DoD, ASPA authorizes various contract types and outlines specific factors for consideration, promoting clear and transparent communication in contracting decisions. This act ensures that the DoD's interactions with contractors are guided by well-defined rules and objectives, fostering accountability and trust in the procurement process (ASPA, 1981).

These statutes lay the groundwork for federal procurement dynamics (Thai et al., 2007). In addition to these core regulations, several other statutes further shape procurement strategies (Thai et al., 2007), each with distinct implications and provisions. The following paragraphs detail these key statutes, highlighting their roles and impacts on procurement communication and processes.

The Truth in Negotiations Act of 1962 (TINA), also referred to as the Truthful Cost or Pricing Statute, mandates that contractors furnish comprehensive cost or pricing information, fostering clear and accurate communication during price negotiations. By requiring contractors to disclose specific cost and pricing details and certify the accuracy of this data, TINA ensures fairness and reasonableness in contract pricing. This, in turn, maintains trust and effective communication between the government and contractors, facilitating equitable pricing agreements (TINA, 1962).

The Competition in Contracting Act of 1984 (CICA) plays a pivotal role in promoting competition and transparency in government procurement. It has a substantial impact on communication by requiring full and open competition, explicit approval for noncompetitive contracts, and clear identification of approving authorities. These provisions enhance accountability and transparency in the procurement process, fostering more effective communication throughout the contracting life cycle (CICA, 1984).

The Procurement Integrity Act of 1988 (PIA) is a cornerstone of legislation focused on upholding integrity and transparency in procurement. It significantly impacts

communication by strictly prohibiting the disclosure of sensitive source selection and bid or proposal data. This promotes confidentiality and clear communication in the procurement process. Additionally, PIA imposes a 1-year prohibition on former employees from certain procurement roles, preventing conflicts of interest and preserving trust in procurement decisions. PIA ensures that communication in procurement is both secure and accountable (PIA, 1988).

The Federal Acquisition Streamlining Act of 1994 (FASA) simplifies complex procurement requirements and encourages streamlined acquisition procedures. In doing so, it promotes efficient communication between government agencies and suppliers. By expediting the procurement of goods and services, FASA reduces internal operational costs and encourages more effective communication channels in the acquisition process. This results in clearer and more cost-effective interactions between government entities and contractors (FASA, 1994).

Lastly, the Federal Acquisition Reform Act of 1995 (FARA) introduces significant changes to the government's acquisition system, including enhanced competition and streamlined bid protests. These changes impact communication by promoting fair competition and efficient dispute resolution. By emphasizing transparent and accountable practices, FARA encourages clearer communication between government agencies and contractors, ensuring that procurement decisions are made with precision and fairness (FARA, 1995).

Overall, this intricate regulatory framework provides structure to public procurement but can inadvertently limit opportunities for open communication and relationship-building (Josephson et al., 2018). Navigating this balance between compliance and effective communication is crucial for an efficient procurement process.

2. Challenges in the Communication and Procurement Process

The procurement process is complex and fraught with challenges, with poor communication being a major issue. This problem impacts various stakeholders, creating significant hurdles for both established firms and non-traditional companies.

The procurement process is far from straightforward; it is a labyrinth of intricacies. The bidding process' complexity requires a deep understanding of procurement procedures and specific requirements (Josephson et al., 2018). This leads to substantial learning and compliance costs for firms (Josephson et al., 2018). These costs extend beyond monetary investments; they encompass time, human resources, and operational efforts (Josephson et al., 2018). In a competitive business environment, these costs can be burdensome, potentially deterring firms from engaging in procurement opportunities (Josephson et al., 2018).

Poor communication can lead to unexpected changes within the procurement process. This element introduces a cascade of challenges. It brings forth business risks (Josephson et al., 2018). Organizations, caught off guard by unanticipated alterations, may find themselves unprepared to adapt (GAO, 2015b). This vulnerability can translate into financial losses, project delays, and a compromised reputation (Josephson et al., 2018). Furthermore, communication gaps can strain vendor relationships, hindering collaboration and jeopardizing long-term partnerships (Lohier et al., 2019).

In the defense sector, the DoD's acquisition process presents unique challenges for non-traditional companies (GAO, 2017). As highlighted in multiple GAO reports, the inherent complexity of the DoD's procurement procedures, characterized by lengthy contracting timelines, a workforce that often lacks extensive experience in contracting, and the unique contract terms and conditions imposed by the government embody complexity at vey turn (GAO, 2010, 2011a, 2013b, 2015b, 2017). Collectively, these factors create a substantial barrier to entry for companies unfamiliar with these intricacies (GAO, 2017).

Moreover, the 2021 Public Spend Forum (PSF) report titled *Barriers to Entry in Public Sector Markets* provides further insights into the communication predicaments faced by organizations seeking to engage with public sector agencies. Among the five major barriers detailed, "poor communication and relationship between public sector agencies and suppliers" takes a prominent place (PSF, 2021, p. 9). This signifies a systemic issue that extends beyond individual organizations. It speaks to the broader

challenge of fostering transparent and constructive communication channels between government entities and suppliers.

Recognizing these impediments, lawmakers undertook legislative efforts, leading to the establishment of the 809 Panel. This advisory body bears the crucial mandate of overhauling and streamlining the defense acquisition process (GAO, 2017). The panel's very existence underscores the acknowledgment of communication challenges and the need to address them systematically. It attempts to establish buyer and seller relationships, improve acquisition system functionality, ensure financial and ethical integrity, protect the DoD's interests, and eliminate unnecessary regulations, all with a prospect of reducing the barriers stemming from poor communication (National Academy of Public Administration, 2019).

The DoD's proactive measures to address the complexity of its acquisition process and to ease government-specific contract terms and conditions reflect an organizational commitment to adapt. Through procedural streamlining and the cultivation of a more conducive contracting environment, the DoD seeks to stimulate innovation, enhance competition, and broaden engagement in defense contracts (OUSD[A&S], 2022). These efforts acknowledge the pivotal role of communication in transforming an intricate system into an accessible one.

The challenges arising from poor communication throughout the procurement process emphasize the necessity of clear and efficient communication strategies. Whether navigating the complexities of acquisition in the defense sector or addressing broader barriers to entry, these challenges highlight the integral role of effective communication in surmounting obstacles and achieving seamless procurement operations.

3. Organizational Factors and Communication Barriers

In public procurement, gaps in communication skills arise from a lack of focused education in public administration programs (Bresler & Bresler, 2021; Snider & Rendon, 2012). This education gap can result in a deficiency in the professional capabilities of those operating in the public procurement sector (Snider & Rendon, 2012). Communication breakdowns are further intensified when novices, including innovative

non-traditional suppliers, struggle to decipher complex technical documents and specifications due to this lack of specialized training in procurement communication (Barton, 2015a; Bresler & Bresler, 2021).

The DoD procurement workforce must manage a multitude of contract actions across diverse domains, facing challenges like limited engagement with non-traditional suppliers and inadequate marketing practices (Bresler & Bresler, 2021; Snider & Rendon, 2012). These professionals are caught between rising defense contracting needs, a dwindling procurement workforce, and the intricate maze of government contract procedures riddled with issues of discoverability, content clarity, and redundancy (Rendon, 2015; Bresler & Bresler, 2021).

A series of reports by both the DoD Inspector General and the GAO have identified lapses in the DoD's approach to contract management (Office of Inspector General, 2009, 2012a, 2012b, 2014; GAO, 2011b, 2013c, 2014a, 2014b, 2014c, 2014d, 2015b, 2023a). These reports underline major shortcomings in contract planning, administration, and oversight, which are exemplified by communication bottlenecks and engagement challenges with non-traditional companies (Bresler & Bresler, 2021).

The gravity of these systemic issues is underscored by the fact that contract management has been flagged as a *high-risk* area for the federal government for over three decades (GAO, 2013c, 2015a, 2019, 2021, 2023a). While the DoD has responded by bolstering the skills of its contract personnel through educational programs (GAO, 2011c, 2014d), it has, unfortunately, sidestepped the vital role of organizational processes in achieving its objectives (Rendon, 2015). Certainly, personnel competency is crucial, but integrating streamlined communication practices, informed by comprehensive research, would ensure both the DoD's engagement with top-tier suppliers and the success of their procurement processes (Bresler & Bresler, 2021; Rendon, 2015).

Public procurement bodies face challenges in gauging contract performance. (Cohen & Eimicke, 2008; Cooper, 2003). The web of organizational factors, combined with process and communication inefficiencies evidenced by issues like short response times and redundant demands, calls for a multi-faceted transformation (Bresler & Bresler,

2021; Rendon, 2015). This shift should focus on both enhancing individual expertise and developing efficient communication procedures.

Ultimately, addressing the issues arising from organizational dynamics and communication barriers in public procurement requires a comprehensive overhaul. A combination of education, training, refined organizational processes, and lessons learned from current deficiencies is key to improving communication and procurement performance.

4. Fostering Clarity and Simplicity in Procurement Communication

Clear, effective communication is indispensable for organizational success, and public procurement is no exception (Lohier et al., 2019; Rathod, 2022). Simplicity and transparency in communication offer myriad benefits (Rathod, 2022):

- preventing misunderstandings and conflicts while promoting workplace harmony
- fostering team member engagement through open discussions
- enabling collaboration by aligning groups toward shared goals
- building trust and positive culture through consistent openness
- meeting customer expectations and enhancing loyalty
- reducing costs and turnover while increasing productivity

In procurement's complex stakeholder ecosystem, clear communication is critical for seamless information flow and bridging gaps (Lohier et al., 2019). Key strategies include:

- unambiguously articulating requirements, timelines, and expectations (Lohier et al., 2019)
- developing relationships through a human-centric approach (Walker & Hampson, 2003)
- resolving conflicts by recognizing negotiators' perspectives (Walker & Hampson, 2003)
- establishing transparency and accountability through open communication (Walker & Hampson, 2003)

In summary, simplicity, clarity, and humanity in procurement communications foster trust, collaboration, and mutual understanding among all parties (Lohier et al, 2019; Rathod, 2022; Walker & Hampson, 2003). Investing in transparent communication strategies is essential for procurement success.

Inadequate communication presents significant barriers for businesses attempting to enter and navigate the intricate landscape of the business-to-government (B2G) market. As explored in the previous section, regulatory requirements, organizational constraints, and complex processes give rise to communication breakdowns that have a widespread impact on public sector engagement. In the next section, the research delves into the barriers created by poor communication in the B2G arena, examining how deficiencies deter market participation and undermine policy objectives. Just as communication challenges permeate procurement operations internally, they also obstruct external entities from effectively connecting with government systems and requirements. This exploration into the inward and outward repercussions of ineffective procurement communication offers a comprehensive understanding of its central importance to public sector functionality and accessibility.

B. BARRIERS TO ENTRY IN THE BUSINESS TO GOVERNMENT MARKET

The B2G market is an enticing arena, driven by the federal government's substantial financial investments in procurement, which reached approximately $694 billion in fiscal year 2022 (GAO, 2023b). More than 60% of Fortune 1000 companies are drawn to this lucrative opportunity (Josephson et al., 2018). Despite its profitability and historical significance, government procurement remains a largely neglected area of study in academia (Josephson et al., 2018). This disregard is concerning, especially given the formidable obstacles that businesses face when attempting to navigate the intricate landscape of government procurement (Josephson et al., 2018).

1. Barriers to Entry in Public Sector Markets Report

The *Barriers to Entry in Public Sector Markets* report by the PSF focuses on identifying and addressing obstacles in open government markets. The study, employing a multi-faceted approach, including a national survey, interviews, and analysis of prior studies, identified five key categories of barriers (PSF, 2021).

First, there are the challenges related to "Complex, Costly, and Inefficient Processes" (PSF, 2021, p. 9). These include prolonged and costly procurement cycles, overemphasis on price in evaluation criteria, outdated systems, unclear pathways for

entering public sector opportunities, and extensive bundling of diverse markets in solicitations (PSF, 2021). Inefficient communication channels often lead to prolonged procurement cycles and unclear initiation procedures.

The second category is the "Challenging Legal and Regulatory Environment" (PSF, 2021, p. 9). This encompasses intricate regulatory prerequisites demanding substantial time and financial resources, onerous management and reporting obligations, varying regulations and policies across jurisdictions or agencies, and inadequate protection of intellectual property and data rights (PSF, 2021). Ineffective communication channels between government agencies and suppliers aggravate these legal and regulatory challenges, leading to misunderstandings and inadequacies in safeguarding rights.

Next, the report highlights the "Poor Communication and Relationship Between Public Sector Agencies and Suppliers" (PSF, 2021, p. 9) as a critical barrier. This includes limited direct communication channels with agencies, minimal insight into agency requirements, unproductive communication/exchanges, unclear contracting language, and a lack of understanding of suppliers' capabilities by public sector buyers (PSF, 2021). The deficiency in effective communication can lead to unproductive interactions, intensifying misunderstandings, and inefficiencies in procurement processes.

The fourth identified barrier is "Incumbent Supplier Advantage" (PSF, 2021, p. 9). Incumbents enjoy benefits from preferences for past performance, bias toward legacy solutions, familiarity with existing pricing structures, and specific technical requirements that often favor them (PSF, 2021). Effective communication can level the playing field, ensuring all suppliers, including newcomers, fully comprehend the requirements and expectations. Conversely, inadequate communication can perpetuate bias toward incumbents due to their familiarity with existing structures.

Finally, "Decision-Making and Political Uncertainty" (PSF, 2021, p. 9) encompasses bureaucratic delays, funding uncertainties tied to budget cycles, turnover among contracting officers and procurement professionals, and shifts in policy priorities causing programmatic uncertainties (PSF, 2021). Effective communication is pivotal in reducing these delays and providing clarity during decision-making processes. It also

helps manage funding uncertainties by facilitating transparent communication about budget cycles and priorities.

While the report identifies these five major obstacles, it is abundantly clear that poor communication is a critical focal point. Inadequate communication underpins and amplifies the complexities and challenges in each of the other categories, making it the linchpin issue that must be addressed to dismantle barriers and foster more accessible and efficient entry into public sector markets.

2. Communication Deficiencies

Communication deficiencies represent a significant barrier to entry in the B2G market, with far-reaching implications for both market participants and government agencies (PSF, 2021). Effective communication is crucial in aligning the interests of policymakers and market entities while mitigating the challenges stemming from information asymmetry (de Mendonça & Nicolay, 2017). Clarity in communication plays an indispensable role in bridging the divide between the public and private sectors, ensuring that the government's messages and requirements are comprehensible to private sector actors (de Mendonça & Nicolay, 2017).

Historically, reports from the GAO (2015b) shed light on persistent issues, including cost overruns, schedule delays, and subpar performance in major defense acquisition programs, often attributable to unrealistic requirements and insufficient communication. This extends to the creation of contract terms and specifications, primarily authored by the government, which at times fall short in effectively conveying its expectations to contractors (Lieblich, 1973).

Furthermore, despite efforts by government agencies to encourage communication with contractors, concerns about potential policy violations, such as those delineated in the Procurement Integrity Act, continue to impede direct engagement (Lohier et al., 2019). Many leaders in the acquisition workforce still fret that direct communication can lead to violations of this act or other policies (Lohier et al., 2019).

The 2021 PSF report underscores these communication challenges, highlighting poor communication and relationships between public sector agencies and suppliers,

encompassing limited direct channels, unclear contracting language, and inadequate understanding of supplier capabilities. These deficiencies not only hinder market participants' ability to comprehend government requirements but also obstruct public sector agencies' capacity to leverage the full spectrum of supplier capabilities (PSF, 2021).

Recent research also indicates that B2G relationships are often perceived as offering lower value across various functions when compared to business-to-business (B2B) counterparts (Purchase et al., 2009). To improve this perception and enhance the government's image, particularly in the scale of value exchange, a strategic focus on information exchange and facilitating access can be pivotal (Purchase et al., 2009).

While communication challenges persist as obstacles in government procurement, efforts to champion clarity have deep historical roots. Beginning in the 1970s, the plain language movement gained momentum, as concerns over bureaucratic communication complexity came to the forefront. This ignited a series of pivotal initiatives, legislative milestones, and advocacy endeavors aimed at enhancing transparency and comprehension in government communications. The decades-long pursuit of plain language in the public sector has been an enduring reflection of the broader objective of open, understandable communication between the government and the people it serves. This historical context provides crucial perspective on the contemporary legislative landscape and the persistent vision of clarity as a cornerstone of governance. Just as poor communication has posed barriers, legislative measures have repeatedly advanced plain language as a catalyst for increased accessibility, public trust, and civic participation.

C. THE HISTORICAL EVOLUTION OF PLAIN LANGUAGE

The evolution of plain language in the United States is a testament to the enduring pursuit of clarity and accessibility in government communications (The Plain Language Action and Information Network [PLAIN], n.d.-a; Schriver, 2017). Over the decades, a variety of factors, including a rich tapestry of events, initiatives, and champions of plain writing, have actively shaped the evolution of plain language. (Schriver, 2017). This section provides a chronological overview of key milestones and influences in the journey toward clear and concise government communication.

1. Before the 1970s: Early Advocates

After World War II, voices within the federal government began to advocate for the adoption of plain language in official documents (PLAIN, n.d.-a; Schriver, 2017). Figures like Jim Minor, a federal employee, championed the cause of clear communication (PLAIN, n.d.-a; Schriver, 2017). John O'Hayre, an employee of the Bureau of Land Management, authored the book *Gobbledygook Has Gotta Go* to promote better written communications among Bureau employees (PLAIN, n.d.-a; Schriver, 2017).

2. 1970s: The Dawn of the Plain Language Movement

The modern plain language movement found its roots in the 1970s, when the federal government initiated efforts to encourage regulatory writers to shed bureaucratic language (PLAIN, n.d.-a; Schriver, 2017). President Richard Nixon's decree that the Federal Register be written in *layman's terms* marked a pivotal moment (PLAIN, n.d.-a; Schriver, 2017).

In 1978, President Jimmy Carter issued executive orders aimed at making government regulations "clearer, less burdensome and more cost effective" (Executive Order No. 12044, 1978). These executive orders signaled a commitment to accessible government communication (PLAIN, n.d.-a; Schriver, 2017).

3. 1980s: Challenges and Agency-Level Initiatives

The 1980s brought a degree of uncertainty, as President Ronald Reagan rescinded some of President Carter's executive orders related to plain language (PLAIN, n.d.-a; Schriver, 2017). Progress in government communication became an agency-specific endeavor, with individual entities deciding whether to prioritize clear and concise writing (PLAIN, n.d.-a; Schriver, 2017). Importantly, lawyers within government agencies began to recognize the benefits of plain language, signifying a significant shift in perception (PLAIN, n.d.-a; Schriver, 2017).

4. 1990s: Legal Milestones and Advocacy

The 1990s witnessed several pivotal moments in the plain language movement (PLAIN, n.d.-a; Schriver, 2017):

- The court decision in Walters v. Reno highlighted the critical need for straightforward communication, determining that the complexity of the Immigration and Naturalization Service's forms was so significant that it infringed on rights to due-process (PLAIN, n.d.-a; Schriver, 2017).
- The PLAIN was established in 1994, serving as a central hub for the U.S. plain language movement (PLAIN, n.d.-a; Schriver, 2017).
- President Bill Clinton issued a Memorandum on Plain Language in Government Writing in 1998, reaffirming the commitment to transparent communication (PLAIN, n.d.-a; Schriver, 2017).
- Vice President Al Gore championed plain language to foster trust in government, presenting *No Gobbledygook Awards* to federal employees who translated bureaucratic messages into plain language (PLAIN, n.d.-a; Schriver, 2017).

5. 2000s: Varied Progress and Financial Sector Recognition

While the George W. Bush administration did not formalize a plain language initiative, clear communication remained a goal in several federal departments and agencies (PLAIN, n.d.-a; Schriver, 2017). Notably, Arthur Levitt, chairman of the Securities and Exchange Commission, recognized the critical role of plain language in financial documents (Birchard, 2022; PLAIN, n.d.-a; Schriver, 2017). The Office of Management and Budget (OMB) issued a policy directive on standardizing grant announcements in plain language, and the Federal Emergency Management Agency highlighted plain language as a public safety matter (PLAIN, n.d.-a; Schriver, 2017).

The Regulation in Plain Language Act of 2006 (H.R. 4809, 2006) addressed the need for federal agencies to draft regulations in understandable language (PLAIN, n.d.-a; Schriver, 2017).

6. 2010: The Plain Writing Act and Beyond

The year 2010 marked a watershed moment as President Barack Obama signed the Plain Writing Act of 2010 into law (Sunstein, 2011). This landmark legislation mandated clear, understandable, and accessible government communication (PWA, 2010).

The OMB issued guidance on implementing the Plain Writing Act in 2011, requiring agencies to utilize plain writing in all covered documents (PWA, 2010).

7. 2020 and Beyond: Expanding the Commitment

In 2020, the DoD reissued the instruction for the DoD Plain Language Program through DoD Instruction (DoDI) 5025.13, reinforcing the importance of plain language in a critical sector (Washington Headquarters Services [WHS], n.d.).

Looking ahead to 2023, the introduction of the Clear and Concise Content Act underscores the continued commitment to improving plain writing and enhancing the public experience (Committee on Homeland Security & Governmental Affairs, 2023).

As this historical timeline reveals, the journey of plain language in the United States has been marked by persistence, advocacy, and legislative action. It stands as a testament to the enduring importance of clear and accessible communication in government, paving the way for a more informed and engaged society.

D. LEGISLATION FOR CLARITY: ADVANCING PLAIN LANGAUGE IN GOVERNMENT

From the time of our nation's founding, the importance of coherence and clarity in laws and regulations has been recognized. James Madison, in the Federalist No. 62, emphasized the necessity of laws that can be read and understood by the people (H.R. 4809, 2006). Today, the need for clear rulemaking is even greater due to the expanding size of government and the multitude of regulations in existence (H.R. 4809, 2006). Federal regulations have placed a growing burden on the American public, resulting in significant costs associated with compliance (H.R. 4809, 2006).

1. The Regulation in Plain Language Act of 2006

In the quest for transparent and comprehensible government communication, the Committee on Government Reform reached a pivotal moment in 2006 when they introduced the Regulation in Plain Language Act of 2006 (H.R. Rep. No. 109-660, 2006) alongside the bill H.R. 4809 (H.R. 4809, 2006). This legislative endeavor, introduced during the 109th Congress second session, marked a significant milestone in the ongoing

effort to enhance the clarity and usability of information disseminated by federal agencies and streamline compliance with federal paperwork requirements (H.R. 4809, 2006).

Recognizing the pressing need for federal agencies to draft regulations in plain and understandable language, the act addressed the persistent issues of frustration, confusion, and non-compliance stemming from complex and opaque regulatory language (H.R. 4809, 2006). Moreover, the act laid down a comprehensive framework for promoting plain language writing within federal agencies, setting clear expectations for all stakeholders (H.R. 4809, 2006). It not only defined best practices for plain language but also established a series of requirements that agencies needed to fulfill to achieve compliance (H.R. 4809, 2006). These requirements encompassed key steps, such as appointing a dedicated plain language coordinator, developing implementation guidelines, providing essential employee training, and mandating regular reporting to Congress on the progress made (H.R. 4809, 2006).

In essence, the Regulation in Plain Language Act of 2006 served as a beacon of change in the realm of government communication, heralding a commitment to accessible, understandable regulations and a more transparent bureaucracy.

2. The Plain Writing Act of 2010

In 2009, U.S. Representative Bruce Braley introduced the Plain Writing Act (H.R. 946) to Congress, aiming to ensure government documents and publications are written in clear, concise, and well-organized language (H.R. Rep. No. 111-432, 2010). This legislative effort recognized the importance of clear and understandable government communication, aligning with best practices in plain language writing and benefiting the intended audience (H.R. Rep. No. 111-432, 2010). This act, when enacted as Public Law 111-274 in 2010, ushered in a new era of government communication, focusing on transparency and accessibility.

The Plain Writing Act of 2010 (Public Law 111-274) meticulously defined key terms central to its implementation. An *agency* referred to an executive agency, as defined under section 105 of title 5, U.S. Code (PWA, 2010). Meanwhile, a *covered document* encompassed any document essential for obtaining federal government benefits

or services, filing taxes, providing information about federal government benefits or services, or explaining compliance with a federal requirement (PWA, 2010). This broad definition included letters, publications, forms, notices, and instructions, but notably excluded regulations (PWA, 2010).

Crucially, the Plain Writing Act did not specify a separate budget for its implementation (Kerr, 2014). Instead, its provisions were seamlessly integrated into the regular activities and budgets of the various federal agencies responsible for adhering to its guidelines (Kerr, 2014). The act primarily focused on the use of plain language in government documents and did not include a specific funding allocation (Kerr, 2014).

Section 4 of the act laid out comprehensive responsibilities for federal agencies (PWA, 2010). Within 9 months of the act's enactment, the head of each agency was tasked with designating senior officials to oversee the act's implementation (PWA, 2010). These officials were further responsible for effectively communicating the act's requirements to agency employees (PWA, 2010). The act also mandated that agencies provide training on plain writing, establish processes for ongoing compliance, create and maintain a dedicated plain writing section on the agency's website, and designate points of contact for public input regarding the act's implementation and agency reports (PWA, 2010). Furthermore, starting one year after the act's enactment, each agency had a mandate to employ plain writing in all covered documents issued or substantially revised (PWA, 2010).

To facilitate uniformity and effectiveness, the Plain Writing Act required the director of the OMB to develop and issue guidance on implementing the act's requirements within 6 months of its enactment (PWA, 2010). This guidance played a pivotal role in helping agencies understand and adhere to the act's principles (PWA, 2010).

Emphasizing transparency and accountability, the act mandated that agencies publish reports detailing their compliance with its requirements (PWA, 2010). Within 9 months of the act's enactment, each agency was required to publish an initial report outlining its plan for compliance (Stabler, 2014). Subsequently, annual compliance

reports became a crucial aspect of agency reporting, detailing progress and actions taken (PWA, 2010).

It is important to note that the Plain Writing Act (2010) emphasized that there would be "no judicial review of compliance or noncompliance with its provisions." Additionally, the act did not create any enforceable rights or benefits through administrative or judicial action (PWA, 2010).

The Plain Writing Act of 2010 aimed to enhance citizen access to government information and services by championing clear and understandable communication. This landmark legislation sought to improve government accountability, eliminate confusion, and ultimately make it easier for the public to navigate government documents and requirements. Through its clear definitions, integration into agency operations, and reporting mechanisms, the act heralded a significant step towards achieving these essential goals.

3. The DoD Plain Language Program

DoDI 5025.13 was introduced to establish the policy and responsibilities for implementing a plain language program within the DoD (WHS, n.d.). This program sought to enhance clarity and effectiveness in DoD communications, promoting plain language in written materials for both internal and external audiences (WHS, n.d.).

The DoD Plain Language Program outlined the roles and responsibilities of various personnel involved in its implementation, including senior officials, heads of DoD components, and plain language coordinators (Office of the Director of Administration and Management [ODAM], 2020). It emphasized the importance of training and education on plain language principles and techniques for DoD personnel involved in writing and editing documents (ODAM, 2020).

4. The Clear and Concise Content Act of 2023

The Clear and Concise Content Act of 2023 (S. 717) represents a new chapter in plain language legislation (S. 717, 2023). Introduced in the Senate in March 2023, this bill aims to improve plain writing and enhance the public experience with government communications (S. 717, 2023). It expands the scope of "covered content" to include

nearly all public information posted by agencies, with exceptions for regulations (S. 717, 2023).

The bill assigns responsibilities to the OMB to establish guidelines and metrics for plain writing, collect public feedback, and report on agency performance (S. 717, 2023). Agencies are required to ensure compliance, designate senior officers for oversight, and provide opportunities for feedback from the public (S. 717, 2023).

While the bill is expected to have minimal regulatory impact, implementing it will entail additional administrative and training expenses (S. 717, 2023). The estimated increase in spending, subject to appropriation, is detailed in the Congressional Budget Office report (S. 717, 2023).

5. An Absent Component: Plain Language in Regulations

A notable commonality among these legislations is the absence of explicit requirements for the use of plain language in regulations (Stabler, 2013). While these acts have made significant strides in promoting plain language in government documents, they do not extend these requirements to regulations, which often remain complex and challenging for the public to decipher (Stabler, 2013). This absence of plain language requirements in regulations raises questions about the comprehensibility and accessibility of government policies and rules (Stabler, 2013). Regulations play a pivotal role in governing various aspects of society, and their complexity can hinder public understanding and compliance (Schooner, 2002; Stabler, 2013).

An administrative Conference of the United States report titled *Plain Language in Regulatory Drafting* found that plain language can advance core administrative law values (Emerson & Blake, 2017). By clearly articulating regulatory purposes and requirements, agencies can bolster the rule of law, enhance regulatory effectiveness, safeguard rights, and encourage public participation in administrative policymaking (Emerson & Blake, 2017). Each of these objectives pertains to distinct primary audiences, including reviewing courts, regulated entities, regulatory beneficiaries, and the public (Emerson & Blake, 2017). For example, enhancing regulatory effectiveness primarily involves employing plain language for regulated entities, particularly small

businesses that may grapple with technical complexities (Emerson & Blake, 2017). Various document formats are well-suited to addressing each of these audiences (Emerson & Blake, 2017). Public participation, for instance, can be furthered through the use of plain language in regulatory preambles and explanatory materials tailored to specific readerships (Emerson & Blake, 2017). Internal administrative procedures can bolster the performance of plain language performance by emphasizing its importance in the drafting process, differentiating the plain language objectives to be met, and identifying regulatory documents capable of effectively conveying information to the pertinent audiences (Emerson & Blake, 2017).

While these legislations represent substantial progress in enhancing government communication through plain language, the challenge of making regulations more transparent and understandable to the general public remains a notable gap in the current landscape of plain language legislation.

6. Impact and Challenges of the Plain Writing Act of 2010

The legitimacy of the policies enacted by the Plain Writing Act of 2010 has been subject to a range of legislative, administrative, and judicial issues, each influencing the effectiveness and impact of the legislation (Kerr, 2014; Stabler, 2013). These issues, spanning from implementation challenges to institutional limitations, have shaped the perception of the act and its ability to fulfill its intended goals (Kerr, 2014; Stabler, 2013).

A significant legislative feature of the Plain Writing Act (2010) is the explicit statement that there is "no judicial review of compliance or noncompliance" with the act. Additionally, the act clarifies that it does not create any enforceable rights or benefits through administrative or judicial action (PWA, 2010). This limitation on judicial review and the absence of penalties for noncompliance impact the enforceability of the legislation (Stabler, 2013). While these provisions can streamline the implementation process, they also raise questions about accountability and the effectiveness of the act in bringing about genuine change in government communication practices (Stabler, 2013).

The Plain Writing Act (2010) stipulated that agencies are required to publish periodic reports on their compliance with the act's provisions. However, compliance with this reporting requirement has been less than satisfactory (Center for Plain Language [CPL], n.d.; Stabler, 2013). Although many agencies published initial implementation reports, subsequent compliance reports have demonstrated decreasing rates of adherence (CPL, n.d.; Stabler, 2013). Reports have often been criticized for being inadequate in terms of depth, detail, and the provision of useful information about the agencies' plans for implementing the act (CPL, n.d.; Stabler, 2013). This issue underscores challenges in consistently monitoring and evaluating the act's impact (Stabler, 2013).

Over time, the Plain Writing Act of 2010 faced challenges with its implementation, with many agencies allowing the act to become dormant (Leyden, 2022). Compliance activities were often limited to paper and did not translate into achieving the intended goals of clear and accessible government communication (Leyden, 2022). The act's initial impact has been mitigated by the lack of comprehensive implementation strategies and sustained efforts to drive change (Leyden, 2022).

In response to the perceived shortcomings and limited impact of the Plain Writing Act, legislative efforts have emerged to address the issue of clear communication more comprehensively (Leyden, 2022). The introduction of the Clear and Concise Content Act of 2023 demonstrates bipartisan recognition of the ongoing challenges related to government communication (Leyden, 2022). This new legislation aims to build upon the foundation laid by the Plain Writing Act and further enhance the effectiveness and accountability of federal agencies' communication with the public (Leyden, 2022). These legislative efforts reflect an acknowledgment of the evolving communication landscape and the need for continuous improvement (Leyden, 2022).

External evaluations and assessments have played a role in assessing the effectiveness of government communication efforts, including those mandated by the Plain Writing Act. Studies conducted by organizations such as VisibleThread and the CPL have highlighted both improvements and setbacks in government communication quality (VisibleThread, 2016a, 2016b, 2017a, 2017b; CPL, n.d.). These evaluations

provide a degree of oversight and transparency, shedding light on the tangible outcomes of communication-related policies (CPL, n.d.).

The Plain Writing Act of 2010 has encountered challenges at various stages of its implementation, ranging from compliance issues to limitations on judicial review. These issues have influenced the act's perceived legitimacy and impact. The emergence of new legislative efforts and external evaluations reflects a dynamic policy landscape where the pursuit of effective and accessible government communication remains an ongoing endeavor.

7. Evaluating Federal Agency Compliance with the Plain Writing Act

The Center for Plain Language plays a pivotal role in assessing the effectiveness of government agencies' compliance with the Plain Writing Act of 2010. Through their annual evaluations, the center gauges how well federal departments and agencies adhere to the principles outlined in the Act (CPL, n.d.). To provide a comprehensive assessment, the Center for Plain Language employs a two-fold grading system, emphasizing two critical criteria: Compliance and Writing and Information Design (CPL, n.d.).

Under the Compliance criterion, agencies are scrutinized for their ability to fulfill the requirements stipulated by the Plain Writing Act of 2010 (CPL, n.d.). Meanwhile, the Writing and Information Design criterion evaluates the extent to which agency documents and web content consistently enhance readability, comprehension, and usability (CPL, n.d.).

Remarkably, the Center for Plain Language only began tracking the average grade for all federal agencies in 2018 (CPL, n.d.). In the initial 2018 Report Card, the most notable finding was that "C had replaced B as the average writing grade" (CPL, n.d., p. 1). However, there was a positive shift in the 2019 Report Card, which indicated that "the average writing grade had risen from a C to a B" (CPL, n.d., p. 1).

The 2020 Report Card presented a mixed picture, revealing that while half of the agencies were successfully following the law's basic requirements, one-third were failing to do so (CPL, n.d.). Notably, 10 out of 20 agencies earned an A for organizational compliance that year, whereas seven others failed (CPL, n.d.). This discrepancy in

compliance was attributed to the challenges some agencies faced in meeting the law's requirements following a change in presidential administration, resulting in significant turnover (CPL, n.d.). For instance, the Department of Transportation had not updated its required plain language page or published the mandated plain language report since 2015 (CPL, n.d.).

In the 2021 Report Card, it was evident that the average writing grade had stabilized at a B-, remaining unchanged from the previous year (CPL, n.d.). However, this overall average was marred by a concerning trend in the Freedom of Information Act request pages, where the average grade had slipped to a C+ (CPL, n.d.). Despite this, there was a more optimistic narrative within the federal government's commitment to plain language, as one-third of agencies had improved their overall writing grade, with the Department of Agriculture making significant progress, elevating its grade from C to A (CPL, n.d.).

Continuing into the 2022 Report Card, the Center for Plain Language persisted in its annual evaluation of federal agencies' compliance with the Plain Writing Act of 2010, shedding light on the state of government communications (CPL, n.d.). The overall assessment revealed that the average writing grade had slightly decreased from the B- average recorded in the previous year, settling at a C (CPL, n.d.). However, beneath this average grade, there remained a more encouraging narrative regarding the federal government's commitment to plain language (CPL, n.d.). Notably, one-third of the agencies had improved their overall writing grade in 2022, demonstrating a tangible commitment to enhancing communication clarity (CPL, n.d.). This information from the 2022 Report Card underscores the ongoing efforts by federal agencies to embrace and implement the principles of plain language communication, even in the face of challenges and changing circumstances.

In summary, the pursuit of clarity and accessibility in government communication has deep historical roots. Over the years, the expansion of government and the proliferation of regulations underscored the need for clear rulemaking to reduce the burden on the American public. This quest for transparency and comprehensibility

culminated in the introduction of key legislative milestones, such as the Regulation in Plain Language Act of 2006 and the Plain Writing Act of 2010.

The Regulation in Plain Language Act marked a turning point by addressing the frustration and confusion stemming from complex regulatory language. It established a comprehensive framework for promoting plain language writing within federal agencies, defining best practices and setting clear expectations. Similarly, the Plain Writing Act of 2010 ushered in a new era of government communication, focusing on transparency and accessibility, with defined responsibilities for agencies and a strong emphasis on training, reporting, and guidance.

However, challenges and limitations have emerged over time, including issues related to compliance reporting and the absence of judicial review in the Plain Writing Act. These factors have influenced the perceived impact and effectiveness of these legislative efforts. Nonetheless, ongoing evaluations and assessments by organizations like the Center for Plain Language provide valuable insights into the progress and setbacks in government communication.

Looking forward, the introduction of the Clear and Concise Content Act of 2023 represents a recognition of the evolving communication landscape and a commitment to continuous improvement. This new legislation aims to build upon the foundation laid by previous acts, further enhancing government communication clarity and accountability.

In conclusion, the journey towards plain language in government communication is marked by both achievements and challenges, with a commitment to transparency and accessibility driving legislative efforts and ongoing evaluations serving as crucial benchmarks of progress.

E. PLAIN WRITING: A COMMITMENT TO CLARITY

In a world inundated with information, the ability to convey complex ideas and critical messages with clarity and precision is paramount. The concept of plain writing, as defined in Public Law 111-274, the Plain Writing Act of 2010, is a beacon of effective communication. It encapsulates a style of expression characterized by its clarity,

conciseness, and strategic organization—a style that ensures that information is readily understood by its intended audience (PWA, 2010).

Plain writing is more than just a literary choice; it is a commitment to eliminating the barriers that obscure understanding (PLAIN, n.d.-b). It embodies the idea that communication should be clear and unambiguous, avoiding the pitfalls of convoluted sentence structures and complex vocabulary (PLAIN, n.d.-b). Plain writing is not about simplifying language but rather about empowering readers to grasp the message effortlessly (PLAIN, n.d.-b).

This section focuses on the core principles of plain writing and its profound significance in our information-rich society, underscoring its role in enhancing document readability and comprehension and providing a more direct path to knowledge. It emphasizes plain writing's relevance in various contexts, from government communications to scholarly research summaries, and explores its transformative power in facilitating effective communication. More than a linguistic endeavor, plain writing serves as a vital tool for fostering a more informed, engaged, and connected society, effectively bridging the gap between complex information and its audience.

1. Plain Writing Defined

Plain writing is a style of communication defined by clarity, conciseness, effective organization, and adherence to best practices appropriate to the subject matter and intended audience, as outlined in Public Law 111-274, also known as the Plain Writing Act of 2010. In essence, plain writing aims to convey information in a manner that is readily understandable to its readers (PWA, 2010). It embodies clear and straightforward expressions, avoiding obscurity, complex vocabulary, and convoluted sentence structures (PLAIN, n.d.-b). It is not about oversimplification but rather a commitment to ensuring that the audience can focus on the message itself without being hindered by language barriers (PLAIN, n.d.-b).

Plain writing is rooted in a fundamental shift from past practices and draws inspiration from literary figures such as Abraham Lincoln, Mark Twain, and others who recognized the enduring relevance and efficacy of simple words (Garner et al., 1994). In

essence, plain writing is a commitment to clear and effective communication, striving to remove unnecessary barriers and complexities from language (Kimble, 1992).

2. Assessing Adult Literacy in the United States

The clarity of language hinges on the literacy level of its intended audience, a critical factor in assessing written language proficiency (Wallendorf, 2001). Understanding the state of literacy among American adults is paramount for promoting plain writing and effective communication. This section delves into findings from the 2003 *National Assessment of Adult Literacy (NAAL)* and subsequent studies, underscoring the necessity for clear and accessible communication methods, such as plain writing, to bridge the literacy gap and ensure information comprehensibility for all members of society.

The 2003 NAAL, sponsored by the National Center for Education Statistics (NCES), marked the most comprehensive evaluation of adult literacy in the United States since the 1992 *National Adult Literacy Survey* (NCES, n.d.-a). The assessment provided invaluable insights into the literacy levels of a diverse cross-section of American adults (NCES, n.d.-a). Of particular significance, it revealed that an estimated 43% (93 million) of U.S. adults aged 16 and older possessed below-basic literacy skills (Harper & Zimmerman, 2009), highlighting the need for clear communication methods like plain writing.

The Organization for Economic Cooperation and Development (OECD) periodically assesses adult literacy skills in the age range of 16 to 65. The 2012 and 2014 Program for the International Assessment of Adult Competencies (PIAAC) reported concerning statistics for the United States (Goodman et al., 2013; NCES, n.d.-b; OECD, 2013). Approximately 4% of Americans were classified as Below Level 1, signifying an inability to perform basic daily activities due to non-literacy (Goodman et al., 2013; NCES, n.d.-b; OECD, 2013). Another 14% had Level 1 literacy, indicating reading and writing skills at a below-basic level (Goodman et al., 2013; NCES, n.d.-b; OECD, 2013). About one-third (34%) had Level 2 literacy, representing basic reading and writing ability, while another one-third (36%) had Level 3 literacy, signifying intermediate reading and writing skills (Goodman et al., 2013; NCES, n.d.-b; OECD, 2013). A total of

13% of Americans were classified as having Level 4 literacy, and 1% achieved Level 5 literacy, both indicating proficient reading and writing skills (Goodman et al., 2013; NCES, n.d.-b; OECD, 2013).

The 2017 PIAAC results showed slight changes in the literacy levels of American adults (NCES, n.d.-b). The percentage of individuals Below Level 1 remained constant at 4%, while there was a 1% increase in Level 1 literacy, now accounting for 15% of the population (NCES, n.d.-b). The percentage of individuals at Level 2 and Level 3 literacy decreased slightly to 33% and 35%, respectively (NCES, n.d.-b). Notably, the Level 4 literacy rate remained steady at 13%, and the percentage of American adults at Level 5 also remained at 1%, continuing to represent the highest proficiency in reading and writing skills (NCES, n.d.-b). As illustrated in Figure 1, the majority of American adults still lacked proficient literacy skills.

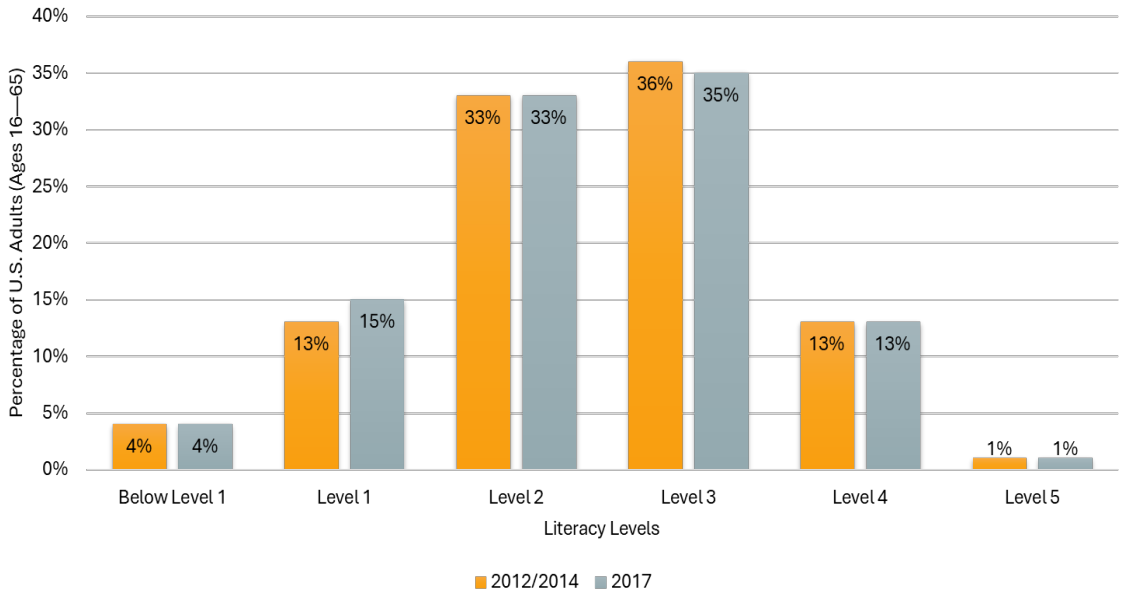


Figure 1. U.S. Adult Literacy Levels (Ages 16–65) in 2012. Adapted from Goodman et al. (2013).

Recent data from 2022 showed that 79% of adults were literate, while 21% were illiterate, with 54% reading below the sixth-grade level (National Literacy Institute [NLI], n.d.). The Literacy Project reported that the typical reading level for the average American aligned with that of a seventh to eighth grade level (Marchand, 2017). As depicted in Figure 2, only 79% of American adults were considered literate in 2022.

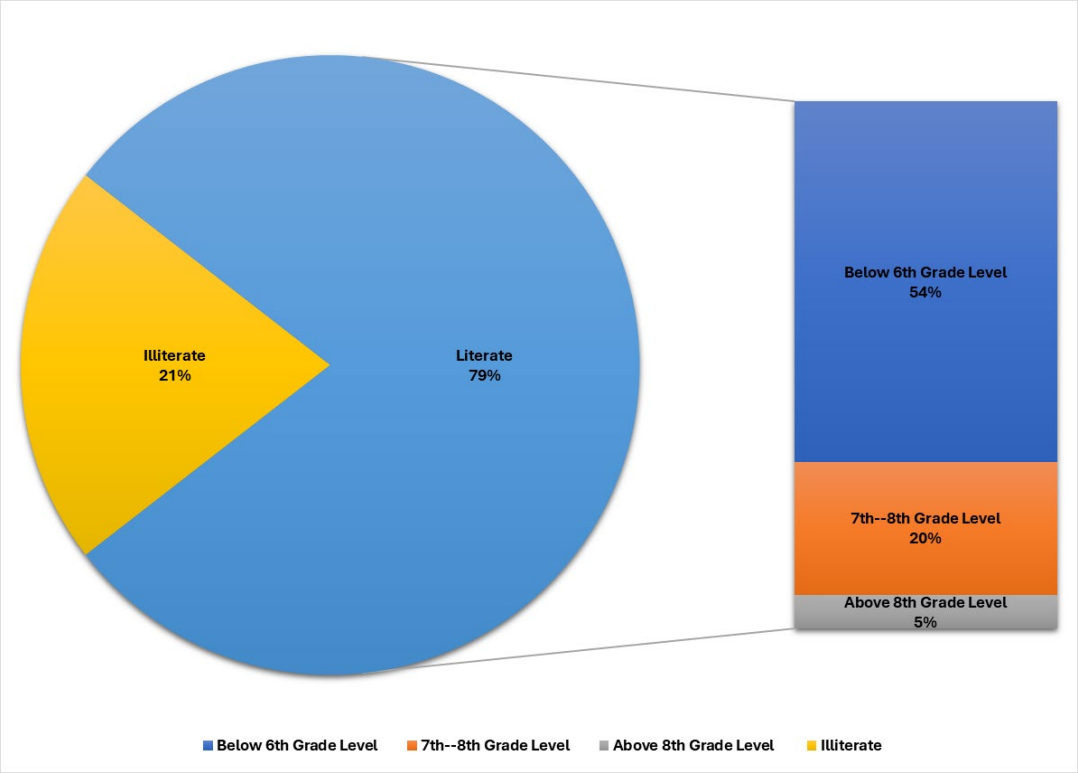


Figure 2. Adult Literacy Rates in 2022. Adapted from NLI (n.d.).

The assessment of adult literacy in the United States underscores the urgency of addressing literacy disparities through plain writing and other accessible communication methods. These efforts are essential for promoting equitable access to information and empowering individuals with diverse literacy levels to participate fully in society.

3. Plain Writing and Complex Information

It is understood that government acquisition policy and contractual documents can be complex yet require a keen understanding by all parties in order to facilitate transparent and equitable terms for and actions by the parties. Plain writing plays a pivotal role in conveying complex information effectively (PLAIN, n.d.-b). It is essential for several reasons. First, it ensures that information is presented in a manner that respects the intelligence of the audience, fostering a shared understanding of the message (PLAIN, n.d.-b). In legal contexts, as Joseph Kimble (1992) explains, it is crucial to use plain language to make legal documents accessible to the general public, as legalese is often unnecessarily complex and not more precise than plain language.

Second, plain writing improves readability and comprehension (Kerwer et al., 2021). It allows readers to grasp the content quickly without the need for extensive decoding, thereby saving time and effort (Kerwer et al., 2021). Clear and concise writing tells readers precisely what they need to know without burdening them with unnecessary words or expressions (PLAIN, n.d.-b).

Moreover, plain writing is associated with good customer service (PLAIN, n.d.-b). Making documents easy to understand enhances reader response to messages and reduces the likelihood of misunderstandings or errors when filling out forms or complying with requirements (PLAIN, n.d.-b). As a result, plain writing not only saves time but also contributes to cost savings (PLAIN, n.d.-b).

4. Plain Writing Enhances Readability and Comprehension

Plain writing significantly enhances readability and comprehension (Kerwer et al., 2021). When information is presented in plain language, readers can understand it more quickly, reducing the need for explanations or re-reading (PLAIN, n.d.-b). This efficiency is particularly crucial in today's fast pace, as people do not want to waste time deciphering complex, wordy documents (PLAIN, n.d.-b).

Studies, such as the one by Kerwer et al. in 2021, have shown that plain language summaries of scholarly articles are more comprehensible to the public compared to scientific abstracts. This increased comprehensibility extends to better understanding of the information presented in these summaries (Kerwer et al., 2021). Plain language summaries are also perceived as more credible, increasing confidence in decision-making based on the summaries (Kerwer et al., 2021).

Furthermore, incorporating subheadings in plain language summaries, as demonstrated by Kerwer et al. (2021), enhances comprehensibility and knowledge acquisition. Subheadings help structure the information and guide readers, making it easier for them to navigate and understand the content (Kerwer et al., 2021; PLAIN, n.d.-b).

In summary, plain writing not only makes information more accessible but also improves the overall reading experience. It empowers readers with the ability to

comprehend complex information more efficiently and accurately, leading to better decision-making and knowledge acquisition.

5. The Principles of Plain Writing

The effective implementation of Plain Writing Principles is pivotal to achieving clarity and accessibility in government communication (PWA, 2010). To delve into this topic, the discussion turns towards the Principles of Plain Writing, as articulated and promoted by the Plain Language Action and Information Network (PLAIN, n.d.-b). This working group, composed of federal employees from diverse agencies and specialties, has long championed the cause of clear communication in government writing, with a shared belief that it not only saves time and money but also enhances service to the American public (PLAIN, n.d.-b).

In order to put these principles into practice, one can refer to the condensed set of plain language principles outlined in Table 2. This streamlined framework encapsulates the core tenets from the *Federal Plain Language Guidelines* into six key areas: audience-focused writing, clear organization, simple language, concise language, active voice, and reader-friendly design. Adherence to these fundamental principles delineates a practical pathway for implementing plain language standards in government communications. Furthermore, Table 2 maps each condensed principle to the original guidelines, providing a useful reference point for understanding the underlying source of each principle. With this efficient set of Plain Writing Principles as a guide, practitioners are equipped to ensure government communications achieve maximum clarity, accessibility, transparency, and resonance with the public.

Table 2. Synthesis of Condensed Principles with Original Guidelines from the Plain Language Checklist. Adapted from PLAIN (n.d.-b).

Condensed Principle	Original Principles Addressed
Audience-Focused Writing: Write using the language your intended audience understands and relates to. Consider their knowledge level.	Audience Centric Writing Addressing the Individual

Condensed Principle	Original Principles Addressed
Clear Organization: Present information logically starting with the main point and purpose. Use headings to guide readers through sections.	Effective Organization The Power of Headings
Simple Language: Use simple, commonly understood words and phrases. Avoid unnecessary jargon. Use present-tense verbs. Use "must" for clarity. Place words carefully to prevent ambiguity.	Present Tense for Clarity The Clarity of "Must" Precision in Word Placement
Concise Language: Use short sections, sentences, and words. Eliminate unnecessary language. Lead with key details.	Concise Sections and Sentences Embrace Conciseness Simplicity in Word Choice
Active Voice: Use active voice. Avoid turning verbs into nouns. Make clear who is performing the action.	Embracing Active Voice Beware of Hidden Verbs
Reader-Friendly Design: Incorporate lists, tables, and visual elements to simplify and clarify complex information. Use easy-to-scan formatting.	Harnessing Lists and Tables

The PLAIN site (plainlanguage.gov) provides a checklist to assist with assessing whether documents meet the plain language standards. The standards as detailed in the *Federal Plain Language Guidelines* include the following.

- **Audience-Centric Writing.** Writing for the audience is the first principle (PLAIN, n.d.-b). Contrary to the misconception that plain language entails *dumbing down* content, the essence of plain writing lies in using language that the audience understands and feels comfortable with (PLAIN, n.d.-b.). It necessitates taking the audience's current knowledge level into account (PLAIN, n.d.-b). Plain writing adapts communication to readers, ensuring that the message resonates with them (PLAIN, n.d.-b). Research and testing are indispensable tools in understanding the audience and eliminating assumptions (PLAIN, n.d.-b).

- **Effective Organization.** Organization is the linchpin of plain writing (PLAIN, n.d.-b). Start by stating the purpose clearly and concisely, followed by the core message (PLAIN, n.d.-b). Lay out the information logically, ensuring that the most crucial details are presented at the beginning, with background information following as needed (PLAIN, n.d.-b). Effective organization not only aids comprehension but also streamlines the reader's journey through the document (PLAIN, n.d.-b).
- **The Power of Headings.** Well-organized content can still prove challenging to follow if readers cannot discern its structure (PLAIN, n.d.-b). Headings provide signposts that guide readers through the material (PLAIN, n.d.-b). They are essential, especially in web content, as they help users quickly identify and navigate relevant sections (PLAIN, n.d.-b). An abundance of useful headings not only enhances understanding but also facilitates efficient information retrieval (PLAIN, n.d.-b).
- **Addressing the Individual.** Even when a document has the potential to impact thousands or even millions, it is important to remember that it speaks to the individual reading it (PLAIN, n.d.-b). Personalizing writing enhances its impact and economy (PLAIN, n.d.-b). By addressing each reader directly, communication becomes more relatable and engaging (PLAIN, n.d.-b).
- **Embracing Active Voice.** Active voice is a powerful tool in plain writing, as it clarifies responsibilities and eliminates ambiguity (PLAIN, n.d.-b). Instead of using passive voice that obscures the doer of the action, active voice conveys actions more clearly (PLAIN, n.d.-b). This shift from passive to active voice makes a world of difference in accountability and comprehension (PLAIN, n.d.-b).
- **Concise Sections and Sentences.** Plain writing thrives on brevity and clarity (PLAIN, n.d.-b). Short sections break up content, making it visually appealing and aiding comprehension (PLAIN, n.d.-b). Short sentences, each expressing a single idea, are easier to process and understand (PLAIN, n.d.-b). They prevent the reader from getting lost in the maze of complex sentence structures (PLAIN, n.d.-b). Resist the temptation to pack too much information into one sentence; let each idea have its own sentence (PLAIN, n.d.-b).
- **Present Tense for Clarity.** Present tense is the simplest and most direct form of a verb (PLAIN, n.d.-b). It makes writing more straightforward and forceful (PLAIN, n.d.-b). Conditional or future tense can introduce unnecessary complexity (PLAIN, n.d.-b). Writing primarily in the present tense saves readers effort and ensures the message is crystal clear.
- **Beware of Hidden Verbs.** Verbs are the driving force of writing, providing power and direction to sentences (PLAIN, n.d.-b). Hiding verbs by transforming them into nouns weakens writing and adds unnecessary words (PLAIN, n.d.-b). Be direct and use verbs that carry the message effectively, avoiding wordy constructions that obfuscate intent (PLAIN, n.d.-b).

- **Embrace Conciseness.** Wordy, dense constructions are a common ailment in government writing (PLAIN, n.d.-b). Excess words confuse and frustrate readers (PLAIN, n.d.-b). Great writing is like a conversation: omit information that the audience does not need to know (PLAIN, n.d.-b). Challenge each word's necessity and eliminate the superfluous (PLAIN, n.d.-b). Pronouns, active voice, and base verbs help streamline the message (PLAIN, n.d.-b).
- **Simplicity in Word Choice.** Choose familiar, commonly used words and phrases over obscure or unusual ones (PLAIN, n.d.-b). Avoid jargon and complex vocabulary when simpler alternatives suffice (PLAIN, n.d.-b). Keep language accessible to the widest audience possible (PLAIN, n.d.-b). Simplicity in word choice ensures that the message is understood without unnecessary barriers (PLAIN, n.d.-b).
- **The Clarity of "Must."** "Must" is the clearest way to convey obligations to the audience (PLAIN, n.d.-b). Avoid the archaic and imprecise "shall" in favor of the straightforward "must" (PLAIN, n.d.-b). "Must" leaves no room for ambiguity and aligns with everyday language usage (PLAIN, n.d.-b). It simplifies the message and enhances user-friendliness (PLAIN, n.d.-b).
- **Precision in Word Placement.** Careful word placement reduces ambiguity in writing (PLAIN, n.d.-b). Keep subjects and objects close to their verbs, ensuring clarity (PLAIN, n.d.-b). Position modifiers like "only" or "always" next to the words they modify (PLAIN, n.d.-b). Place long conditions after the main clause to maintain coherence and readability (PLAIN, n.d.-b).
- **Harnessing Lists and Tables.** Lists are invaluable for highlighting steps, requirements, or pieces of information clearly (PLAIN, n.d.-b). They provide visual clarity and help readers understand the sequence and hierarchy of information (PLAIN, n.d.-b). Tables further simplify complex material, making relationships visible and reducing textual density (PLAIN, n.d.-b). "If–then" tables excel in simplifying intricate content and presenting it in an easily digestible format (PLAIN, n.d.-b).

Incorporating these principles into government writing not only upholds the standards of plain language but also ensures that government communication serves its primary purpose: to inform, engage, and empower the American public. Adhering to these principles paves the way for greater clarity, accessibility, and transparency in government communication.

In summary, plain writing is a commitment to clear and accessible communication in our information-rich world. It prioritizes clarity, conciseness, and organization, drawing inspiration from literary figures who championed simplicity. The

necessity of plain writing is further underscored by recent adult literacy test results, such as the 2003 National Assessment of Adult Literacy, revealing that a significant portion of the population struggles with basic literacy skills.

Plain writing is particularly effective in conveying complex information, as it enhances readability and comprehension. Advocated by organizations like PLAIN, its core principles include audience-centric writing, effective organization, strategic use of headings, direct addressing of individuals, active voice, concise expression, and simplicity in word choice.

Adherence to these principles ensures that government communication not only remains clear but also empowers the public, fulfilling its fundamental purpose. In an era overwhelmed with data and information, plain writing stands out as an essential tool, making content accessible and understandable, thereby fostering an informed, engaged, and connected society.

The importance of clear communication extends into our modern digital age, which demands not only clarity in human-written text but also the development of technologies capable of sophisticated language interaction. Natural Language Processing (NLP) epitomizes these technological advancements, aiming to bridge the communication gap between humans and computers. It strives to equip machines with the ability to "read," "write," and "understand" human language in ways that align with the principles of plain writing, enhancing both understanding and interaction.

F. UNLOCKING THE POWER OF LARGE LANGUAGE MODELS

NLP enables computers to analyze and process human language, with the goal of attaining human-like comprehension. Large Language Models (LLMs), exemplified by models like Generative Pre-Trained Transformer 3 (GPT-3) through GPT-4, LLaMA, and Claude 2 with interfaces such as ChatGPT, have become pivotal in the field of NLP. Built on advanced deep learning algorithms and extensive datasets, LLMs excel at understanding context, generating coherent text, and engaging in human-like conversations. This section examines how LLMs are transforming NLP through their ability to process intricate language data and engage in sophisticated textual tasks. LLMs

constitute a groundbreaking innovation in enabling machines to process and interact with natural language effectively.

1. Natural Language Processing

NLP is a field of study and practice that encompasses a wide range of computational techniques designed to analyze and represent naturally occurring human language in a way that enables computers to understand and process it, ideally in a manner similar to human language comprehension. As defined by Liddy (2001), NLP aims to achieve human-like language processing capabilities for various tasks and applications.

NLP is not a recent development but has a rich history dating back to the late 1940s (Liddy, 2001). One of the earliest computer-based applications related to natural language was machine translation, demonstrating the early interest in automating language-related tasks (Liddy, 2001). NLP's lineage is a blend of various disciplines, each contributing unique perspectives and expertise (Liddy, 2001). Key contributors to the discipline include:

- Linguistics: The discipline of linguistics is crucial in NLP, as it concentrates on creating formal and structural language models and investigating the commonalities across languages. The term *Computational Linguistics* was initially used to describe what is now known as NLP (Liddy, 2001).
- Computer Science: Computer science is deeply involved in NLP through the development of internal data representations and efficient processing methods for language structures. This aspect deals with how computers can handle and manipulate language data (Liddy, 2001).
- Cognitive Psychology: NLP is influenced by cognitive psychology, which treats language as a reflection of human cognitive activities. This branch of psychology seeks to model language use in a manner that resonates with the workings of the human mind, thereby rendering language processing more psychologically plausible (Liddy, 2001).

Within NLP, there are two distinct but interconnected focuses: language processing and language generation (Liddy, 2001). These two facets encompass the analysis and production of language, respectively.

- Language Processing: Language processing involves the analysis of natural language to create meaningful representations. It is akin to the role

of a reader or listener, where the computer comprehends and interprets human language. This phase involves tasks like text analysis, sentiment analysis, and language understanding (Liddy, 2001).

- Language Generation: On the other hand, language generation pertains to the production of human-like language from a structured representation. In this context, the computer takes on the role of a writer or speaker. While there is a significant overlap in theory and technology with language processing, language generation also requires a planning capability (Liddy, 2001). This planning ensures that the generated language aligns with the intended goal of the interaction (Liddy, 2001).

In essence, NLP strives to equip computers with the ability to comprehend, generate, and interact with human language in a manner that is both meaningful and contextually relevant (Nadkarni et al., 2011). The field continues to evolve, driven by advancements in linguistics, computer science, and cognitive psychology, offering a wide array of applications in areas such as chatbots, machine translation, sentiment analysis, and much more (Nadkarni et al., 2011). NLP plays a pivotal role in bridging the gap between human communication and technology, fostering enhanced interactions and understanding in our increasingly digital world.

2. Large Language Models

In the dynamic landscape of NLP, LLMs have emerged as a groundbreaking force, revolutionizing how machines interpret, generate, and predict textual content (Min et al., 2023; Teubner et al., 2023). With their foundation in advanced deep learning techniques and extensive datasets, these models have reshaped the field of NLP (Min et al., 2023; Teubner et al., 2023). These models, particularly notable for their self-attention mechanisms, belong to the family of neural network architectures known as transformer networks (Teubner et al., 2023). This architectural innovation has given LLMs a unique ability to understand the intricate context and relationships within sequential data, a fundamental skill for processing natural language (Min et al., 2023; Teubner et al., 2023; Wei et al., 2022).

To appreciate the impact of LLMs in natural language processing, it is crucial to recognize that they have revolutionized how machines engage with human language (Teubner et al., 2023; Wei et al., 2022). LLMs are distinct as generative AI systems designed explicitly to generate textual content (Teubner et al., 2023; Wei et al., 2022).

They excel at both comprehending and producing human-like text, making them versatile tools for a wide array of language-related tasks (Teubner et al., 2023; Wei et al., 2022).

One remarkable aspect of LLMs is their broad applicability across a spectrum of language-related tasks, including but not limited to translation, sentiment analysis, and chatbot interactions (Teubner et al., 2023; Wei et al., 2022). Their capacity to handle intricate textual data, identify entities and relationships, and generate coherent and grammatically accurate text sets them apart as invaluable assets in the NLP toolkit (Teubner et al., 2023; Wei et al., 2022).

LLMs, exemplified by GPT-4, underpin the field of natural language processing, aiming to attain human-like language comprehension and generation across various applications (Khurana et al., 2023). These models play an integral role in the two core components of NLP: Natural Language Understanding and Natural Language Generation (Liddy, 2001). Understanding the science of language, and encompassing aspects like phonology, morphology, syntax, semantics, and pragmatics, form the foundation of NLP (Khurana et al., 2023; Liddy, 2001). Additionally, LLMs employ a two-stage training pipeline, contributing to their effectiveness (Shen et al., 2023). In the initial pretraining phase, they leverage self-supervised learning on extensive, unannotated datasets, eliminating the need for extensive manual annotation and enhancing scalability (Shen et al., 2023). Subsequently, they undergo fine-tuning on smaller, task-specific annotated datasets, enabling them to perform specific tasks with high accuracy (Shen et al., 2023).

For instance, ChatGPT, built on the GPT-3.5 architecture, represents a significant advancement in conversational AI (Shen et al., 2023). Trained on a vast array of internet text, including books, articles, and websites, ChatGPT excels in conversational tasks (Shen et al., 2023). Its adaptive behavior based on human feedback, including the identification of toxic text, allows it to understand user intentions, generate human-like text, and maintain coherence in conversations (Shen et al., 2023).

It is crucial to acknowledge that LLMs, including ChatGPT, have limitations, such as the tendency to produce plausible yet incorrect responses, often referred to as the *hallucination effect* (Shen et al., 2023). Additionally, they may prioritize following

instructions over genuine interaction, potentially making assumptions when user input lacks clarity (Shen et al., 2023).

LLMs like GPT-4 and its variants, including ChatGPT, have emerged as transformative tools in the field of NLP. Their deep learning algorithms, self-attention mechanisms, and training methodologies have enabled them to understand, generate, and interact with human language in a remarkably sophisticated manner. These models are at the forefront of advancing the capabilities of AI systems in comprehending and generating textual content, with significant implications for various applications.

In summary, in NLP, two critical elements stand out: NLP itself and LLMs. NLP, with roots dating back to the mid–20th century, leverages linguistics, computer science, and cognitive psychology to enable computers to understand and generate human-like text. It encompasses language processing and generation, which are fundamental for text comprehension and production.

LLMs, represented by GPT-3 and driven by advanced deep learning and vast datasets, have revolutionized NLP. These models, based on transformers, excel in context and relationship understanding. LLMs are designed for both comprehending and generating human-like text, making them versatile across various language-related tasks.

LLMs play a pivotal role in NLP, underpinning Natural Language Understanding and Generation. Their training, involving self-supervised learning and fine-tuning, ensures effectiveness. Models like ChatGPT showcase their excellence in conversational AI, although they have limitations like producing occasional incorrect responses. Nevertheless, LLMs are leading advancements in AI's text comprehension and generation, with significant implications across diverse digital applications.

G. TEXT ANALYSIS

Text analysis is a powerful tool that unravels the intricacies of written and spoken language, revealing hidden meanings and patterns (Hassan, 2023). As Alan McKee (2003), a leading scholar in the field, aptly defined it, text analysis involves making informed conjectures about how individuals in distinct cultures and eras interpret the world around them. Delving into critical elements of text, such as content, context,

audience, authorship, and structure, text analysis offers diverse perspectives on communication and comprehension (Oleinikova, 2020). This section discusses the significance of text analysis, highlighting its integration with innovative software tools, and its utilization of the foundational Flesch scoring method.

1. Text Analysis and Its Significance

Text analysis, a fundamental tool in information processing, plays a pivotal role in deciphering the meanings, patterns, and insights concealed within written or spoken language (Hassan, 2023; McKee, 2003). When conducting textual analysis, one delves into several critical factors within the text that merit meticulous scrutiny to derive meaning (Maitama et al., 2020). These factors encompass the content of the text, involving both explicit and implicit messages, themes, and ideas (Maitama et al., 2020). Moreover, the analysis considers the context in which the text was produced, including temporal and spatial aspects, cultural and societal influences, and the circumstances surrounding its creation and dissemination (Maitama et al., 2020). Audience analysis is another dimension of textual scrutiny, shedding light on the intended recipients, their reception of the text, and the impact it exerts on them (Kjeldsen, 2018). Authorship, a crucial aspect of text analysis, involves exploring the identity of the creator, their background, perspectives, and the potential influence of these factors on the text (Zhang et al., 2014). Additionally, text analysts assess the form and structure of the text, examining elements like layout, sequence, and organization to discern how they contribute to the overall meaning of the analyzed text (Binmakhashen & Mahmoud, 2019).

2. Integration of Software Tools

Advancements in text analysis have led to the integration of specialized software tools (Kirchhoff, 2023). Many text analysis software excel in swiftly scanning documents, websites, and other textual content, identifying nuances within the text, including readability issues, complexities, and the usage of specialized terminology (Alexa & Zuell, 2000). They may also aid in maintaining compliance and linguistic consistency, particularly in industries subject to stringent regulations such as responding

to Request for Proposals (RFPs) and crafting proposals (Wilkerson & Casas 2017). These platforms can be used for the evaluation process by meticulously assessing and scoring proposals, identifying compliance gaps, and evaluating the overall quality of responses (Choi et al., 2021). Additionally, they can contribute to effective risk management by scrutinizing documents for potential legal or compliance pitfalls (Moreno & Redondo, 2016).

Building upon these advances in text analysis software, it is also essential to understand the specific methods these tools deploy. The precision and efficiency of these software solutions often hinge upon tried-and-tested readability indices, bridging the gap between intricate textual evaluation and its practical application.

3. The Flesch Scoring Method

Many text analysis software relies on readability indices. One of the most popular is the Flesch Reading-Ease Formula, introduced by Rudolph Flesch in 1948. This formula quantifies text difficulty, primarily based on factors like sentence and word length (Flesch, 1948). Text analysis software employs the Flesch score to assess readability by analyzing sentence structure, word choice, and length (Flesch, 1948). This assessment enables organizations to pinpoint sections of their content that may be challenging for the intended audience and offers actionable suggestions for simplification (Flesch, 1948).

In summary, text analysis, as a transformative tool for understanding language, addresses an array of textual facets, from content and context to audience and authorship (Maitama et al., 2020). Integrated software tools enhance this process by swiftly scanning and optimizing content, ensuring compliance, streamlining proposal evaluations, and mitigating risks (Choi et al., 2021; Moreno & Redondo, 2016). Moreover, the Flesch scoring method, introduced by Rudolph Flesch in 1948, forms the bedrock of readability assessment (Flesch, 1948). Employed by many text analysis software applications, it aids in pinpointing complex content areas and simplifying them for better comprehension (Kiselnikov et al., 2020). Together, these elements converge to advance the field of text analysis, offering a deeper understanding of language and communication.

H. SUMMARY

This chapter presented a thorough examination of the multifaceted aspects that influence communication within the public procurement process. It began by discussing the regulatory and organizational constraints that challenge effective communication and examined how these factors create barriers in the B2G market. The chapter then provided a historical overview of the plain language movement, tracing its journey from early advocacy to widespread adoption and highlighted the significant strides made over the decades. Additionally, it scrutinized key legislation, including the Plain Writing Act and the Clear and Concise Content Act, underscoring their role in promoting clarity in governmental communications.

Further, the chapter provided an in-depth analysis on the essence of plain writing and its importance in enhancing comprehension and readability, particularly in light of the adult literacy levels in the United States. The discussion also encompassed the revolutionary impact of LLMs and NLP, with a focus on their integration into text analysis and the utilization of tools such as the Flesch Scoring Method. These technological advancements not only enhance our understanding of language but also facilitate the simplification of complex content, making it more accessible and comprehensible.

Collectively, these insights establish a foundational understanding of the complexities in public procurement communication and the evolving strategies employed to address them. This foundational understanding is pivotal as the thesis progresses into Chapter III, Methods and Data. This chapter details the specific methodologies and data analysis techniques utilized in the study. It further elucidates how these tools and concepts have been applied to enhance our understanding of communication efficacy in public procurement, effectively bridging theoretical insights with practical applications. This integration of theory and practice is instrumental in providing a thorough exploration of the broader field of public procurement communication.

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III. METHODS AND DATA

This chapter outlines the methodology employed in this study to critically examine and improve government procurement communications. Grounded in the mandates of the Plain Writing Act of 2010, this approach evaluated these communications against established Plain Writing Principles and pioneered the integration of AI to augment clarity and comprehension.

Central to this investigation was an array of sophisticated tools—a synthesis of advanced text analysis software and state-of-the-art AI models. These tools constituted the core of the analytical framework, facilitating an exhaustive evaluation and refinement of complex procurement documents. By leveraging this dual-technological strategy, the study transcended conventional textual analysis and ventured into a domain where AI collaboratively augmented human expertise, culminating in unparalleled precision and readability in procurement communication.

A. OVERVIEW OF METHODOLOGY

This research was structured into two phases, each meticulously crafted to examine and refine the communication standards of government procurement documents. This methodology enabled a comprehensive exploration of the efficacy of current communication practices and the potential advancements achievable through AI and human intervention.

Phase 1: Empirical Text Analysis

Phase 1 involved an empirical assessment of procurement documents, segmented into three stages:

1. Initial Automated Analysis: This stage involved using VisibleThread's text analysis software for evaluating documents against key readability metrics. This automated process established a baseline for document clarity, complexity, and adherence to industry best practices.
2. AI-Enhanced Analysis: After the initial evaluation, AI models, notably OpenAI's ChatGPT, refined complex sections identified in the documents. This stage highlighted AI's potential to augment readability and simplify complex language.

3. Human Editors Review and Refinement: The final stage required human subject matter experts for rigorous scrutiny and refinement of the AI-enhanced outputs. This ensured precision and contextual accuracy in alignment with the Plain Writing Act's principles.

Phase 2: Survey-Based Analysis of Plain Writing Principles

Phase 2 pivoted to a survey-based analysis, focusing on evaluating stakeholders' perceptions of the effectiveness of the Original, AI-Refined, and AI/Human-Refined documents. This phase was vital in comprehending the practical impact of the interventions on the intended audience.

For this phase, the research team developed a survey designed to measure the perceived clarity, effectiveness, and overall quality of the documents in alignment with Plain Writing Principles. Feedback from participants with diverse career and educational backgrounds provided essential insights into the readability and comprehensibility of the various document versions. This feedback played a critical role in evaluating the contributions of AI and human efforts in refining the documents.

Analysis of the survey data offered key insights into the efficacy of different refinement methodologies. Conclusions were drawn about the relative strengths and weaknesses of AI-driven, human-involved, and combined approaches in improving the quality and compliance of government procurement communications with plain writing standards. This phase was crucial in deriving insights about the effectiveness of various refinement methodologies, as well as understanding their real-world implications for enhancing stakeholder understanding and engagement.

This two-phase methodology, anchored in empirical analysis and the application of AI, embodied a comprehensive approach to augmenting the clarity and efficacy of government procurement communications.

B. PHASE 1: EMPIRICAL TEXT ANALYSIS

Phase 1 of the research constituted a critical step in evaluating and refining government procurement communications. This phase focused on the empirical text analysis of procurement documents, comprising several stages that involved dissecting and assessing these documents from various analytical perspectives.

The primary goal of Phase 1 was to establish a detailed understanding of the current state of procurement documentation in terms of readability and complexity. Achieving this understanding was crucial, as it informed the study's approach to enhancing the accessibility and comprehensibility of these documents, aligning them with the objectives of the Plain Writing Act. By dissecting the linguistic and structural elements of the documents, the phase provided a foundational assessment that guided the subsequent stages of the research.

1. Stage 1: Initial Automated Analysis

In the first stage of the Empirical Text Analysis, the study focused on a two-step process using VisibleThread's text analysis software to assess government procurement documents. The initial step involved uploading source documents to VT Docs, a component of VisibleThread, which facilitated an automated analysis to create an *Original* version of the documents. This assessment set the foundation for a comprehensive analysis by establishing a quantitative baseline in terms of readability and grade-level comprehension. Following this, the second step entailed recording the documents' readability scores and the software's suggested edits in a data analysis spreadsheet, identifying key areas in the documents that could benefit from further improvement.

a. Text Analysis Software

Text analysis software played a pivotal role in assessing documents' readability, structure, grammar, and other linguistic attributes (Alexa & Zuell, 2000). These tools enabled a large-scale evaluation of procurement materials against industry standards for clarity and ease of reading.

VisibleThread (VT) is a text analysis tool that offers three distinct service levels: VT Docs, VT Writer + VT Insights, and the Full Platform. In this study, the research team used VT Docs to analyze procurement materials for readability, structure, grammar, and linguistic characteristics. VT Docs provided quantified ratings and basic improvement suggestions, facilitating a large-scale evaluation. The software's readability metrics and scoring made it straightforward to identify text areas that might be difficult

for readers to comprehend. Metrics such as readability, grade level, passive voice use, and sentence length were color-coded to highlight problematic passages with visual heat maps, as illustrated in Figure 3.

The metrics evaluated by the software included (VisibleThread, 2023):

- percentage of passive voice
- Flesch-reading ease score
- Flesch-Kincaid grade level
- percentage of lengthy sentences

Each metric was color-coded based on performance against preset criteria, derived from a comprehensive analysis by VisibleThread (K. Peterson, email to author, September 21, 2023). The Flesch-Kincaid readability tests (Flesch reading ease and Flesch-Kincaid grade level) formed the basis of these evaluations.

The Flesch-reading ease test evaluates content readability on a scale of 100. A score above 60 indicates content that is easily understood, typically correlating with an eighth grade reading level. Conversely, scores below 30 suggest a complexity level more appropriate for university graduates. Thus, a higher Flesch score signifies greater ease of understanding the text (VisibleThread, 2023).

In addition to the above metrics, the software flags sentences spanning 25–29 words as *long sentences* and those exceeding 30 words as *very long sentences*. Table 3 summarizes the preset scoring structure. Although users can customize these parameters, this study strictly adhered to the default setting provided by VisibleThread. These settings are based on the company's insights into industry best practices, enabling benchmarking against established standards in the field.

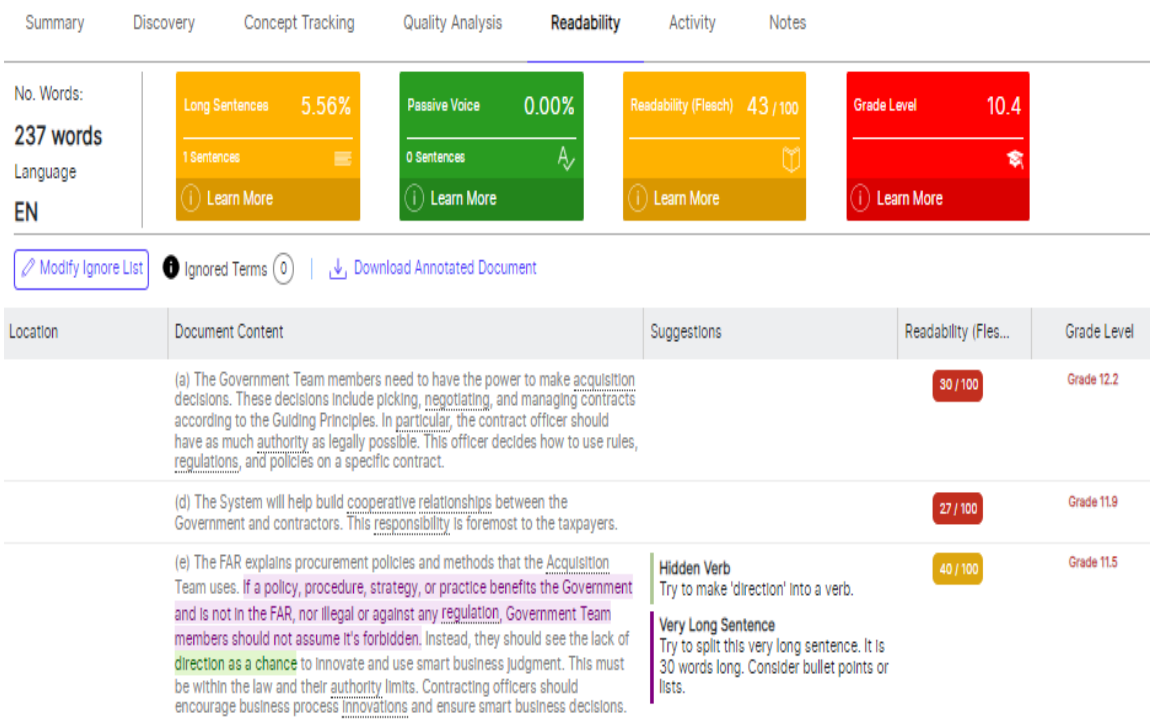


Figure 3. Screen Capture of VisibleThread Platform with Example Scoring. Source: VisibleThread (2023).

Table 3. VisibleThread Preset Scoring Structure. Adapted from VisibleThread (2023).

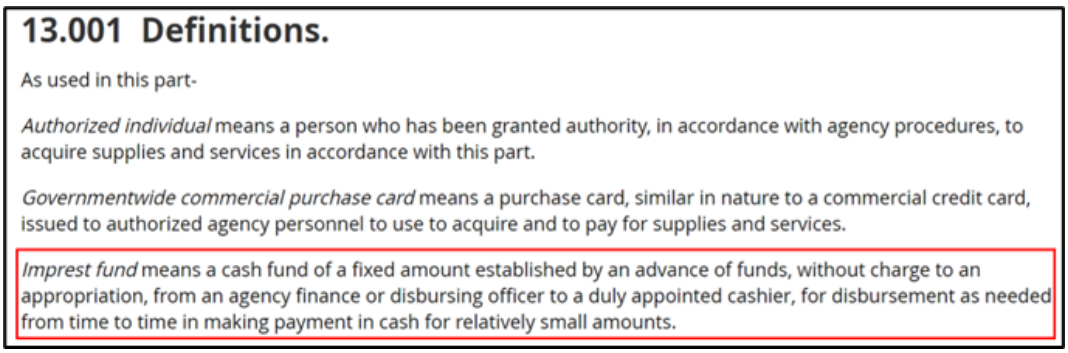
Language Thresholds	**Red**	**Yellow**	**Green**
Passive Voice	≥ 10%	9%–5%	≤ 4%
Readability (Flesch)	≤ 30	31–49	≥ 50
Grade Level	≥ 10	9–7	≤ 6
Long Sentences	≥ 15%	14%–6%	≤ 5%
Long sentences		25–29 words	
Very long sentences		> 30 words	

b. Verifying Readability Metrics

To validate the accuracy of the readability metrics provided by VT Docs, the research team executed a comprehensive verification process. This involved systematically comparing the software's readability scores with those obtained from manual calculations and other readability assessment tools. The comparison process revealed some discrepancies across different methodologies, emphasizing the importance of rigorous validation in assessing readability.

(1) Sample Text Analysis

An excerpt from FAR Part 13, shown in Figure 4, was used to demonstrate the text analysis process. This passage was evaluated in VT Docs to establish baseline readability and grade level scores. The same excerpt underwent additional analysis through manual Flesch calculations in Excel, online readability tools, and ChatGPT.



13.001 Definitions.

As used in this part-

Authorized individual means a person who has been granted authority, in accordance with agency procedures, to acquire supplies and services in accordance with this part.

Governmentwide commercial purchase card means a purchase card, similar in nature to a commercial credit card, issued to authorized agency personnel to use to acquire and to pay for supplies and services.

Imprest fund means a cash fund of a fixed amount established by an advance of funds, without charge to an appropriation, from an agency finance or disbursing officer to a duly appointed cashier, for disbursement as needed from time to time in making payment in cash for relatively small amounts.

Figure 4. Screen Capture of FAR 13.001. Source: FAR 13.001 (2023).

Table 4 summarizes the textual analysis feedback furnished by VT Docs, encompassing quantified readability and grade levels. Furthermore, Figures 5 and 6 exhibit the actual Flesch readability and Flesch-Kincaid grade level formulas employed by VisibleThread to derive its scores.

Table 4. VT Docs Suggested Edits and Scoring for FAR 13.001. Adapted from VisibleThread (2023).

Feedback	Suggested Edits / Scoring
2 Hidden verbs	Try to make "payment" and "advance" into verbs.
Very long sentence	Try to split this very long sentence. It is 50 words long. Consider bullet points or lists.

Feedback	Suggested Edits / Scoring
Readability	17/100
Grade level	23.3

Flesch Reading Ease

$$206.835 - 1.015 \left(\frac{\text{total words}}{\text{total sentences}} \right) - 84.60 \left(\frac{\text{total syllables}}{\text{total words}} \right)$$

Figure 5. Flesch Reading Ease Formula. Adapted from Readable (n.d.).

Flesch-Kincaid Grade Level

$$0.39 \left(\frac{\text{total words}}{\text{total sentences}} \right) + 11.8 \left(\frac{\text{total syllables}}{\text{total words}} \right) - 15.59$$

Figure 6. Flesch-Kincaid Grade Level Formula. Adapted from Readable (n.d.).

Table 5 presents a comparative analysis of readability scores obtained from various methods highlighting the variability inherent in assessing textual context. The methods varied in their assessment of readability score, grade level, and syllable count for the same text excerpt. A significant part of this comparison involved manual computations, as indicated by the gray highlighted cells in Table 5. These computations were executed based on the figures provided by each method, utilizing the formulas depicted in Figures 5 and 6.

While the majority of methods, including Readability Formulas, ChatGPT-4, Hand Calculated, TextCompare, and VT Docs, estimated the syllable count to be in the range of 79 to 82, a notable deviation was observed with Syllable Counter.org, which counted 88 syllables. This discrepancy highlights significant inconsistencies in syllable calculation logic among different tools. Figure 7 further elucidates this point by demonstrating the computation of average syllables per word for one particular method.

It is noteworthy that ChatGPT-4 demonstrated precision in calculating scores based on provided formulas. However, it is important to acknowledge that ChatGPT, while adept at computing readability scores when provided specific formulas, does not

autonomously process and evaluate written text in the same way as dedicated readability tools do.

Table 5. Readability Scores by Method

Method	Readability Score	Grade Level	Word Count	Sentence Count	Avg. Syllables per Word	Syllables
Readability Formulas	23	22.6	50	1	1.58	79
ChatGPT-4	20.7	22.8	50	1	1.6	80
Hand Calculated	17.3	23.3	50	1	1.64	82
TextCompare	17.3	23.3	50	1	1.64	82
VT Docs	17	23.3	50	1	1.64	82
Readable	15.6	23.5	50	1	1.66	83
Good Calculators	12.3	24	50	1	1.7	85
My Math Tables	12.3	24	50	1	1.7	85
Syllable Counter.org	7.2	24.7	50	1	1.76	88

Note. The gray highlighted cells indicate values that were manually computed. This distinction is made to highlight the differences between automated and manually calculated data. Adapted from Good Calculators (n.d.); My Math Tables (n.d.); OpenAI (2023); Readability Formulas (n.d.); Readable (n.d.); Syllable Counter.org (n.d.); TextCompare (n.d.); VisibleThread (2023).

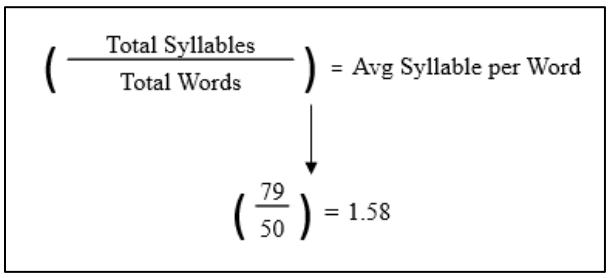


Figure 7. Portion of Flesch Readability Calculation. Adapted from Readable (n.d.).

The findings, particularly the elevated syllable count of 88 in one case, underscored how intricacies in programmed exceptions can significantly impact readability and grade- level metrics. This prompted a more focused investigation into the underlying methodologies of syllable quantification.

(2) Syllable Counting Analysis

The observed discrepancies in syllable counts indicated differences in the programmed exceptions to basic syllable counting rules, particularly how vowels are treated as syllables. Extensive research on this subject revealed that accurately computing syllables requires numerous exceptions to be encoded, despite the general principle that vowels signal syllables.

For instance, a study by Irving Fang (1968) in *Behavioral Science* notes exceptions such as not counting a final "e" as a syllable unless preceded by specific consonants. In response to an inquiry regarding VisibleThread's approach to such exceptions, the vice president of engineering explained that, akin to Fang's exceptions, the software omits final "e" syllables in certain contexts, such as in "le" at the end of "simple" (K. Peterson, email to author, September 21, 2023). This confirms that variances across tools in syllable counting largely stem from how these exceptions are handled.

To explore this variability, the sample text was evaluated using various syllable counter tools, different versions of ChatGPT, and manual counting. As demonstrated in Table 6, this analysis substantiated the inconsistencies across tools, attributable to the programmed exceptions in syllable counting rules.

Table 6. FAR 13.001 Syllable Counts by Method

Method	Syllable Count
Syllable Counter.org	88
Word Count	82
Made in Text	82
ChatGPT-4	82
Syllable Counter.net	80
How Many Syllables	80
Poetry Soup	80
ChatGPT-3.5	80
Hand Counted	80

Adapted from How Many Syllables (n.d.); Made in Text (n.d.); OpenAI (2023); Poetry Soup (n.d.); Syllable Counter.net (n.d.); Syllable Counter.org (n.d.); Word Count (n.d.).

This analysis emphasized the importance of tailoring these exceptions to align with the fundamental rules of syllable counting. To validate the logic of the outlier tool that counted 88 syllables, the sample text was manually counted, applying a specific rule and exception, which yielded a syllable count matching this anomalous result. Table 7 provides a detailed breakdown of this manual syllable counting process, adapted from Fang (1968).

Table 7. Manual Syllable Counting. Adapted from Fang (1968).

Word	Syllables Counted	Words Continued	Syllables Counted	Words Continued	Syllables Counted
Imprest	2	charge	2	disbursement	4
fund	1	to	1	as	1
means	1	an	1	needed	2
a	1	appropriation	4	from	1
cash	1	from	1	time	2
fund	1	an	1	to	1
of	1	agency	3	time	2
a	1	finance	3	in	1
fixed	2	or	1	making	2
amount	2	disbursing	3	payment	2
established	4	officer	3	in	1
by	1	to	1	cash	1
an	1	a	1	for	1
advance	3	duly	2	relatively	5
of	1	appointed	3	small	1
funds	1	cashier	2	amounts	2
without	2	for	1	**Total Syllables for Passage**	**88**

Note. To validate the logic of one outlier tool, the sample text was manually counted by applying the following rule and exception:

- Count all vowels (a, e, i, o, u, and y) as individual syllables, regardless of their position in a word.
- Exception: When vowels are adjacent, count them collectively as one syllable. For example, in the word "appointed," "o" and "i" are adjacent vowels in the second and third positions and are counted together as one syllable.

Further manual analysis of additional FAR excerpts, applying the same rule and its associated exception, corroborated the tool's reliance on this approach. As shown in Table 8, these manual syllable counts aligned with the results from the automated Syllable Counter tool, thereby validating the accuracy of the software's syllable counting approach.

Table 8. Comparison of Syllable Count Tools to Manual Count. Adapted from Syllable Counter.org (n.d.).

Document	Words	Syllable Counter	By Hand
13.001	50	88	88
13.002(a)	3	10	10
13.002(b)	23	60	60
13.002(c)	7	17	17
13.002(d)	7	17	17

The findings, particularly the elevated syllable count of 88, underscored how intricacies in programmed exceptions, or lack thereof, can significantly impact readability and grade level metrics. This analysis revealed that the variances in syllable quantification and subsequent scoring are largely due to differences in handling these exceptions.

This verification process highlighted the significant influence of syllable counts on readability metrics and simultaneously affirmed the reliability of VisibleThread's scoring. This scoring, aligned with most methods, served as a dependable starting point for text analysis. Consequently, the automated readability ratings offer an efficient means for the initial benchmarking of procurement documents.

c. Scoring Data

After completing the verification process, the research team evaluated a comprehensive set of procurement regulations, statutes, and contracts using VT Docs. This evaluation focused on generating baseline readability and grade level scores, as well as other relevant scoring data. To ensure accuracy in the results, any extraneous elements such as hyperlinks were removed to prevent skewing the analysis. This process enabled a standardized assessment of the entire compilation of documents, establishing a clear baseline for the *Original version* of the procurement texts. Crucially, this evaluation stage was instrumental in understanding the complexity and readability of the existing documents. It highlighted specific areas that needed alignment with industry standards, thus illuminating the sections that required significant improvement. This analysis established a foundational understanding of the current state of these documents and

simultaneously paved the way for targeted enhancements in subsequent stages of the study.

d. Steps for Stage 1

The first stage involved two primary actions. Initially, source documents were uploaded to VT Docs for an automated analysis, which led to the creation of the Original version of the documents. Following this, document readability scores and VT Docs' suggested edits for the Original version were recorded in a data analysis spreadsheet. This systematic approach ensured a comprehensive evaluation of the documents' initial readability and potential areas for improvement.

In summary, this initial stage of the Empirical Text Analysis established a solid foundation for understanding the complexity and readability of existing procurement texts. VT Docs proved to be an efficient tool for large-scale document analysis, effectively applying preset industry thresholds to identify areas needing improvement. Through scoring and color-coded highlights, the evaluation process streamlined the identification of specific document sections that required better alignment with industry best practices for clarity and accessibility. VT Docs facilitated an efficient analysis of numerous procurement documents, creating the Original version that serves as a baseline for further improvements.

Moving forward, the insights from this stage informed subsequent stages and phases. The combination of AI and human expertise was leveraged to further enhance these documents, striving for clear, efficient, and accessible communication in government procurement. The objective was to ensure that documentation aligned with the Plain Writing Principles and simultaneously met the evolving demands of the industry. Therefore, this initial analysis paved the way for a more detailed and refined approach to improving procurement documents, driving towards the objective of streamlined and effective communication.

2. Stage 2: AI-Enhanced Analysis

This stage focused on utilizing the advanced capabilities of ChatGPT-4, OpenAI's sophisticated interface for GPT models, to refine procurement texts. This refinement

process was guided by feedback from VT Docs and the application of Plain Writing Principles. As depicted in Figure 8, ChatGPT's conversational interface, utilizing advanced deep learning techniques, demonstrated its efficacy in processing and generating text with notable precision (Khurana et al., 2023; Shen et al., 2023).



Figure 8. Screen Capture of the ChatGPT-4 Platform. Adapted from OpenAI (2023).

The integration of LLMs, such as ChatGPT, into this study's text analysis strategy was a direct response to recent advances in NLP. These models, capable of processing text with human-like fluency (Teubner et al., 2023), were instrumental in improving problematic sections of the documents, enhancing overall comprehension.

Building upon the foundational analysis conducted with VT Docs in Stage 1, specific text passages from contract provisions and related documents were selected based on their low readability scores. This targeted selection, detailed in Figure 9, allowed the study to concentrate on the most challenging sections. Utilizing ChatGPT, these passages were refined, resulting in *AI-Refined versions* of the documents. The refinement process was executed in three distinct steps. Initially, it involved integrating VT Docs' suggestions and aligning the content with the six Plain Writing Principles. Subsequently, the AI-Refined documents were subject to a reevaluation using VT Docs. The research team conducted a second evaluation using VT Docs to assess improvements

in readability, focusing on changes in readability scores, grade levels, and any new editing suggestions. Finally, these updates were recorded in the data analysis spreadsheet, ensuring a detailed account of the improvements achieved through the refinement process.

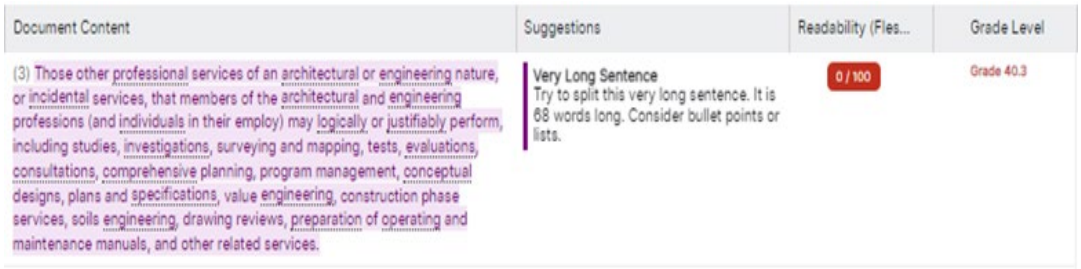


Figure 9. Screen Capture from the VisibleThread Platform of a Document Section Score. Adapted from VisibleThread (2023).

The linguistic capabilities of ChatGPT, based on extensive training datasets, proved instrumental in rephrasing complex procurement language. Despite occasional inaccuracies (the previously mentioned *hallucination effects*), ChatGPT demonstrated a significant potential for simplifying complex language, thus enhancing the efficiency of text revisions when compared to traditional manual editing.

a. Steps for Stage 2

Stage 2 commenced with the integration of VT Docs suggestions, where complex excerpts were processed by ChatGPT to implement VT Docs' edits. This step was crucial for enhancing clarity and adhering to Plain Writing Principles, ultimately leading to the generation of AI-Refined document versions. Subsequently, these AI-Refined documents underwent a second round of automated analysis with VT Docs. This analysis was pivotal in evaluating the effectiveness of the AI-driven enhancements. The final step involved a review and recording of readability scores, grade levels, and suggested edits from the AI-Refined versions. This process was essential for monitoring the readability improvements and ensuring a comprehensive evaluation of the enhancements made.

In summary, Stage 2 marked a significant advancement in the methodology through the integration of AI tools with text analysis software. This method facilitated a balanced approach that leveraged software tools and AI efficiency, proving effective for

scalable and nuanced text enhancement. This process resulted in a seamless, efficient, and dynamic method for improving text clarity. The success of this stage underscored the critical role of AI in enhancing government procurement communication, paving the way for the next stage of the study.

3. Stage 3: Human Editors' Review and Refinement

The third stage of the methodology was crucial in ensuring the effectiveness and accuracy of the text refinement process. Subject matter expert human editors meticulously reviewed the AI-Refined documents from Stage 2, finalizing these outputs to create the *AI/Human-Refined version* of the procurement documents. They focused on preserving the original context and ensuring factual accuracy, correcting any discrepancies or nuances that the AI might have overlooked or misinterpreted.

This human review process was critical, as it corrected any errors or oversights from the AI-assisted revision stage. It exemplified the indispensable role of human expertise in overseeing AI-assisted revisions, especially in a nuanced domain like government procurement.

Following the human review, these AI/Human-Refined documents underwent a final automated analysis using VT Docs. This step was vital for quantitatively assessing improvements in readability and grade level. The final VT Docs analysis provided benchmarks to evaluate the combined efficacy of AI and human editorial efforts in refining the documents. These insights were instrumental in gauging the overall impact of the study's methodology on the accessibility and comprehensibility of the procurement documents.

The concluding step of this stage involved the documentation of the process outcomes. The final readability scores and insights from VT Docs for the AI/Human-Refined versions were recorded in the data analysis spreadsheet. This served as an important record-keeping measure, offering tangible evidence of the enhancements achieved through the study's methodical approach.

a. Steps for Stage 3

The third stage began with a human review, where subject matter expert editors conducted a comprehensive analysis of the AI-Refined documents. During this stage, necessary adjustments were implemented to ensure that the original context and factual accuracy were maintained, resulting in the AI/Human-Refined document versions. Following this, the AI/Human-Refined documents underwent a final automated analysis using VT Docs. This step was crucial for quantifying readability enhancements introduced by the combined AI and human efforts. The last step involved a thorough review and recording of the final readability scores and insights derived from VT Docs for the AI/Human-Refined versions. These scores and insights were documented in the data analysis spreadsheet, enabling a detailed evaluation of the effectiveness of the combined AI and human editing process.

In summary, the completion of Stage 3 marked a significant achievement in the Empirical Text Analysis Phase. This stage bridged the initial automated analysis with AI-enhanced refinement, underscoring the critical importance of human oversight in the final phases of text refinement and ensuring that AI-driven enhancements optimized readability while maintaining the complexities of professional procurement language. The insights and methodologies derived from this stage laid a solid foundation for future initiatives focused on improving communication within government procurement. Detailed representations of the three document versions and associated AI prompts are provided in Appendix A.

With these foundational insights established, the study transitioned into Phase 2: Survey-Based Analysis of Plain Writing Principles. This phase shifted the focus to an evaluation of the practical impact of the refinements on different stakeholder groups. Through a series of structured surveys, the phase seeks to gather diverse perspectives on the effectiveness of the distinct document versions, providing a comprehensive view of the successes and areas for further improvement in government procurement communications.

C. PHASE 2: SURVEY-BASED ANALYIS OF PLAIN WRITING PRINCIPLES

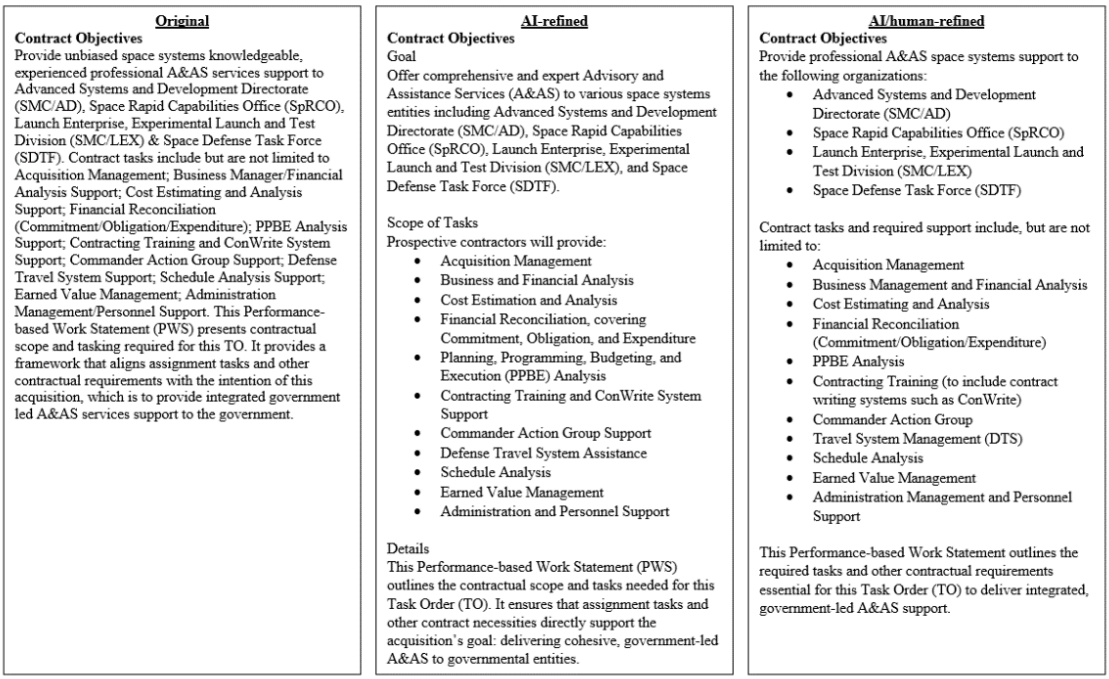
Building on the foundation established in Phase 1, the study progressed into its second phase. This phase shifted the focus from empirical text analysis to the evaluation of stakeholder perceptions, particularly in terms of how effectively the document versions adhered to the six Plain Writing Principles. The primary objective of this phase was to assess the communicative efficacy of the Original, AI-Refined, and AI/Human-Refined versions, determining how well each resonated with the intended audience in light of these principles.

At the heart of this phase was the critical assessment of the contributions made by AI and human editorial efforts. By employing a Likert scale, the survey provided a quantifiable measure of stakeholders' perceptions regarding these enhancements, thereby enabling a detailed analysis of the impact of AI and human efforts on communicative efficacy.

The culmination of this phase was an in-depth analysis of the survey results, uncovering insights into the relative effectiveness of different refinement methodologies. The analytical approach was selected to ensure that the findings were both statistically robust and contextually meaningful. This phase was crucial in linking the empirical analysis identified in Phase 1 with real-world, user-centric evaluations, thereby validating the practical benefits of these advancements in government procurement communication.

1. Surveys

To assess conformity with the Plain Writing Principles, the surveys included a comparative analysis of the Original, AI-Refined, and AI/Human-Refined text excerpts. As depicted in Figure 10, the surveys presented these paragraph variants in a randomized sequence for participant evaluation. The survey instructions underscored that while the government communications used in this study are accessible to the public, their primary target audience is prospective contractors interested in bidding on government contracts, as well as the acquisition personnel responsible for evaluating these offers. Participants were advised to keep this specific audience in mind while conducting their assessments of each passage.



Original

Contract Objectives

Provide unbiased space systems knowledgeable, experienced professional A&AS services support to Advanced Systems and Development Directorate (SMC/AD), Space Rapid Capabilities Office (SpRCO), Launch Enterprise, Experimental Launch and Test Division (SMC/LEX) & Space Defense Task Force (SDTF). Contract tasks include but are not limited to Acquisition Management; Business Manager/Financial Analysis Support; Cost Estimating and Analysis Support; Financial Reconciliation (Commitment/Obligation/Expenditure); PPBE Analysis Support; Contracting Training and ConWrite System Support; Commander Action Group Support; Defense Travel System Support; Schedule Analysis Support; Earned Value Management; Administration Management/Personnel Support. This Performance-based Work Statement (PWS) presents contractual scope and tasking required for this TO. It provides a framework that aligns assignment tasks and other contractual requirements with the intention of this acquisition, which is to provide integrated government led A&AS services support to the government.

AI-refined

Contract Objectives

Goal

Offer comprehensive and expert Advisory and Assistance Services (A&AS) to various space systems entities including Advanced Systems and Development Directorate (SMC/AD), Space Rapid Capabilities Office (SpRCO), Launch Enterprise, Experimental Launch and Test Division (SMC/LEX), and Space Defense Task Force (SDTF).

Scope of Tasks

Prospective contractors will provide:

- Acquisition Management
- Business and Financial Analysis
- Cost Estimation and Analysis
- Financial Reconciliation, covering Commitment, Obligation, and Expenditure
- Planning, Programming, Budgeting, and Execution (PPBE) Analysis
- Contracting Training and ConWrite System Support
- Commander Action Group Support
- Defense Travel System Assistance
- Schedule Analysis
- Earned Value Management
- Administration and Personnel Support

Details

This Performance-based Work Statement (PWS) outlines the contractual scope and tasks needed for this Task Order (TO). It ensures that assignment tasks and other contract necessities directly support the acquisition's goal: delivering cohesive, government-led A&AS to governmental entities.

AI/human-refined

Contract Objectives

Provide professional A&AS space systems support to the following organizations:

- Advanced Systems and Development Directorate (SMC/AD)
- Space Rapid Capabilities Office (SpRCO)
- Launch Enterprise, Experimental Launch and Test Division (SMC/LEX)
- Space Defense Task Force (SDTF)

Contract tasks and required support include, but are not limited to:

- Acquisition Management
- Business Management and Financial Analysis
- Cost Estimating and Analysis
- Financial Reconciliation (Commitment/Obligation/Expenditure)
- PPBE Analysis
- Contracting Training (to include contract writing systems such as ConWrite)
- Commander Action Group
- Travel System Management (DTS)
- Schedule Analysis
- Earned Value Management
- Administration Management and Personnel Support

This Performance-based Work Statement outlines the required tasks and other contractual requirements essential for this Task Order (TO) to deliver integrated, government-led A&AS support.

Figure 10. Comparative Presentation of Text Excerpts in Surveys. Adapted from an Air Force Space and Missile System Center's Performance Work Statement (J. Bair, email to author, August 2, 2023) and OpenAI (2023).

a. Materials and Procedure

Based on the results from Phase 1 – Stage 1, the research team selected three text passages from contract provisions and documents characterized by the lowest readability scores, as determined by VT Docs analysis. These passages, in their original form, were labeled as "Version A." Following this, the text passages were processed through ChatGPT to incorporate suggestions from VT Docs and adhere to the Plain Writing Principles, resulting in "Version B," the AI-Refined documents. Human editors further refined these versions to ensure completeness and contextual accuracy, leading to the creation of "Version C," the AI/Human-Refined documents. The three versions were deliberately labeled as Version A, Version B, and Version C in the surveys to ensure an unbiased assessment by participants. This strategy was employed to prevent participants from knowing which version was associated with a specific method of refinement (Original, AI-Refined, or AI/Human-Refined), thereby minimizing any potential biases in their evaluations.

b. Assessment of Contributions from AI and Human Editorial Efforts

Consenting participants were assigned to one of three between-subjects conditions, each corresponding to the origin of the original document: FAR1 (FAR 52.212-1), FAR2 (FAR 52.212-3), or Contract Document (PWS, a Performance Work Statement outlining technical and administrative requirements for an Air Force Space and Missile Systems Center contract, J. Bair, email to author, August 2, 2023). Within each condition, participants were exposed to three versions of the document (Original, AI-Refined, or AI/Human-Refined) in a random sequence. After examining each version, participants rated how well each version exemplified the six Plain Writing Principles. Each principle was accompanied by its name and a succinct description, with participants providing their ratings using a 1–3 Likert scale (1: Not Effective, 2: Somewhat Effective, 3: Very Effective). This evaluative process was repeated until participants had rendered ratings for all three versions of the assigned text.

Additionally, the survey collected demographic information and participant-level characteristics. This information included service affiliation, rank or title, education background, connection with the Naval Postgraduate School (NPS), years of experience in acquisition-related roles, and specific career fields. At the conclusion of the survey, participants were afforded the opportunity to offer additional insights or feedback in a designated comment section. The complete survey instruments and details are cataloged in Appendix B.

2. Analysis of Survey Results

The research team systematically analyzed the survey results from Phase 2 to scrutinize the perceived effectiveness of the Original, AI-Refined, and AI/Human-Refined versions of procurement communications. This approach integrated an examination of participants' responses across various dimensions and demographic backgrounds.

a. Initial Data Preparation

Prior to the main analysis, the dataset underwent a thorough cleaning process. This step involved removing incomplete records, responses deemed invalid due to

uniformity or participant request, and any data that did not meet the established criteria. This step was crucial to ensure the accuracy and dependability of the analysis that followed.

b. Demographic Analysis

The research team examined how participant demographics, including acquisition experience and educational background, influenced perceptions of the communication variants.

c. Focus of Analysis

The analysis primarily focused on evaluating participant ratings of the effectiveness of each document version, as defined by the six Plain Writing Principles. This involved a detailed examination of Likert scale responses to uncover trends and patterns in how participants perceived the effectiveness of the documents. The goal was to determine which version Original, AI-Refined, or AI/Human-Refined was most effective in adhering to these principles.

d. Statistical Methods Used

The study utilized diverse statistical techniques to conduct a robust analysis. This included the use of a Multivariate Analysis of Variance (MANOVA) to identify significant differences in effectiveness scores among various document versions and demographic groups. Additionally, the consistency of these scores was verified through reliability measures such as Cronbach's alpha.

D. DATA COLLECTION

The evaluation of procurement communications' alignment with the Plain Writing Act involved a compilation of regulations, statutes, contracts, and survey responses. This comprehensive collection of materials enabled a thorough assessment of both the official guidelines and real-world practices in procurement communications. The data encompassed regulations and statutes, contract documents, and survey data.

1. Regulations and Statutes

The study commenced with an extensive collection of federal regulations pertinent to procurement. This compilation included all 50 parts of the FAR sourced from Acquisition.gov. Relevant statutes governing acquisition processes, such as the Competition in Contracting Act of 1984, Truthful Cost or Pricing Data (formerly known as TINA), 41 U.S. Code Chapter 71 Contract Disputes, the Plain Writing Act, and the Procurement Integrity Act of 1988, were also integral to the study. In total, the research team analyzed 58 regulatory and statutory documents, providing a detailed overview of the legal framework governing procurement.

2. Contract Documents

The research team collected a diverse array of contract documents, including PWSs, Statements of Work (SOWs), and Request for Quotation (RFQs), to gain practical insights into the application of procurement regulations. These documents, acquired through convenience sampling from various bases and public procurement platforms, provided valuable perspectives on the real-world aspects of procurement communication, offering a contrast to formal regulations and statutes. The collected set, encompassing 18 contract documents, represented a range of stages within the procurement life cycle.

3. Survey Data

The forthcoming analysis of survey responses represents a significant portion of the data collection process. These responses, gleaned from a diverse group of stakeholders, offer invaluable perspectives on the effectiveness of the communication variants. The survey data, upon analysis, reflected the subjective assessments of these stakeholders and also provided empirical evidence to support or challenge the effectiveness of the AI and human-refined documents. This data is essential for addressing the study's research questions and understanding the real-world impact of the proposed enhancements in government procurement communication.

E. SUMMARY

This chapter outlined the study's two-phase methodology, focused on assessing and enhancing the communication standards of government procurement documents in line with industry best practices and the Plain Writing Principles. The first phase involved applying AI techniques to improve readability and comprehension, while the second phase evaluated the effectiveness of these enhancements. This dual-phase approach provided a thorough examination of existing communication practices and the potential improvements achievable through combined AI and human interventions. Together, these phases developed a comprehensive strategy for improving the clarity and accessibility of government procurement communications. The following Results and Analysis chapter presents the significant findings from this analysis, highlighting the impact of these interventions on the quality and accessibility of procurement documents.

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IV. RESULTS AND ANALYSIS

This study adopted a structured, two-phase approach to evaluate and refine public procurement documents to meet the requirements of the Plain Writing Act and improve overall communication effectiveness. The methodology was aligned with specific research questions.

Phase 1 utilized VT Docs text analysis software for empirical analysis of public-facing procurement documents, assessing readability and comprehension against industry best practices. This phase, addressing Research Questions 1a and 1b, evaluated initial document scores and the improvements from AI refinements, particularly LLMs guided by VT Docs feedback and the Plain Writing Act principles.

Phase 2 involved a survey-based analysis to understand the effectiveness of Plain Writing Principles in public procurement as measured by human raters. This phase, covering Research Questions 2, 3, and 4, explored stakeholder perceptions in the DoD procurement process, focusing on the impact of AI and human refinements and the influence of job roles and education levels on communication effectiveness.

The subsequent sections detail the findings and implications of this two-phase approach, presenting the findings and discussing their implications for enhancing the quality and transparency of DoD procurement communications.

A. PHASE 1: EMPIRICAL TEXT ANLYSIS

The empirical text analysis phase marked the initial step in this study's comprehensive examination of public procurement communications. This phase sought to methodically assess the readability, clarity, and overall effectiveness of a variety of procurement documents. By utilizing advanced text analysis software, this phase scrutinized documents to identify areas where readability and comprehension could be improved. This approach was instrumental in establishing baseline metrics against which the efficacy of subsequent refinements could be measured.

1. Stage 1: Initial Automated Analysis

The first stage of the empirical analysis was focused on evaluating the readability and grade level of public-facing procurement communications using text analysis software. The selection of documents was diverse, covering federal regulations, key statutes governing acquisition, and various procurement documents spanning different stages of the procurement life cycle. This provided a foundation for a robust evaluation, offering insights into both official guidelines and the actual communication practices within real-world contracting scenarios. This stage measured how these documents fared against established industry best practices.

Central to this stage was addressing Research Question #1a. This question guided the initial automated analysis, seeking to establish a quantitative understanding of the current state of procurement communication.

Research Question #1a: How does public procurement communication score in terms of readability and comprehension when analyzed by leading text analysis software using commercial standard measures?

During this stage, the process involved two primary actions. Initially, the Original versions of 58 regulatory and statutory documents, along with 18 contract documents, were uploaded for initial automated analysis. VT Docs assessed readability and grade level for comprehension, providing a quantitative baseline and suggesting potential enhancements. Following this, the readability scores, grade levels, and other relevant metrics were documented in a data analysis spreadsheet. This documentation created a detailed profile of each document's readability characteristics, which included word count, percentage of long sentences, passive voice usage, total sentences, overall readability scores, and grade level.

The initial automated analysis offered a revealing snapshot of the various readability and complexity levels across different procurement document types, which are detailed in Table 9.

Table 9. Average Readability and Complexity Metrics of Procurement Documents. Adapted from VisibleThread (2023).

Document type	Avg. no. words	Long		Passive		Avg. tot. sentences	Readability score	Grade level
		n	%	n	%			
Statutes	6,388	35	23.99	69	17.66	696	36	12.15
Regulations	18,407	291	28.86	227	24.12	967	27	13.90
Contract Documents	6,472	69	20.22	68	19.52	506	29	12.86

Note. Readability scores are out of 100.

Statutes, on average, contained 6,388 words. They exhibited about 24% of sentences as long and complex, with passive voice usage in 17.66% of sentences. These features contributed to an average readability score of 36 out of 100 indicating moderate complexity that may pose comprehension challenges. The average grade level for these documents was 12.15, reflecting their intricate nature.

In the case of regulations, these averaged 18,407 words and showed a higher incidence of long sentences at 28.86% and a greater reliance on passive voice at 24.12%, both metrics being higher than those found in statutes. This complexity was further underscored by a lower readability score of 27 out of 100, and a higher average grade level requirement of 13.90, suggesting the need for more sophisticated reading ability for proper understanding.

Contract documents had an average word count of 6,472. They exhibited a moderate percentage of long sentences at 20.22%, which is lower than that found in regulations but slightly less concise than statutes. The use of passive voice stood at 19.52%, a higher percentage than statutes but less than regulations. These documents achieved an average readability score of 29 out of 100, suggesting a complex yet relatively more comprehensible style compared to other document types. The average grade level requirement of 12.86, while indicative of complexity, positions these documents as somewhat more comprehensible than regulations.

Figure 11 presents the distribution of readability scores across various types of public procurement documents, shedding light on the differing levels of complexity, as

measured by the Flesch-reading ease test. According to the Flesch scale, where a score above 60 signifies content easily understood by someone with an eighth grade reading level and scores below 30 are suitable for university graduates, the analysis indicated that statutes typically have a higher median readability score, suggesting that these documents are generally more readable than the other categories are. In contrast, regulations displayed a lower median and a wider range of readability scores, indicating less consistent readability. Contract documents exhibited a pattern similar to regulations, characterized by a lower median readability score and a wide range, highlighting a general trend towards lower and more variable readability. The overall analysis revealed that despite some document types being more readable than others, they all generally present a degree of complexity beyond the grasp of the average reader, with most falling below the threshold of what is considered easily understandable by the general public as per the Flesch-reading ease standards.

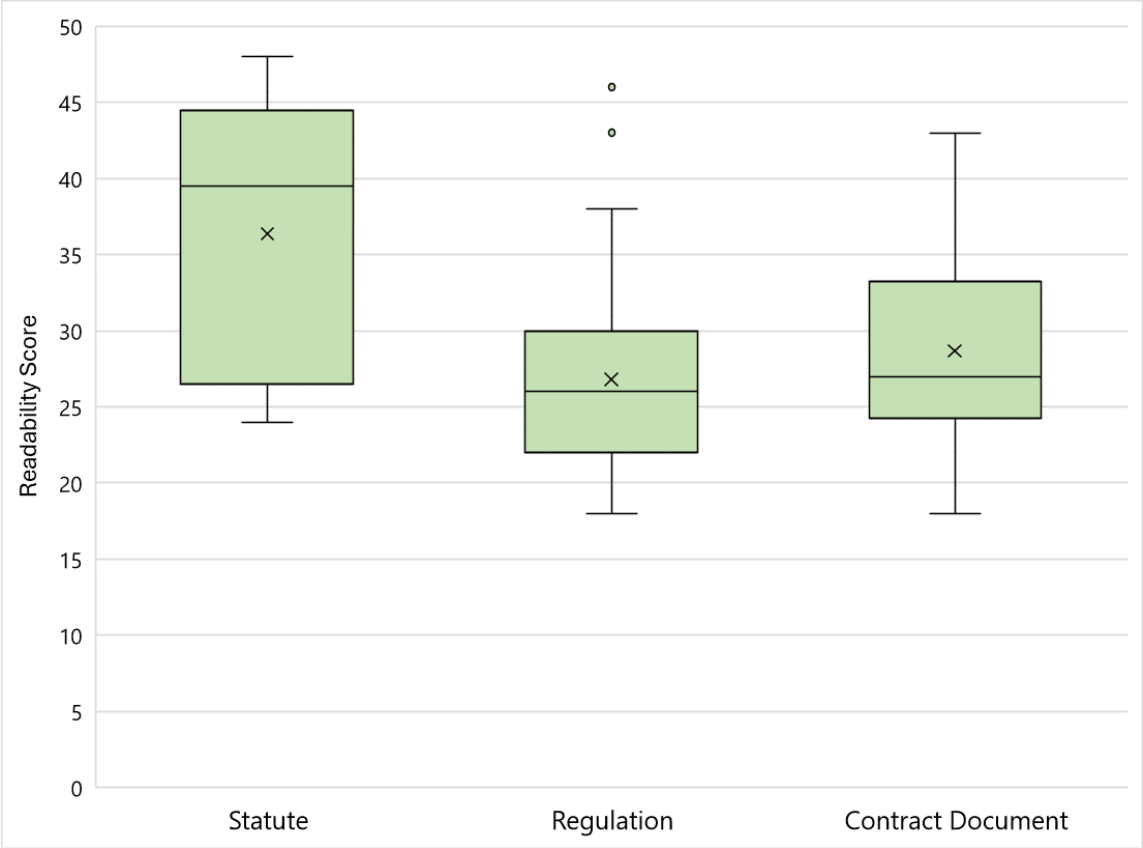


Figure 11. Distribution of Readability Scores by Document Type. Adapted from VisibleThread (2023).

The analysis of Grade Level distributions, as illustrated in Figure 12, revealed the distinct trends across document categories. Statutes demonstrated a generally lower median Grade Level, suggesting they are composed in a more accessible academic style compared to regulations and contract documents. In contrast, regulations are characterized by a higher median Grade Level, reflecting a more advanced academic writing style. Contract documents followed a similar pattern to regulations, with a high median Grade Level.

While the analysis of Grade Levels reveals some variations among document types, with statutes generally faring better than regulations and contract documents, the overall picture remains concerning. This is especially true when considering the broader context of adult literacy and reading proficiency in the United States. According to 2022 data, 79% of adults are literate, but a significant 54% read below the sixth-grade level (National Literacy Institute, n.d.). Furthermore, The Literacy Project reports that the average American's reading level is comparable to that of a seventh to eighth grader (Marchand, 2017). This stark contrast between the complexity of procurement documents and the actual reading capabilities of the general public underscores a substantial gap. Even the statutes, which appear relatively more accessible, may still pose comprehension challenges for a significant portion of the population.

This contrast between document complexity and public reading capabilities is not just an academic issue. The acquisition and contractor workforces, who engage with these documents, are drawn from the general American population. Therefore, the reading levels of these documents directly impact and reflect upon the broader society. In particular, those in the workforce, who may not have advanced academic qualifications, are expected to comprehend and work with these complex documents. This disparity highlights the need for procurement documents to be more aligned with the average American's reading proficiency, ensuring that the documents are accessible and understandable to those directly involved in government contracting as well as the broader public who may indirectly interact with these documents.

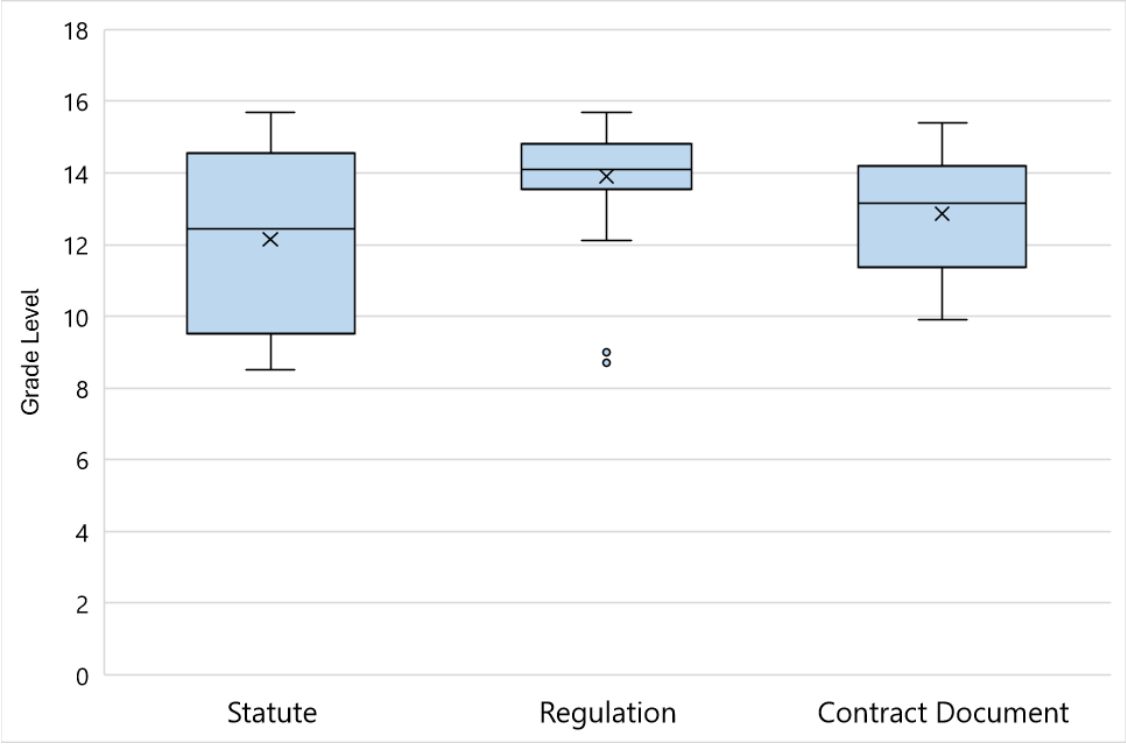


Figure 12. Distribution of Grade Level Scores by Document Type. Adapted from VisibleThread (2023).

The variation in scores and metrics across these document types highlighted the diverse levels of complexity and clarity present, providing a comprehensive baseline for the current state of procurement communications based on standard commercial measures.

Subsequent to the initial evaluation, the research team explored how AI and Human-AI collaboration could enhance the readability scores of public-facing communications, as measured by commercial text analysis tools.

2. Stage 2: AI-Enhanced Analysis

The second stage of this research phase focused on addressing Research Question 1b through the integration of AI for refining the initially analyzed documents. This stage involved assessing the proficiency of LLMs, specifically ChatGPT, to implement VT Docs' suggestions and enhance the readability scores of the documents according to plain language principles.

Research Question #1b: Can text generated by commercially available LLMs, when prompted with the six Plain Writing Principles, enhance the readability and comprehension scores of these communications, as determined by the same text analysis software used in Research Question 1a?

In this stage, the process encompassed three key actions. The initial step of this stage was to integrate the suggestions from VT Docs. This involved utilizing ChatGPT to process complex excerpts, implementing the recommended edits to enhance clarity and ensure adherence to Plain Writing Principles. This process culminated in the creation of AI-Refined document versions. Subsequently, the AI-Refined documents underwent a second round of automated analysis with VT Docs. This analysis was essential for evaluating the impact of the AI-driven enhancements on readability and comprehension. The final action in this stage was the review and recording of readability scores, grade levels, and suggested edits from the AI-Refined versions. This documentation in the data analysis spreadsheet was critical for monitoring the readability improvements and ensuring a comprehensive assessment of the enhancements.

This AI-driven refinement stage resulted in significant enhancements in the documents' readability and clarity. Observations showed a substantial reduction in the use of complex sentences and passive voice, leading to improved readability scores and lower grade levels, as illustrated in Table 10.

3. Stage 3: Human Editors' Review and Refinement

The focus of this stage was to validate and enhance the AI's preliminary edits by ensuring that the revised documents retained their full context and accuracy. Subject matter expert human editors meticulously evaluated the AI-Refined documents to ensure their integrity and adherence to the intended meaning.

The process during this stage comprised several key actions. Initially, subject matter expert editors conducted a comprehensive review of the AI-Refined documents. This involved making essential adjustments to preserve the original context and ensure factual accuracy, thereby refining the documents with a combination of AI and human expertise. Following this human review, the documents underwent a final automated

analysis using VT Docs. This analysis was crucial for quantifying the enhancements in readability achieved through the collaborative efforts of AI and human editing. The last step in this stage was the review and documentation of the final readability scores and insights derived from VT Docs. These ultimate readability metrics were then recorded in the data analysis spreadsheet, providing a detailed and conclusive assessment of the improvements in document readability.

The human editors' review was indispensable for verifying that the AI enhancements were contextually sound and that the documents were coherent and complete. The resulting readability scores were a testament to the synergistic potential of AI and human expertise, as illustrated in Table 10.

Table 10. Comparative Readability Metrics between Phase 1's Stages. Adapted from VisibleThread (2023).

Document version	Tot. words	Long sentence		Passive voice		Tot. sentences	Readability score	Grade level
		n	%	n	%			
PWS								
Original	131	3	60.00	1	20.00	5	0	21.80
AI-Refined	136	1	5.26	0	0.00	19	8	13.90
AI/Human-Refined	114	0	0.00	1	5.26	19	4	14.20
FAR1								
Original	493	9	56.25	10	62.50	16	20	17.80
AI-Refined	344	1	3.45	1	3.45	29	32	11.40
AI/Human-Refined	319	2	7.69	5	19.23	26	36	11.10
FAR2								
Original	263	4	44.44	2	22.22	9	1	20.20
AI-Refined	249	0	0.00	0	0.00	24	22	12.60
AI/Human-Refined	192	2	13.33	2	13.33	15	20	13.40

Note. Readability scores are out of 100.

4. Comparative Analysis between Stages

Table 10 provides a comparative analysis across the three stages, highlighting the impact of both AI and human editing on the readability and clarity of the documents.

- PWS: The original document had a high percentage of passive voice (20%), a grade level of 21.80, and a readability score of 0. The AI editing improved readability, reduced passive voice, and lowered the grade level substantially. While the AI/Human-Refined version did see a slight increase in passive voice and grade level compared to the AI-only version, it still demonstrated a significant enhancement in readability over the Original document.

- FAR 52.212-1 (FAR1): The original document had the highest percentage of passive voice (62.50%), a grade level of 17.80, and a readability score of 20. The AI editing improved readability, reduced passive voice, and lowered the grade level, whereas the AI/Human-Refined edit increased the passive voice, improved readability, and slightly decreased the grade level score. Both AI-Refined and AI/Human-Refined versions represented a significant improvement over the Original document.

- FAR 52.212-3 (FAR2): The original document had a high percentage of passive voice (22.22%), a grade level of 20.20, and a readability score of 1. The AI editing improved readability, reduced passive voice, and lowered the grade level. The AI/Human-Refined version, while showing an increase in passive voice and grade level compared to the AI-only version, still maintained a better readability score and a lower grade level than the Original document did.

The analysis underscored the effectiveness of both AI and Human-AI teaming in improving the readability and clarity of procurement communications.

AI edits alone led to substantial enhancements by reducing the percentage of long sentences and almost entirely eliminating passive voice. However, human review proved essential for ensuring that these changes were contextually appropriate and complete. While the additional human refinement, crucial for accuracy and completeness, resulted in slight increases in grade levels and reductions in readability scores, as observed in the final metrics for the AI/Human-Refined documents. The AI/Human-Refined documents still outperformed the Original versions in terms of readability. This finding emphasizes a nuanced balance in optimizing procurement communications: While AI significantly boosts readability, human expertise is vital for maintaining the precision and complexity inherent in these types of documents.

The readability scores presented in Table 10 reflect the outcomes of the analysis. In the context of the readability scoring system used, a higher score indicates a text that is easier to comprehend. Generally, a score above 60 is considered to be at an eighth grade reading level and is regarded as a good readability score. However, as the results indicated, both the Original documents and their AI-Refined and AI/Human-Refined versions scored significantly lower than 60. Despite a marked improvement in readability from the original documents to the AI-Refined versions, the scores remained below the recommended industry standard of 60. This outcome suggests two possible interpretations: First, the section of text analyzed may inherently have a lower readability score due to its complexity or specific content; second, it may reflect a broader issue of overall unreadability prevalent in government documents.

These findings underscored the challenges inherent in enhancing the readability of procurement communications, particularly when dealing with complex and technical government documents. The scores revealed that, despite improvements made through AI and human editing, achieving an ideal readability score in this context was a significant challenge and indicated a need for ongoing efforts to simplify and clarify these types of communications.

5. Interpreting the Role and Limitations of VT Docs Software

While VT Docs played a critical role in the initial assessment of the documents, providing quantitative data on readability, grade level, and passive voice usage, it is

important to interpret its role accurately, acknowledging its limitations. While the software provided valuable quantitative data and aligned with certain Plain Writing Principles, such as promoting active voice and simpler language, its assessments do not fully capture the nuanced requirements of the Plain Writing Act. Aspects like Audience-Focused Writing, Clear Organization, and Reader-Friendly Design necessitated a qualitative and context-sensitive approach, which extends beyond the capabilities of VT Docs.

Thus, while VT Docs served as a valuable tool for identifying areas of improvement, it is not a standalone solution. The integration of AI, in the form of LLMs like ChatGPT, and meticulous review by human editors were crucial steps to ensure completeness, contextual accuracy, and alignment with Plain Writing Principles. This holistic approach, combining quantitative assessments with qualitative evaluations, underscored the potential of text analysis software in public procurement communications and highlighted the necessity for ongoing developments to fully embrace plain writing standards.

In synthesizing the insights derived from the three stages of the first phase of analysis, and acknowledging the role and limitations of VT Docs, the study established a comprehensive foundation for understanding the intricacies of enhancing readability and clarity in procurement communications. This approach adhered to industry best practices of readability and grade level comprehension paving the way for more accessible, user-friendly public-facing communications.

Following this detailed exploration of the three-stage procedure dedicated to enhancing readability through AI and human integration, this analysis highlighted the need to delve deeper into understanding the practical implications of these findings. While text analysis software illuminated systematic issues related to readability and grade level comprehension, and LLMs demonstrated their potential in ameliorating these challenges, it became clear that a more nuanced understanding of effectiveness was required.

As such, the validation through a survey served as a critical juncture, marking the transition from the empirical text analysis of Phase 1 to the perceptual analysis of Phase

2. The next phase employed a survey instrument to gather data on perceived effectiveness, capturing the perspectives of potential consumers of the text. This step was essential for assessing how the readability improvements, as quantified by commercial text analysis measures, align with the Plain Writing Principles when subjected to the scrutiny of the intended audience.

Subsequent sections present the examination of these additional research questions, shedding light on end users' experiences with the original and refined versions. The results from this survey-based analysis offered a granular view of communication effectiveness across different job roles and education levels, contributing to a more inclusive and accessible procurement environment.

B. PHASE 2: SURVEY-BASED ANALYSIS OF PLAIN WRITING PRINCIPLES

As the study transitioned into Phase 2, the focus shifted from empirical text analysis to a survey-based evaluation of the impact of AI and human interventions on public procurement documents. In this phase, the research team assessed the perceived effectiveness of the Original, AI-Refined, and AI/Human-Refined versions, with a particular emphasis on their alignment with the Plain Writing Principles. Through collecting and analyzing responses from a diverse group of participants, researchers gained deeper insights into the subjective aspects of readability and comprehension, offering perspectives beyond purely quantitative metrics. This approach facilitated an evaluation of the practical implications of the enhancements, as well as their alignment with the principles of plain writing as experienced by end-users.

Building on the focus of Phase 2, this stage incorporated a methodology for participant selection and data collection, complemented by a demographic analysis of the survey participants. A key element of this phase was the thorough examination of three primary research questions, each seeking to explore different dimensions of the perceived effectiveness of refined procurement communications.

1. Participant Background and Demographics

For this study, participation was sought from representative groups, resulting in a diverse sample of 129 individuals from the NPS community and various listservs. After an initial screening of the collected data, 22 records were identified as incomplete and subsequently removed from the dataset. Data imputation across these records was not possible given the missing information elements. Additionally, two records were discarded due to invalid responses, characterized by identical selections across all options. Furthermore, an additional record was eliminated at the participants' request, as they expressed the intention to alter their ratings in the post-submission comments, which would have resulted in a lack of variance in their responses. This meticulous data cleaning process ensured the integrity of the dataset, resulting in a robust sample for analysis.

The final study sample, comprising 104 participants, represented a diverse cross-section of the NPS community and various related fields. Table 11 presents a detailed demographic breakdown, highlighting various facets such as acquisition experience, educational background, service affiliation, rank or title, and NPS affiliation.

By accounting for participant characteristics, the study gained a richer understanding of the interplay between career experiences and educational attainment on engagement with procurement processes.

Table 11. Summary of Participant Characteristics, N = 104

Base characteristic	Participants	
	n	%
Education Level		
Non-Graduate Degree Associate/Bachelor's	56	53.85
Graduate Degree Master's/Doctorate	48	46.15
Acquisition Experience		
Non-Acquisition	41	39.42
Acquisition	63	60.58
Contracting	28	44.44
Engineering	1	1.59
Financial Management	5	7.94
Logistics	13	20.63
Project/Program Management	10	15.87
Other	18	28.57
Service affiliation		
U.S. Air Force	52	50.00
U.S. Army	5	4.81
U.S. Marine Corps	8	7.69
U.S. Navy	26	25.00
Foreign military	2	1.92
No Affiliation	11	10.58
Rank or Title		
Enlisted	11	10.58
Officer	70	67.31
Civilian	23	22.12
NPS affiliation		
Master's Student	69	66.35
Doctoral Student	1	0.96
NPS Faculty	7	6.73
Graduate Writing Center Staff	11	10.58
Other	16	15.38

Note. Percentages exceed 100% in Acquisition sub-categories as participants were allowed to select more than one option.

2. Test of Research Question 2

Research Question #2: What is the rate of perceived effectiveness in public procurement communications according to the six Plain Writing Act principles?

To address Research Question 2, the researchers analyzed participants' evaluations of the Original, AI-Refined, and AI/Human-Refined passages, specifically their ratings of adherence to the six Plain Writing Principles. For this analysis, the focus was specifically on the changes in effectiveness across the three versions of the document presented to participants, collapsing across document type. Using the scale provided to participants, the research team analyzed the percentage of participants who rated each principle as "Not Effective." The findings are summarized in Table 12 and Figure 13.

Table 12. Percentage of "Not Effective" Ratings across Within-Subject Conditions and Principles

Plain writing principle	Original version	AI-Refined version	AI/Human-Refined version
	%	%	%
1. Audience-Focused Writing	26.92	3.85	9.62
2. Clear Organization	62.50	2.88	16.35
3. Simple Language	48.08	6.73	18.27
4. Concise Language	54.81	3.85	14.42
5. Active Voice	28.85	4.81	15.38
6. Reader-Friendly Design	80.77	7.69	25.00

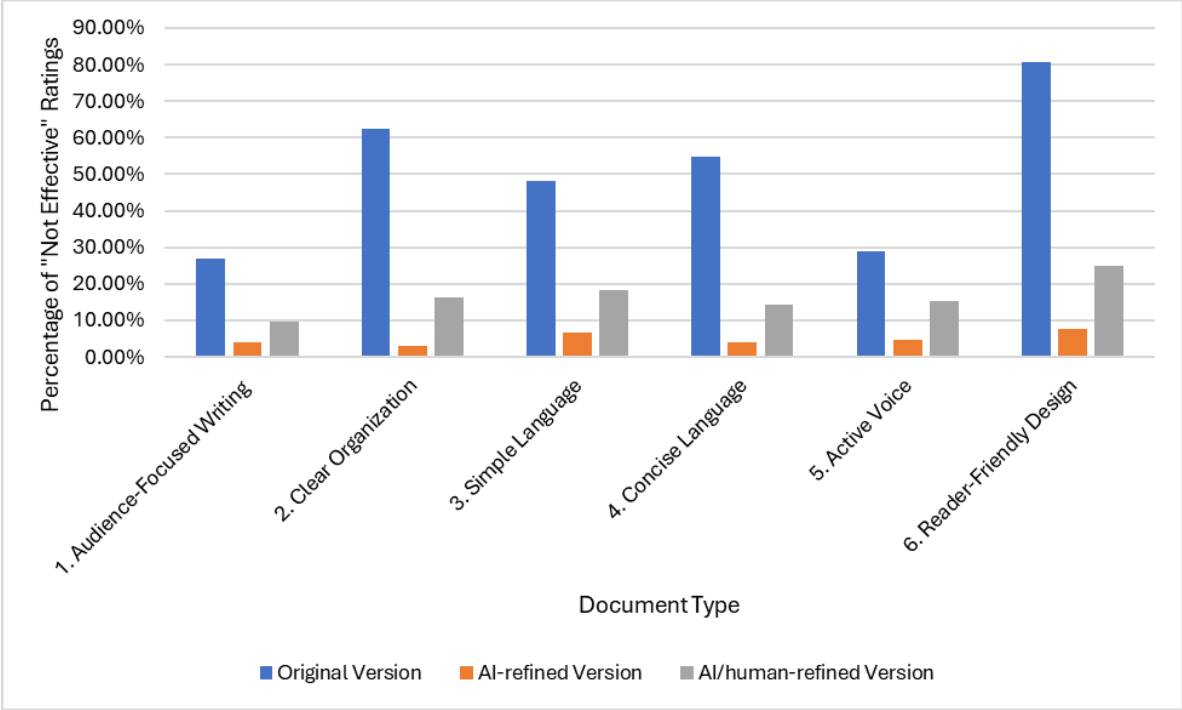


Figure 13. Comparison of Writing Principles across Within-Subject Conditions

The analysis revealed notable trends:

- Original Version: This version exhibited significant deficiencies in adhering to Plain Writing Principles, with high "Not Effective" ratings across all principles, ranging from 26.92% to 80.77% ineffective.
- AI-Refined Version: This version showed marked improvements in all areas. The most significant enhancements were observed in "Clear Organization" and "Reader-Friendly Design," with dramatic reductions in "Not Effective" ratings. Specifically, the "Clear Organization" principle experienced a striking 95.39% decrease in "Not Effective" ratings.
- AI/Human-Refined Version: While this version displayed a slight decrease in effectiveness compared to the AI-only version, it still represented a significant advancement from the Original version. This indicated that human adjustments, while potentially reintroducing certain complexities, did not substantially detract from the AI's improvements. Notably, the "Clear Organization" principle showed a 73.84% decrease in "Not Effective" ratings. However, certain areas, particularly "Reader-Friendly Design," "Simple Language," and "Clear Organization," exhibited more challenges than others, like "Active Voice," "Concise Language," and "Audience-Focused Writing." The "Active Voice" principle, despite being less problematic in the human analysis, still observed a 46.69% decrease in ratings of ineffectiveness.

The discrepancies in effectiveness raised interesting questions. For instance, the AI/Human-Refined version had less effectiveness in "Reader-Friendly Design" and "Simple Language" but performed relatively better in "Active Voice" and "Audience-Focused Writing." This observation aligned with common trends in human editing, where readability and conciseness can be more subjective and thus more challenging to optimize.

When comparing these findings with the VT Docs reports, an intriguing pattern emerged. The VT Docs analysis highlighted a substantial presence of passive voice in the Original documents, which was significantly reduced in the AI-Refined versions. However, the survey results indicated that "Active Voice" was less of a concern for participants, suggesting that human users might be less sensitive to passive versus active voice distinctions than VT Docs is. This discrepancy underscored the different perspectives between automated text analysis and human perception, highlighting the complex nature of text refinement for public procurement communications.

In conclusion, both AI-Refined and AI/Human-Refined revisions resulted in a substantial and significant reduction in the documents' ineffectiveness. The improvements ranged from 46.69% to an impressive 95.39%, indicating the overall effectiveness of AI integration in enhancing adherence to Plain Writing Principles. However, the varying effectiveness across different principles also revealed areas where human refinement might not align as strongly with automated analysis, offering valuable insights for further refining this integrated approach.

3. Test of Research Question 3

Research Question #3: What is the comparative impact of AI-driven and human-involved refinements on the perceived effectiveness of public procurement communications?

To examine Research Question 3, the role of AI and human collaboration on public procurement communications was tested by computing and comparing an Effectiveness Score for the three versions: Original, AI-Refined, and AI/Human-Refined.

a. Computing Effectiveness Score

Participants' ratings across the six Plain Writing Principles were averaged for each document condition. This process yielded three separate Effectiveness Scores for each participant, corresponding to the Original version, AI-Refined version, and AI/ Human-Refined version, respectively. The composite scores for each version demonstrated high internal consistency, validating the decision to average them into a single Effectiveness Score. Cronbach's alpha, a measure of internal scale consistency and reliability for averaged scores, was 0.80 for the Original version Effectiveness Score, 0.83 for the AI-Refined version Effectiveness Score, and 0.89 for the AI/Human-Refined version Effectiveness Score. The increasing alpha values suggested that the consistency of participant ratings across the six principles improved from the Original version through to the AI/Human-Refined version, indicating a potential reduction in the variability of the evaluations. These alpha values were within the acceptable range as recommended by Nunnally and Bernstein (1994) in their seminal work, *Psychometric Theory*.

A MANOVA was performed to test the effects of Document Type and Version on the Effectiveness Score. In this analysis, both Document Type and Version were treated as independent variables, with Document Type as the between-subjects variable, and Version as the within-subjects variable. The results indicated no main effect of Document Type, $F(2,101) = 0.79$, $p = .46$. However, a significant main effect of Version was observed, $F(2,100) = 157.23$, $p < .0001$. There was also a significant interaction effect between Document Type and Version, $F(4,200) = 2.99$, $p = .02$.

The significant main effect of Version means that the Effectiveness Score for the Original version was significantly lower than the Effectiveness Score for the other two versions. The significant interaction between Document Type and Version indicated that ratings of Effectiveness Scores for the AI/Human-Refined version varied slightly by Document Type. While the interaction was significant, the pattern was theoretically and practically tangential to the research objectives, and heterogenous perceptions of effectiveness driven by document variation was to be expected. The most important finding was that both the AI and human–AI versions outperformed the Original version.

In pairwise comparisons of Effectiveness Scores between Versions, the AI-Refined version significantly outperformed the Original version, $t(103) = 16.17$, $p < .0001$. The AI/Human-Refined version also significantly outperformed the Original version, $t(103) = 11.05$, $p < .0001$. Comparing the two AI-assisted versions, the AI-Refined version outperformed the AI/Human-Refined version, $t(103) = -3.55$, $p = .0006$.

The results suggested that AI-driven refinements surpassed human-involved refinements in enhancing the perceived effectiveness of public procurement communications. Specifically, the AI-Refined version demonstrated superior performance compared to both the Original and the AI/Human-Refined versions, as evidenced by the Effectiveness Scores. This significant improvement brought about by AI is illustrated in Table 13 and Figure 14, where the AI-Refined versions consistently outperformed the Originals across all document types.

Table 13. Comparative Analysis of Within-Subject Conditions Based on Effectiveness Score and Improvement Overview

Document Type	**Original version**		**AI-Refined version**		**AI/Human-Refined version**		**Improvement (AI-Refined)**	**Improvement (AI/Human-Refined)**
	M	SD	M	SD	M	SD		
PWS	1.59	0.39	2.59	0.39	2.37	0.62	+1.00	+0.78
FAR1	1.59	0.44	2.64	0.39	2.52	0.51	+1.05	+0.93
FAR2	1.73	0.57	2.61	0.49	2.14	0.65	+0.88	+0.41

Note. PWS (n=37); FAR1 (n=34); FAR2 (n=33). In this table, 'M' represents the mean Effectiveness Score for each document version, while 'SD' refers to the Standard Deviation.

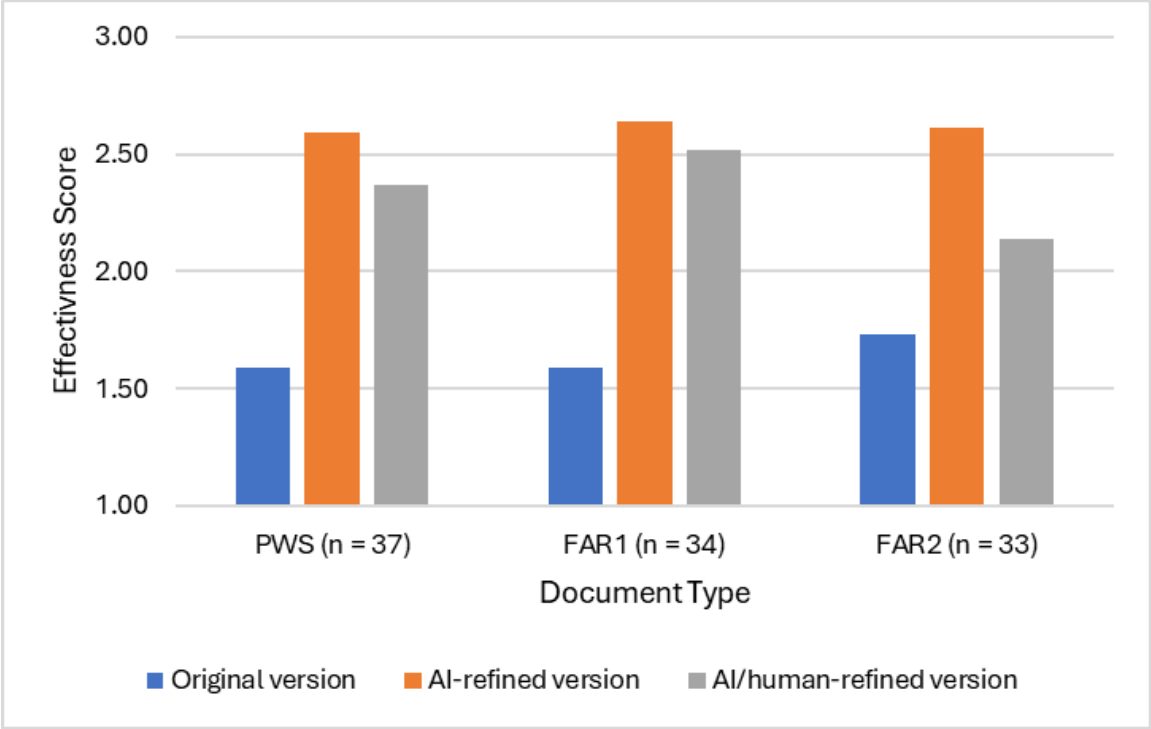


Figure 14. Comparison of Effectiveness Scores across Within-Subject Conditions

The analysis revealed the following patterns in Effectiveness Scores:

- AI-enhanced clarity: The AI-Refined versions outperformed the Original documents across all cases, showcasing AI's proficiency in improving the clarity and comprehensibility of the communications.
- Varied human impact: The AI/Human-Refined versions experienced a slight dip in effectiveness with human intervention, suggesting that the human refinement process may not always align with the Plain Writing Principles as strongly as AI does.

The evidence highlights AI's pivotal role in enhancing public procurement communications for end users by aligning with the mandates of the Plain Writing Act. The study revealed that, while human input contributes positively, AI applications yield the most substantial improvements in clarity and effectiveness. These findings underscored the potential of AI as a crucial tool for advancing the quality of public procurement communications, thereby ensuring their transparency and accessibility. This research contributed to the understanding of AI's capacity to optimize communication strategies and could inform future policies and practices in public procurement processes.

4. Test of Research Question 4

Research Question #4: Does job role or education level impact perceived effectiveness across human-generated (Original), AI-Refined and AI/Human-Refined public communications?

To test Research Question 4, the Effectiveness Score was compared to assess whether job roles or education levels influenced the perceived effectiveness of AI-Refined and AI/Human-Refined communications, compared to the Original version.

Two MANOVAs were performed to test the effects of Acquisition Experience and Education Level, respectively, on perceived effectiveness of the three document versions. In these analyses, Acquisition Experience and Education Level were each treated as independent, between-subjects variables. Additionally, the Versions of the documents were considered independent, within-subjects variables.

The analysis by Education Level indicated a significant main effect of Version, $F(2,101) = 151.52$, $p < .0001$; a main effect of Education Level, $F(1,102) = 4.86$, $p = .03$; and no interaction between Education Level and Version, $F(2,101) = 0.24$, $p = .79$.

This finding revealed a strong preference for AI-Refined versions over the Original, particularly for participants with Non-Graduate Degree education.

The main effect of Version indicates, as previously noted, that there is a significant difference in Effectiveness Score between the three versions of the document. However, the interaction effect between Education Level and Version indicates that this relationship is different for participants with different levels of education. Specifically, it was observed that participants holding a Graduate Degree, relative to those holding a Non-Graduate Degree, tended to rate all versions as somewhat less effective, even though there was a marked preference for AI-enhanced versions.

The analysis by Acquisition Experience yielded a significant main effect of Version, $F(2,101) = 144.90$, $p < .0001$; no effect of Acquisition Experience, $F(1,102) = 0.03$, $p = .87$; and no interaction between Acquisition Experience and Version, $F(2,101) = 0.23$, $p = .79$. While there was a significant preference for AI-Refined versions over the Original (as indicated by the main effect of Version), this preference was not influenced by the participants' Acquisition Experience, indicating that the effectiveness of the AI-Refined versions was not dependent on the participants' prior experience.

Overall, the results of these analyses revealed a significant and consistent preference for AI-Refined documents over the Originals, irrespective of participants' Education Level or Acquisition Experience. While participants with Non-Graduate Degrees tended to rate all versions as more effective than participants holding Graduate Degrees did, this effect was minor compared to the overall preference across all participants for AI-Refined versions. The analysis also highlighted that Acquisition Experience did not significantly impact this preference, underscoring the universal effectiveness of AI-Refined documents. These findings suggest that AI-enhanced communications are broadly effective, transcending variations in users' educational backgrounds and experience levels.

The comparative effectiveness of AI-Refined documents across different job roles and education levels is further illustrated in Figure 15 and Table 14. All improvements are calculated against the base case of the Original version of the text.

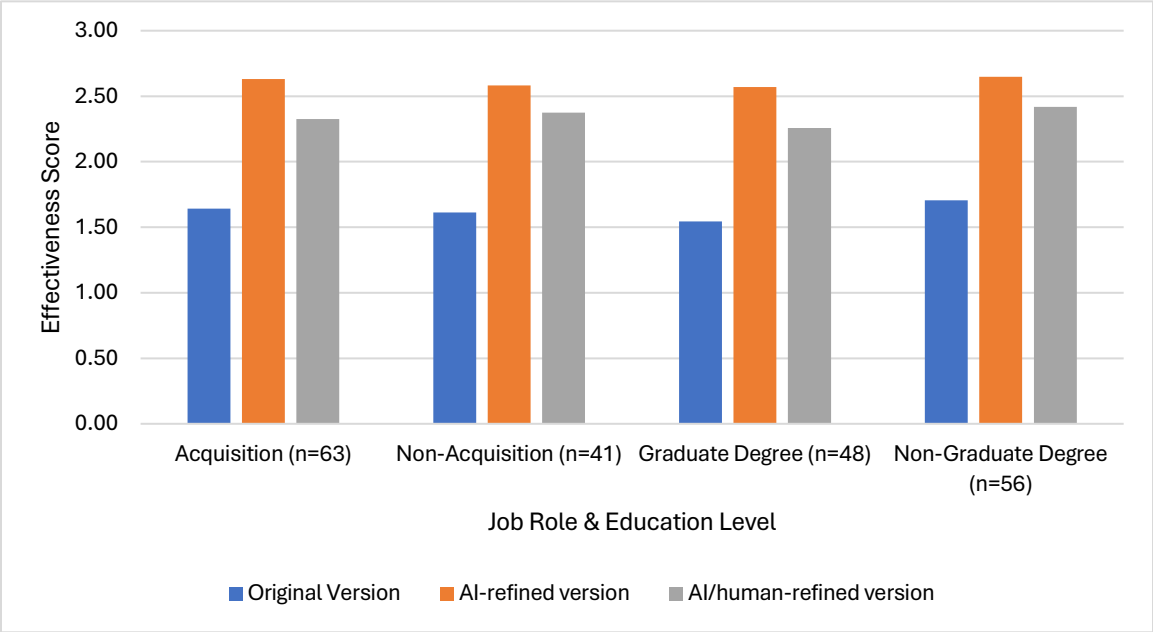


Figure 15. Comparison of Effectiveness Scores across Job Role and Education Level

Table 14. Comparative Effectiveness Scores by Job Role and Education Level across Within-Subject Conditions

Job Role & Education Level	Original version		AI-Refined version		AI/Human-Refined version		Improvement (AI-Refined)	Improvement (AI/Human-Refined)
	M	SD	M	SD	M	SD		
Acquisition	1.64	0.49	2.63	0.39	2.33	0.59	+0.99	+0.68
Non-Acquisition	1.61	0.45	2.58	0.46	2.37	0.64	+0.97	+0.76
Graduate Degree	1.55	0.45	2.57	0.43	2.26	0.70	+1.02	+0.71
Non-Graduate Degree	1.71	0.48	2.65	0.42	2.42	0.51	+0.94	+0.71

Note. Acquisition (n=63), Non-Acquisition (n=41), Graduate Degree (n=48), Non-Graduate Degree (n=56). In this table, 'M' represents the mean Effectiveness Score for each document version, while 'SD' refers to the Standard Deviation.

The analysis revealed the following patterns in Effectiveness Scores:

- Regardless of job role or education level, a preference for the AI-Refined version over the Original was consistently observed.
- Every group experienced an increase in Effectiveness Score when transitioning from the Original to the AI-Refined version.

In conclusion, the study's findings underscored AI's capacity to significantly enhance the effectiveness of public procurement communications across various demographic segments. This was particularly notable given that the AI-Refined version was preferred regardless of job role and education level, highlighting its broad applicability and appeal. Although human input alongside AI refinements did not consistently improve upon the enhancements made by AI alone, it was nevertheless viewed more favorably compared to the unrefined Original version. This suggested that while AI plays a pivotal role in enhancing the quality of these communications, the human element still retains a valuable place in the refinement process.

V. CONCLUSION

The study adapted a two-phase approach to evaluate and refine public procurement documents, leveraging the synergistic potential of AI and human expertise. Focused on enhancing readability and compliance with the Plain Writing Act, this research offers essential insights into optimizing complex communications.

A. PHASE 1: EMPIRICAL TEXT ANALYSIS

Phase 1 was structured into three stages, each focusing on a distinct aspect of enhancing the readability and comprehension of public procurement communications.

1. Stage 1: Initial Automated Analysis

Employing VT Docs text analysis software, the study evaluated a diverse range of procurement documents, uncovering significant variations in complexity and readability across statutes, regulations, and contract documents. This initial analysis highlighted a critical issue: The majority of these documents are not easily understood by the general public. This is particularly concerning, considering that the acquisition and contractor workforces, which are key to implementing these documents, are drawn from this very population. The disparity between the documents' complexity and the average American's reading level poses a significant challenge, emphasizing the need for transparency and accessibility in public procurement. By establishing a baseline understanding of the current state of procurement communications, the study lays the groundwork for targeted enhancements to improve these documents' clarity and comprehensibility.

2. Stage 2: AI-Enhanced Analysis

Integrating AI, specifically ChatGPT, the documents were refined based on VT Docs feedback and the application of the six Plain Writing Principles. This stage significantly improved readability and clarity, demonstrating AI's potential in simplifying complex language and enhancing overall comprehension. The analysis underscored the

value of AI in making complex procurement documents more accessible to the average reader.

3. Stage 3: Human Editors' Review and Refinement

Subject matter expert human editors reviewed the AI-Refined documents to ensure contextual accuracy and completeness. While critical for maintaining precision and nuance, this intervention slightly increased the documents' grade levels and reduced their readability scores. This highlights the balance that must be struck between accuracy and accessibility, underscoring the importance of human oversight in the refinement process.

Comparative Analysis and the Role of VT Docs

The comparative analysis across these stages highlighted the efficacy of AI and human–AI collaboration in enhancing document readability. It also brought to light the role and limitations of VT Docs. While VT Docs provided valuable quantitative data, it was not sufficient on its own. The integration of AI and human expertise proved crucial in aligning the documents with the Plain Writing Act's standards, showcasing a robust approach to improving clarity in procurement communications.

The study's findings highlight a significant gap between the complexity of procurement documents and the reading capabilities of the general public. This gap poses a challenge to public understanding and transparency. It is recommended that future efforts in public procurement communication prioritize simplifying language and structure to make these documents more accessible to a broader audience. The successful application of AI and human–AI collaboration in this study provides a promising pathway for achieving this goal.

Phase 1's comprehensive approach, adhering to industry best practices of readability and grade level comprehension, improved the accessibility of public-facing communications and laid a solid foundation for the in-depth exploration in Phase 2. The insights from Phase 1 informed the understanding of these communications' effectiveness, as perceived by various demographic segments.

B. PHASE 2: SURVEY-BASED EVALUATION

Phase 2 transitioned from empirical text analysis to a survey-based evaluation, focusing on the impact of interventions on public procurement communications. This phase was integral for gauging how modifications in earlier stages resonated with readers and stakeholders, particularly in terms of clarity, comprehension, and alignment with the Plain Writing Act principles.

Phase 2 revealed several key findings, which are discussed in the following paragraphs.

The first major finding was the perceived effectiveness across Plain Writing Principles. The survey showed that the AI-Refined versions of procurement communications demonstrated significant improvements in adherence to these principles. Notably, there were substantial reductions in "Not Effective" ratings, particularly in aspects like "Clear Organization" and "Reader-Friendly Design." Compared to these, the AI/Human-Refined versions were slightly less effective, but they still represented a considerable enhancement over the Original documents.

Another critical observation was the divergence in effectiveness between AI-driven and human-involved refinements. AI enhancements significantly improved clarity and comprehensibility, closely aligning with Plain Writing Principles. In contrast, human adjustments occasionally reintroduced complexities. However, these reintroductions did not majorly detract from the overall improvements achieved by AI. It appears that these reintroduced complexities may be a necessary trade-off to ensure that critical regulatory and legal information is accurately conveyed and not oversimplified. This suggests that while AI is proficient in enhancing document clarity, human oversight is crucial to retain the essential intricacies and specificities of legal and regulatory language, thereby striking a balance between simplicity and precision.

The comparative impact of AI and human interventions was also a notable finding. Effectiveness Scores computed for each version indicated that the AI-Refined versions were perceived as more effective than both the Original and the AI/Human-Refined versions. This finding was consistent across various demographic segments,

underscoring AI's capability to universally enhance the effectiveness of public procurement communications.

Lastly, the influence of Job Role and Education Level was examined. The results indicated a strong preference for the AI-Refined versions over the Original across all participant groups. This indicates the broad applicability and appeal of AI enhancements in public procurement communications, regardless of the participants' job roles or education levels.

Phase 2 provided vital insights into the readability and comprehension of the procurement documents, as measured by human users. The AI-driven refinements significantly outperformed human-involved refinements, showcasing the profound impact of AI in enhancing the clarity, comprehensibility, and overall effectiveness of communications in line with the Plain Writing Act's principles. While human involvement still plays a valuable role, particularly in maintaining the accuracy and completeness of the content, the findings from this phase emphasize the transformative potential of AI in public procurement communications. This opens new avenues for optimizing communication strategies, potentially guiding future policies and practices in this crucial sector.

Ultimately, the study underscores the potential of integrating AI with human expertise to enhance the clarity and effectiveness of public procurement communications. It showcases AI's robust capabilities in improving document readability and affirms the indispensable role of human intervention in ensuring accuracy and completeness. These findings pave the way for future explorations into the collaborative potential of AI and human expertise in other specialized communication fields.

C. LIMITATIONS

This study has made significant strides in understanding the impact of AI and human interventions on public procurement communications. However, like any research endeavor, it is subject to certain limitations that may influence the interpretation of the findings. The following subsections delve into the specifics of these limitations, discussing the potential biases, challenges in methodology, and constraints in the tools

used for analysis. Acknowledging these limitations is crucial for a balanced understanding of the study's results and implications.

1. Participant Demographics and Sample Size

One of the primary limitations of this study lies in the participant demographics, as a significant portion of the participants were affiliated with the NPS. This affiliation may have introduced a bias in the responses, as these individuals are likely to have a unique perspective on public procurement communication that differs from that of the general population. In contrast to the general population, the NPS-affiliated sample is characterized by higher education levels, more specialized knowledge in government and military operations, and potentially greater familiarity with procurement processes and jargon. This contrast is critical, as it suggests that the NPS group might have higher comprehension and tolerance for complex procurement language, which is not representative of the average American's experience. Additionally, the sample size, particularly in the subgroup analyses, was unevenly distributed, with certain subgroups having a much smaller representation than others. This could potentially influence the generalizability of the findings to the broader public procurement community.

2. AI and Human Interventions in Document Refinement

The use of AI and human interventions in refining the procurement documents, while a central focus of this study, also introduces a layer of complexity. The exact nature and extent of the human interventions were not detailed, which could leave room for variability in the interpretation of the results. Moreover, the AI tool's capabilities were not exhaustively explored; its performance was evaluated based on its alignment with the Plain Writing Act's principles, yet the tool itself was not specifically designed with these principles in mind.

3. Reliance on VT Docs for Assessment

The study's reliance on the VT Docs software for assessing the readability and compliance of the procurement documents with Plain Writing Principles presents another limitation. As the software focuses primarily on readability, grade level, and passive voice, it does not fully capture all of the principles outlined in the Plain Writing Act. This

could potentially lead to an incomplete assessment of the documents' compliance and quality.

4. Limitations of VT Docs in Text Enhancement

While VT Docs provides valuable data on document characteristics, it is imperative to acknowledge its limitations in terms of text enhancement. VT Docs primarily offers scoring based on readability and other metrics but does not provide direct suggestions or updates to the text based on these scores. It diagnoses the issues but does not suggest alternative text to correct for them. This is a significant point of distinction from other AI models that through prompt engineering, can generate suggestions and even rewrite text to improve alignment with Plain Writing Principles. The lack of this capability in VT Docs might have resulted in a less comprehensive analysis of the potential improvements that could be achieved through AI-driven interventions.

5. Rapid Advancements in AI Domain

Another significant limitation arises from the rapid advancements in the AI domain, which have outpaced the progress of this study. At the study's inception, certain AI models such as Claude AI were not readily available, limiting the range of tools that could be employed for text refinement and analysis. This restriction could have potentially led to an underestimation of the capabilities of AI in enhancing public procurement communications, as newer models might offer more sophisticated and effective interventions.

D. AREAS OF FUTURE RESEARCH

The findings of this study open numerous avenues for future research, aiming to address its limitations and expand upon its contributions to the field of public procurement communications. The subsequent subsections outline potential directions for future studies, emphasizing the need for a more diverse participant pool, the exploration of various AI models and tools, and the development of targeted interventions to enhance the clarity and accessibility of procurement documents.

1. Addressing Sample Size and Demographic Limitations

Future research should aim for a broader and more diverse sample population, encompassing a wider array of institutions and demographic backgrounds. This would enhance the representativeness of the findings and contribute to a more comprehensive understanding of public procurement communication.

Crucially, future studies should aim to include contractors in the participant pool, as they represent a significant portion of the target audience for government procurement communications. Their inclusion would provide valuable insights into how these communications are received and understood by the very individuals and entities they are intended to serve. Contractors' unique perspectives and experiences with procurement documents can shed light on areas that require improvement, ensuring that communications are not only compliant with plain writing standards but also effectively meet the needs of this pivotal audience. This approach would ultimately contribute to the creation of more accessible, clear, and user-centered procurement communications, aligning more closely with the goals of the Plain Writing Act.

2. Comprehensive Evaluation of AI and Human Interventions

Further research could also delve deeper into the AI and human intervention processes, providing a more granular analysis of how these refinements impact the clarity and effectiveness of the documents. This could involve a detailed examination of the specific changes made, the rationale behind them, and their alignment with Plain Writing Principles. This could also entail testing different controlled interventions for the Plain Writing principles.

Expanding the scope of the study to include additional text analysis tools and software would provide a more holistic view of how these technologies can aid in enhancing document quality and compliance. Comparative analyses of different tools, their methodologies, and their alignment with Plain Writing Principles would offer valuable insights and guide future improvements in this domain.

3. Expanding the Use of Text Analysis Software

Future researchers should consider employing a wider range of text analysis tools, especially those that have emerged due to recent advancements in the AI domain. This would provide a more comprehensive assessment of how different tools can contribute to enhancing public procurement communications.

Moreover, comparative studies involving a variety of AI models, including those that became available after the commencement of this study, would provide valuable insights into the relative effectiveness of different tools. Such research could guide practitioners in selecting the most suitable AI tools for their specific needs, ultimately contributing to the broader goal of enhancing transparency and accessibility in public procurement communications.

4. Developing AI Models for Specific Use Cases

Future studies should consider exploring the rapidly evolving landscape of AI models and tools available for text analysis and enhancement. Research in *prompt engineering* with AI models holds particular promise, as it involves crafting prompts to guide AI in generating desired outputs, including suggestions for text improvement. Developing and training a specific model to assess and correct texts not in alignment with the Plain Writing Principles could lead to more targeted and effective interventions. This would not only enhance the quality of public procurement communications but also contribute to a richer understanding of how AI can be leveraged to achieve compliance with plain writing standards.

E. OPERATIONALIZING THE RESEARCH METHODOLOGY

In the dynamic landscape of public procurement, the adoption of AI for enhancing communications marks a significant stride towards efficiency and clarity. This section presents a structured, step-by-step guide to seamlessly integrate AI into the process of refining procurement documents. Designed with flexibility in mind, this guide is applicable to a wide range of AI tools and can be customized to fit the unique needs and resources of various organizations. By following these steps, entities can ensure that their

procurement documents not only comply with legal requirements but are also clear, concise, and accessible to their intended audiences.

Step 1: Selection of Documents

- Identify and collect procurement documents requiring refinement, including Performance Work Statements (PWS), Statements of Work (SOW), Request for Proposals (RFP), Request for Quotation (RFQ), and other relevant materials.
- Ensure these documents are formatted for compatibility with the chosen AI tool.

Step 2: Preprocessing of Text

- Conduct a manual review to remove any sensitive or classified information from the documents before AI processing.

Step 3: AI Tool Configuration

- Select an appropriate AI language model (e.g., OpenAI's GPT-3 or GPT-4, Claude, Bard AI, or other proprietary or open-source language models).
- Develop a detailed AI prompt that embodies the Plain Writing Principles. This prompt should direct the AI to
    - prioritize audience-focused writing by tailoring the language to the document's intended readers
    - organize content clearly by structuring information logically and intuitively
    - use simple language by opting for common, everyday words over complex jargon and technical terms
    - emphasize concise language to avoid verbosity and unnecessary details
    - adopt an active voice to make writing more direct and engaging
    - ensure reader-friendly design by considering layout and visual elements that enhance readability
- Configure the AI to meet the specific needs of procurement communications and Plain Writing Principles.
- Test and refine the AI prompt with sample documents for optimal clarity and simplicity.

Step 4: Initial AI Refinement

- Input the documents and prompt into the AI tool for processing.

Step 5: Review and Adjust AI Suggestions

- Have specialists review the AI's suggestions for alignment with original intent, legal accuracy, and industry-specific terminology.
- Consult departmental experts for additional insights.

Step 6: Iterative Refinement

- Implement the reviewed changes and reprocess the document with the AI tool, repeating until the desired balance of clarity and accuracy is achieved.

Step 7: Human Expert Review

- Assemble a team of legal advisors, procurement professionals, and industry representatives for a comprehensive review of the AI-Refined document.
- Ensure the document adheres to all necessary standards and is understandable to its intended audience.

Step 8: Validation and Testing

- Engage with a diverse audience, including industry representatives, using surveys, readability tests, focus groups, pre-solicitation notices, or requests for information to assess the document's effectiveness and clarity.
- Collect feedback for any final adjustments.

Step 9: Documentation and Training

- Document the process, including AI settings, iterations, and human review stages, for future reference and training.
- Educate procurement staff on using the AI tool and the refinement process for ongoing document improvements.

Step 10: Monitoring and Continuous Improvement

- Establish a monitoring system to track the performance of AI-Refined documents over time.
- Utilize feedback and performance data to enhance the AI refinement process continuously.

This guide offers a structured approach for integrating AI to enhance the clarity and compliance of procurement communications in line with the Plain Writing Principles. It emphasizes an iterative process, fostering continuous refinement and adaptability. This approach is particularly effective in addressing the dynamic demands of the industry and keeping abreast of technological advancements. Ultimately, it equips procurement professionals with the tools to effectively leverage AI, ensuring that their communications meet regulatory standards and engage their varied audience with clarity and precision. By following this guide, professionals in the field can ensure their communications are both effective and accessible, bridging the gap between complex procurement processes and clear, comprehensible language.

F. CONCLUDING REMARKS

Effective communication is the lifeblood of public procurement, yet complex language often hinders understanding between government entities and contractors. This research addresses the pressing issue of complex and unclear communication in DoD procurement documents, hindering transparency and posing a barrier to entry in public sector markets. The study advances the understanding of how to enhance public procurement communications and align them with the Plain Writing Act. By employing a two-phase approach that leveraged the synergistic potential of AI and human expertise, the research yields valuable insights and recommendations for improving communication practices in this crucial domain.

Phase 1, through empirical text analysis, reveals significant deficiencies in alignment with plain writing standards and a gap between the complexity of procurement documents and the reading capabilities of the general public. This gap hinders public understanding and transparency. To bridge this gap, Phase 2 employs a survey-based evaluation to assess the impact of AI-driven and human-involved refinements on perceived effectiveness, clarity, and comprehension.

Through integrating AI tools with human expertise, the study pioneered enhancements yielding marked improvements in clarity, comprehension, and compliance. The findings unequivocally demonstrate the transformative power of AI in enhancing public procurement communications. AI-Refined versions consistently outperformed both the Original and AI/Human-Refined versions, showcasing AI's remarkable ability to simplify language, adhere to Plain Writing Principles, and improve overall effectiveness.

Human intervention in AI-Refined text proved less proficient than the pure AI-Refined version at enhancing clarity and comprehensibility from an empirical language analysis perspective. However, the study finds that human intervention may be necessary to ensure the topical details of the texts are preserved. Human–AI teaming still provided a marked improvement in perceived effectiveness, readability, and appropriate comprehension levels over the standard human–generated text. Therefore, the findings underscore the potential of this collaborative approach, with AI delivering impactful refinements complemented by indispensable human oversight.

It is recommended that procurement professionals embrace this synthesis of technological capabilities and human judgment to transform communications. These findings underscore the pressing need for public procurement stakeholders to leverage AI as a powerful tool for improving communication practices. By integrating AI into the communication process, organizations can overcome linguistic barriers, foster greater public understanding, and promote transparency in procurement activities. This, in turn, can drive better value for taxpayers, increase competition, and strengthen the integrity of public procurement processes.

Ultimately, this study calls for a paradigm shift in public procurement communication, one that embraces the transformative power of AI to enhance clarity, effectiveness, and accessibility. By harnessing AI's capabilities, government organizations can foster a more transparent, accountable, and efficient public procurement system, ultimately benefiting the public and society as a whole. Achieving this vision will drive mutual understanding, ignite competition, catalyze innovation, and propel public procurement into a bold new era of transparency.

APPENDIX A. PHASE 1 – EMPIRICAL TEXT ANALYSIS AND DOCUMENT REFINEMENT

This appendix provides detailed representations of the three versions of the document used in the study: the Original version, the AI-Refined version, and the AI/ Human-Refined version. Each version is presented alongside the specific AI prompts used to generate the AI-Refined content. This section serves to illustrate the tangible differences between each version and showcases the step-by-step process of refinement.

The documentation here is crucial for understanding the practical applications of AI in enhancing the readability and clarity of procurement documents. It also offers insights into the collaborative process between AI and human input, highlighting how each approach contributes to the final product.

Readers will find these examples useful for a comprehensive understanding of the changes and improvements made to each document, thus providing a clear context for the survey results and analyses discussed in the main body of the thesis.

FAR1 52.212-1: ORIGINAL (VERSION A); PHASE 1, STAGE 1

(f) Late submissions, modifications, revisions, and withdrawals of offers. (1) Offerors are responsible for submitting offers, and any modifications, revisions, or withdrawals, so as to reach the Government office designated in the solicitation by the time specified in the solicitation. If no time is specified in the solicitation, the time for receipt is 4:30 p.m., local time, for the designated Government office on the date that offers or revisions are due.

(2) (i) Any offer, modification, revision, or withdrawal of an offer received at the Government office designated in the solicitation after the exact time specified for receipt of offers is "late" and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late offer would not unduly delay the acquisition; and-

(A) If it was transmitted through an electronic commerce method authorized by the solicitation, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of offers; or

(B) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of offers and was under the Government's control prior to the time set for receipt of offers; or

(C) If this solicitation is a request for proposals, it was the only proposal received.

(ii) However, a late modification of an otherwise successful offer, that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.

(3) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the offer wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

(4) If an emergency or unanticipated event interrupts normal Government processes so that offers cannot be received at the Government office designated for receipt of offers by the exact time specified in the solicitation, and urgent Government requirements preclude amendment of the solicitation or other notice of an extension of the closing date, the time specified for receipt of offers will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

(5) Offers may be withdrawn by written notice received at any time before the exact time set for receipt of offers. Oral offers in response to oral solicitations may be withdrawn orally. If the solicitation authorizes facsimile offers, offers may be withdrawn via facsimile received at any time before the exact time set for receipt of offers, subject to the conditions specified in the solicitation concerning facsimile offers. An offer may be withdrawn in person by an offeror or its authorized representative if, before the exact time set for receipt of offers, the identity of the person requesting withdrawal is established and the person signs a receipt for the offer (FAR 52.212-1, 2023).

FAR1 52.212-1: PROMPT USED TO GENERATE AI-REFINED (VERSION B); PHASE 1, STAGE 2

Prompt: I would like you to act as a reviewer and editor of public facing communications between the U.S. Government and industry. Please rewrite the original text adhering to VisibleThread suggestions and the Plain Writing Principles only, keeping the intended audience in mind.

Intended Audience: Prospective offerors for government contracts and the acquisition personnel that may evaluate their offers.

Constraint: Do not utilize any other writing principles other than the six listed below and do not use casual language.

Original Text:

(f) Late submissions, modifications, revisions, and withdrawals of offers. (1) Offerors are responsible for submitting offers, and any modifications, revisions, or withdrawals, so as to reach the Government office designated in the solicitation by the time specified in the solicitation. If no time is specified in the solicitation, the time for receipt is 4:30 p.m., local time, for the designated Government office on the date that offers or revisions are due.

(2) (i) Any offer, modification, revision, or withdrawal of an offer received at the Government office designated in the solicitation after the exact time specified for receipt of offers is "late" and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late offer would not unduly delay the acquisition; and-

(A) If it was transmitted through an electronic commerce method authorized by the solicitation, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of offers; or

(B) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of offers and was under the Government's control prior to the time set for receipt of offers; or

(C) If this solicitation is a request for proposals, it was the only proposal received.

(ii) However, a late modification of an otherwise successful offer, that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.

(3) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the offer wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

(4) If an emergency or unanticipated event interrupts normal Government processes so that offers cannot be received at the Government office designated for receipt of offers by the exact time specified in the solicitation, and urgent Government requirements preclude amendment of the solicitation or other notice of an extension of the closing date, the time specified for receipt of offers will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

(5) Offers may be withdrawn by written notice received at any time before the exact time set for receipt of offers. Oral offers in response to oral solicitations may be withdrawn orally. If the solicitation authorizes facsimile offers, offers may be withdrawn via facsimile received at any time before the exact time set for receipt of offers, subject to the conditions specified in the solicitation concerning facsimile offers. An offer may be withdrawn in person by an offeror or its authorized representative if, before the exact time set for receipt of offers, the identity of the person requesting withdrawal is established and the person signs a receipt for the offer.

Visible Thread Suggestions:

Suggestion 1: Passive Language - Try to rephrase ‘specified’ using active voice. Is it clear who performs this action?

Suggestion 2: Hidden Verb - Try to make ‘solicitation’ into a verb.

Suggestion 3: Very Long Sentence - Try to split this very long sentence. It is 30 words long. Consider bullet points or lists.

Suggestion 4: 3 uses of Passive Voice - Try to rephrase ‘made’, ‘received’ and ‘considered’ using active voice. Is it clear who performs these actions?

Suggestion 5: Hidden Verb - Try to make ‘solicitation’ into a verb.

Suggestion 6: Very Long Sentence - Try to split this very long sentence. It is 60 words long. Consider bullet points or lists.

Suggestion 7: 2 uses of Passive Voice - Try to rephrase ‘received’ and ‘transmitted’ using active voice. Is it clear who performs these actions?

Suggestion 8: Very Long Sentence - Try to split this very long sentence. It is 32 words long. Consider bullet points or lists.

Suggestion 9: Passive Language - Try to rephrase ‘received’ using active voice. Is it clear who performs this action?

Suggestion 10: Very Long Sentence - Try to split this very long sentence. It is 36 words long. Consider bullet points or lists.

Suggestion 11: 3 uses of Passive Voice - Try to rephrase ‘received’, ‘accepted’ and ‘considered’ using active voice. Is it clear who performs these actions?

Suggestion 12: Very Long Sentence - Try to split this very long sentence. It is 32 words long. Consider bullet points or lists.

Suggestion 13: Hidden Verb - Try to make ‘installation’ into a verb.

Suggestion 14: Very Long Sentence - Try to split this very long sentence. It is 40 words long. Consider bullet points or lists.

Suggestion 15: 3 uses of Passive Voice - Try to rephrase ‘received’, ‘extended’ and ‘deemed’ using active voice. Is it clear who performs these actions?

Suggestion 16: 3 Hidden Verbs - Try to make ‘amendment’, ‘extension’ and ‘solicitation’ into verbs.

Suggestion 17: Very Long Sentence - Try to split this very long sentence. It is 86 words long. Consider bullet points or lists.

Suggestion 18: 5 uses of Passive Voice - Try to rephrase ‘established’, ‘withdrawn’, ‘withdrawn’, ‘withdrawn’ and ‘withdrawn’ using active voice. Is it clear who performs these actions?

Suggestion 19: 2 Very Long Sentences - Try to split these very long sentences. They are 36 and 42 words long. Consider bullet points or lists.

Plain Writing Principles:

1. Audience-Focused Writing: The passage uses language the intended audience would understand and relate to. The language level matches the audience’s knowledge.

2. Clear Organization: The information is presented logically starting with the main point. Headings guide readers through sections.

3. Simple Language: The passage uses simple words and avoids unnecessary jargon. Verbs are in present tense. Words like “must” are used for clarity. Word placement prevents ambiguity.

4. Concise Language: The sections, sentences, and words are short and unnecessary language is eliminated. Key details appear first.

5. Active Voice: The passage uses active voice. Verbs are not turned into nouns. The doer of the action is clear.

6. Reader-Friendly Design: The passage incorporates lists, tables, bullets, or other visual elements to simplify complex information. The formatting is easy to scan.

FAR1 52.212-1: AI-REFINED (VERSION B) RESULTING FROM PROMPT; PHASE 1, STAGE 2

Offer Submission Guidelines

1. **Timely Submissions:**
   - You must submit your offers, and any related modifications, revisions, or withdrawals, to the designated Government office by the solicitation deadline. If the solicitation does not specify a time, ensure your documents arrive by 4:30 p.m., local time, on the due date.

2. **Handling Late Submissions:**
   - We define any offer or related document arriving after the specified deadline as "late."
   - We will not consider late submissions unless:
     - We receive it before making the award,
     - The Contracting Officer confirms that considering the late offer will not cause undue acquisition delays, and
     - It meets one of the following criteria:
       - It arrived at the initial point of entry to the Government infrastructure no later than 5:00 p.m., one working day before the deadline (for electronically transmitted submissions only),
       - Acceptable evidence demonstrates it was under Government control before the deadline,
       - It was the only proposal received (applies to request for proposals only).
   - We will consider and may accept a late modification of an otherwise successful offer if it provides more favorable terms to the Government.

3. **Validating Receipt Time:**
   - Acceptable proof of timely receipt at the Government installation includes:
     - The installation's time/date stamp on the offer wrapper,
     - Other documentable evidence of receipt maintained by the installation,
     - Oral testimony or statements of Government personnel.

4. **Emergency Protocols:**
   - In the event of an emergency or unexpected event that disrupts normal Government processes, preventing offers from being received at the designated office by the specified time, and if urgent Government needs prevent the extension of the closing date through solicitation amendment or other notification, we will extend the time specified for receipt of offers to the same time on the next business day that normal Government processes resume.

5. **Offer Withdrawals:**
    - You may withdraw offers via written notice at any time before the set deadline for offer receipt.
    - If the solicitation permits, you may withdraw oral offers in response to oral solicitations orally and facsimile offers via facsimile.
    - Offer withdrawal in person requires:
        - Verification of the identity of the person requesting withdrawal, and
        - That person's signature on the offer receipt.

FAR1 52.212-1: AI/HUMAN-REFINED (VERSION C) INCORPORATING SUBJECT MATER EXPERT INPUT; PHASE 1, STAGE 3

Submitting, Changing, and Withdrawing Offers
You must submit your offers, including any changes or withdrawals, to the specified Government office by the deadline in the solicitation.

- If no time is listed, offers are due by 4:30 p.m. local time on the due date.

Late Offers
Any offer received after the deadline is late and will not be considered unless:

- It reaches the office before the award is made and the contracting officer determines accepting the late offer will not unreasonably delay the acquisition and;
    - One of the following situations applies:
        - It was sent electronically through a method authorized in the solicitation and was received at the initial Government point of entry by 5:00 p.m. one working day before the deadline.
        - There is evidence that it arrived at the Government installation and was under the government's control prior to the deadline.
        - It is the only proposal received and the solicitation was a request for proposals.

However, a late change to an otherwise successful offer that benefits the Government will be considered at any time.

Evidence of Timely Receipt
Acceptable evidence that an offer arrived on time at the Government installation includes:

- The date/time stamp of the office on the offer wrapper.
- Other documentation of receipt maintained by the office.
- Oral statements of Government personnel.

Extensions for Unexpected Interruptions
If an emergency or unexpected event disrupts normal Government operations and prevents offers from reaching the designated Government office on time, and if urgent needs prevent amending the solicitation, the deadline for receiving offers will automatically extend to the same time of day as stated in the solicitation on the first workday when normal Government operations resume.

Offer Withdrawal
Offers maybe withdrawn at any time before the deadline:

- In writing.
- Orally, if responding to an oral solicitation.
- Via fax, if allowed in the solicitation.
- In person, if the contractor or an authorized representative provides identification and signs a receipt for the offer.

FAR2 52.212-3: ORIGINAL (VERSION A); PHASE 1, STAGE 1

The Offeror shall complete only paragraph (b) of this provision if the Offeror has completed the annual representations and certification electronically in the System for Award Management (SAM) accessed through https://www.sam.gov. If the Offeror has not completed the annual representations and certifications electronically, the Offeror shall complete only paragraphs (c) through (v) of this provision.

(b) (1) Annual Representations and Certifications. Any changes provided by the Offeror in paragraph (b)(2) of this provision do not automatically change the representations and certifications in SAM.

(2) The offeror has completed the annual representations and certifications electronically in SAM accessed through http://www.sam.gov. After reviewing SAM information, the Offeror verifies by submission of this offer that the representations and certifications currently posted electronically at FAR 52.212-3, Offeror Representations and Certifications-Commercial Products and Commercial Services, have been entered or updated in the last 12 months, are current, accurate, complete, and applicable to this solicitation (including the business size standard(s) applicable to the NAICS code(s) referenced for this solicitation), at the time this offer is submitted and are incorporated in this offer by reference (see FAR 4.1201), except for paragraphs __.

[Offeror to identify the applicable paragraphs at (c) through (v) of this provision that the offeror has completed for the purposes of this solicitation only, if any.

These amended representation(s) and/or certification(s) are also incorporated in this offer and are current, accurate, and complete as of the date of this offer.

Any changes provided by the offeror are applicable to this solicitation only, and do not result in an update to the representations and certifications posted electronically on SAM] (FAR 52.212-3, 2023).

FAR2 52.212-3: PROMPT USED TO GENERATE AI-REFINED (VERSION B); PHASE 1, STAGE 2

Prompt: I would like you to act as a reviewer and editor of public facing communications between the US Government and industry. Please rewrite the original text adhering to Visible Threads suggestions and the Plain Writing Principles only, keeping the intended audience in mind.

Intended Audience: Prospective offerors for government contracts and the acquisition personnel that may evaluate their offers.

Constraint: Do not utilize any other writing principles other than the six listed below and do not use casual language.

Original Text:

The Offeror shall complete only paragraph (b) of this provision if the Offeror has completed the annual representations and certification electronically in the System for Award Management (SAM) accessed through https://www.sam.gov. If the Offeror has not completed the annual representations and certifications electronically, the Offeror shall complete only paragraphs (c) through (v) of this provision.

(b) (1) Annual Representations and Certifications. Any changes provided by the Offeror in paragraph (b)(2) of this provision do not automatically change the representations and certifications in SAM.

(2) The offeror has completed the annual representations and certifications electronically in SAM accessed through http://www.sam.gov. After reviewing SAM information, the Offeror verifies by submission of this offer that the representations and certifications currently posted electronically at FAR 52.212-3, Offeror Representations and Certifications-Commercial Products and Commercial Services, have been entered or updated in the last 12 months, are current, accurate, complete, and applicable to this solicitation (including the business size standard(s) applicable to the NAICS code(s) referenced for this solicitation), at the time this offer is submitted and are incorporated in this offer by reference (see FAR 4.1201), except for paragraphs __.

[Offeror to identify the applicable paragraphs at (c) through (v) of this provision that the offeror has completed for the purposes of this solicitation only, if any.

These amended representation(s) and/or certification(s) are also incorporated in this offer and are current, accurate, and complete as of the date of this offer.

Any changes provided by the offeror are applicable to this solicitation only, and do not result in an update to the representations and certifications posted electronically on SAM.]

Visible Thread Suggestions:

Suggestion 1: Very Long Sentence - Try to split this very long sentence. It is 31 words long. Consider bullet points or lists.

Suggestion 2: 3 uses of Passive Voice - Try to rephrase ‘entered’, ‘submitted’ and ‘incorporated’ using active voice. Is it clear who performs these actions?

Suggestion 3: Hidden Verb - Try to make ‘submission’ into a verb.

Suggestion 4: Very Long Sentence - Try to split this very long sentence. It is 86 words long. Consider bullet points or lists.

Suggestion 5: Hidden Verb - Try to make ‘provision’ into a verb.

Suggestion 6: Long Sentence - Try to split this long sentence. It is 27 words long. Consider bullet points or lists.

Suggestion 7: Passive Language - Try to rephrase ‘incorporated’ using active voice. Is it clear who performs this action?

Suggestion 8: Long Sentence - Try to split this long sentence. It is 28 words long. Consider bullet points or lists.

Plain Writing Principles:

1. Audience-Focused Writing: The passage uses language the intended audience would understand and relate to. The language level matches the audience’s knowledge.

2. Clear Organization: The information is presented logically starting with the main point. Headings guide readers through sections.

3. Simple Language: The passage uses simple words and avoids unnecessary jargon. Verbs are in present tense. Words like “must” are used for clarity. Word placement prevents ambiguity.

4. Concise Language: The sections, sentences, and words are short and unnecessary language is eliminated. Key details appear first.

5. Active Voice: The passage uses active voice. Verbs are not turned into nouns. The doer of the action is clear.

6. Reader-Friendly Design: The passage incorporates lists, tables, bullets, or other visual elements to simplify complex information. The formatting is easy to scan.

FAR2 52.212-3: AI-REFINED (VERSION B) RESULTING FROM PROMPT; PHASE 1, STAGE 2

Submitting Your Offer: A Step-by-Step Guide

Step 1: Determine Your Completion Section

- If you've finished the annual electronic representations and certifications in the System for Award Management (SAM), complete only paragraph (b). Access SAM here.
- If not, complete paragraphs (c) through (v) only.

Step 2: Understand Annual Representations and Certifications (paragraph b)

(b)(1) Clarifications

Any changes you provide in paragraph (b)(2) won't automatically alter the representations and certifications in SAM.

(b)(2) Validation of Information

After reviewing SAM's information:

- Confirm that the representations and certifications at FAR 52.212-3 are current and accurate.
- Ensure they have an entry or update within the last 12 months.
- Verify they apply to this solicitation, including the business size standard(s) relevant to the NAICS code(s) referenced.

Ensure the following:

- Your submission verifies the accuracy, completeness, and applicability of the information.
- Your offer includes the aforementioned data by reference (refer to FAR 4.1201), excluding paragraphs ___. [Specify applicable paragraphs, if any.]

Step 3: Special Situations (Paragraphs c through v)

Specify and identify any applicable paragraphs from (c) to (v) that you've completed for this solicitation only, if any. Ensure the following:

- Any amended representations and/or certifications you include are accurate and complete as of the offer's date.

- Any changes you provide apply only to this solicitation, and won't update the representations and certifications posted electronically on SAM.

Important Note: Be mindful to regularly check and confirm the accuracy of your details in SAM. Your annual electronic updates keep your information current and applicable to future solicitations.

FAR2 52.212-3: AI/HUMAN-REFINED (VERSION C) INCORPORATING SUBJECT MATTER EXPERT INPUT; PHASE 1, STAGE 3

Completing Required Representations and Certifications

The Offeror must complete one of the following instructions:

- Only paragraph (b) of this provision if the offeror has completed the annual representations and certifications electronically in the System for Award Management (SAM) accessed through https://www.sam.gov.
- Paragraphs (c) through (v) of this provision if the offeror has not completed the annual representations and certifications electronically in SAM.

(b)(1) Annual Representations and Certifications

- Any changes the offeror makes in paragraph (b)(2) do not automatically update the offeror's representations and certifications in SAM.

(2) Confirmation of SAM Details:

(i) The Offeror confirms that the representations and certifications in SAM:

- Have been completed or updated within the last 12 months.
- Are current, accurate, complete, and applicable to this solicitation, including the business size and NAICS codes.
- Are incorporated in this offer by reference (see FAR 4.1201).

(ii) If there are any changes to the representations and certifications, the Offeror must:

- Identify the amended representations and certifications contained in paragraphs (c) through (v). Amended paragraphs: _____.
- Understand and confirm that these amendments are incorporated in this offer, are current, accurate, and complete as of this offer's date, and apply only to this solicitation.

PWS: ORIGINAL (VERSION A); PHASE 1, STAGE 1

Contract Objectives

Provide unbiased space systems knowledgeable, experienced professional A&AS services support to Advanced Systems and Development Directorate (SMC/AD), Space Rapid Capabilities Office (SpRCO), Launch Enterprise, Experimental Launch and Test Division (SMC/LEX) & Space Defense Task Force (SDTF). Contract tasks include but are not limited to Acquisition Management; Business Manager/Financial Analysis Support; Cost Estimating and Analysis Support; Financial Reconciliation (Commitment/Obligation/Expenditure); PPBE Analysis Support; Contracting Training and ConWrite System Support; Commander Action Group Support; Defense Travel System Support; Schedule Analysis Support; Earned Value Management; Administration Management/Personnel Support. This Performance-based Work Statement (PWS) presents contractual scope and tasking required for this TO [Task Order]. It provides a framework that aligns assignment tasks and other contractual requirements with the intention of this acquisition, which is to provide integrated government led A&AS services support to the government (J. Bair, email to author, August 2, 2023).

PWS: PROMPT USED TO GENERATE AI-REFINED (VERSION B); PHASE 1, STAGE 2

Prompt: I would like you to act as a reviewer and editor of public facing communications between the US Government and industry. Please rewrite the original text adhering to Visible Threads suggestions and the Plain Writing Principles only, keeping the intended audience in mind.

Intended Audience: Prospective offerors for government contracts and the acquisition personnel that may evaluate their offers.

Constraint: Do not utilize any other writing principles other than the six listed below and do not use casual language.

Original Text:

Contract Objectives

Provide unbiased space systems knowledgeable, experienced professional A&AS services support to Advanced Systems and Development Directorate (SMC/AD), Space Rapid Capabilities Office (SpRCO), Launch Enterprise, Experimental Launch and Test Division (SMC/LEX) & Space Defense Task Force (SDTF). Contract tasks include but are not limited to Acquisition Management; Business Manager/Financial Analysis Support; Cost Estimating and Analysis Support; Financial Reconciliation (Commitment/ Obligation/Expenditure); PPBE Analysis Support; Contracting Training and ConWrite System Support; Commander Action Group Support; Defense Travel System Support; Schedule Analysis Support; Earned Value Management; Administration Management/ Personnel Support. This Performance-based Work Statement (PWS) presents contractual scope and tasking required for this TO. It provides a framework that aligns assignment tasks and other contractual requirements with the intention of this acquisition, which is to provide integrated government led A&AS services support to the government.

Visible Thread Suggestions:

Suggestion 1: Passive Language - Try to rephrase 'limited' using active voice. Is it clear who performs this action?

Suggestion 2: Hidden Verb - Try to make 'requirements' into a verb.

Suggestion 3: 3 Very Long Sentences - Try to split these very long sentences. They are 31, 36 and 48 words long. Consider bullet points or lists.

Plain Writing Principles:

1. Audience-Focused Writing: The passage uses language the intended audience would understand and relate to. The language level matches the audience's knowledge.

2. Clear Organization: The information is presented logically starting with the main point. Headings guide readers through sections.

3. Simple Language: The passage uses simple words and avoids unnecessary jargon. Verbs are in present tense. Words like “must” are used for clarity. Word placement prevents ambiguity.

4. Concise Language: The sections, sentences, and words are short and unnecessary language is eliminated. Key details appear first.

5. Active Voice: The passage uses active voice. Verbs are not turned into nouns. The doer of the action is clear.

6. Reader-Friendly Design: The passage incorporates lists, tables, bullets, or other visual elements to simplify complex information. The formatting is easy to scan.

PWS: AI-REFINED (VERSION B) RESULTING FROM PROMPT; PHASE 1, STAGE 2

Contract Objectives

Goal

Offer comprehensive and expert Advisory and Assistance Services (A&AS) to various space systems entities including Advanced Systems and Development Directorate (SMC/AD), Space Rapid Capabilities Office (SpRCO), Launch Enterprise, Experimental Launch and Test Division (SMC/LEX), and Space Defense Task Force (SDTF).

Scope of Tasks

Prospective contractors will provide:

- Acquisition Management
- Business and Financial Analysis
- Cost Estimation and Analysis
- Financial Reconciliation, covering Commitment, Obligation, and Expenditure
- Planning, Programming, Budgeting, and Execution (PPBE) Analysis
- Contracting Training and ConWrite System Support
- Commander Action Group Support
- Defense Travel System Assistance
- Schedule Analysis
- Earned Value Management
- Administration and Personnel Support

Details

This Performance-based Work Statement (PWS) outlines the contractual scope and tasks needed for this Task Order (TO). It ensures that assignment tasks and other contract necessities directly support the acquisition's goal: delivering cohesive, government-led A&AS to governmental entities.

PWS: AI/HUMAN-REFINED (VERSION C) INCORPORATING SUBJECT MATTER EXPERT INPUT; PHASE 1, STAGE 3

Contract Objectives:
Provide professional A&AS space systems support to the following organizations:

- Advanced Systems and Development Directorate (SMC/AD)
- Space Rapid Capabilities Office (SpRCO)
- Launch Enterprise, Experimental Launch and Test Division (SMC/LEX)
- Space Defense Task Force (SDTF)

Contract tasks and required support include, but are not limited to:

- Acquisition Management
- Business Management and Financial Analysis
- Cost Estimating and Analysis
- Financial Reconciliation (Commitment/Obligation/Expenditure)
- PPBE Analysis
- Contracting Training (to include contract writing systems such as ConWrite)
- Commander Action Group
- Travel System Management (DTS)
- Schedule Analysis
- Earned Value Management
- Administration Management and Personnel Support

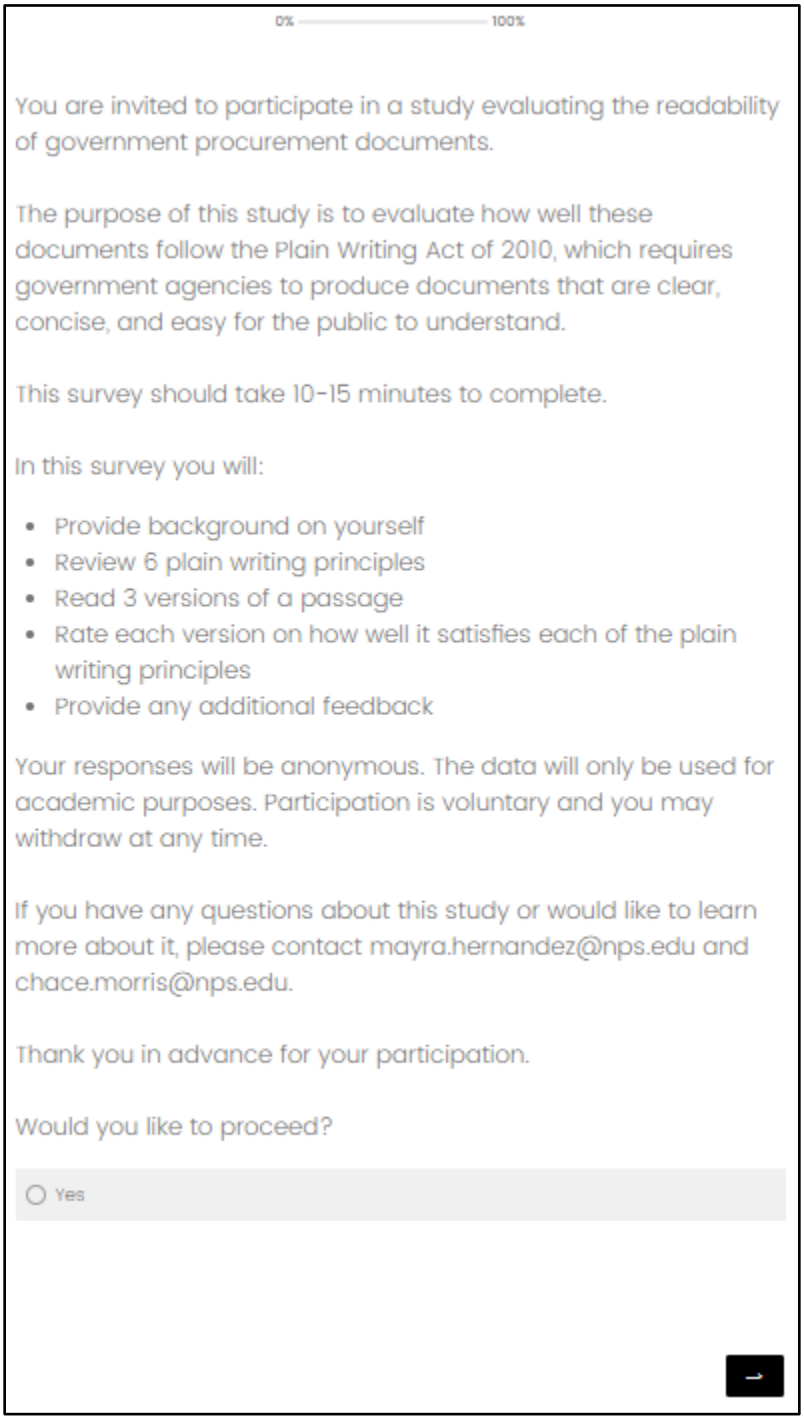
This Performance-based Work Statement outlines the required tasks and other contractual requirements essential for this Task Order (TO) to deliver integrated, government-led A&AS support.

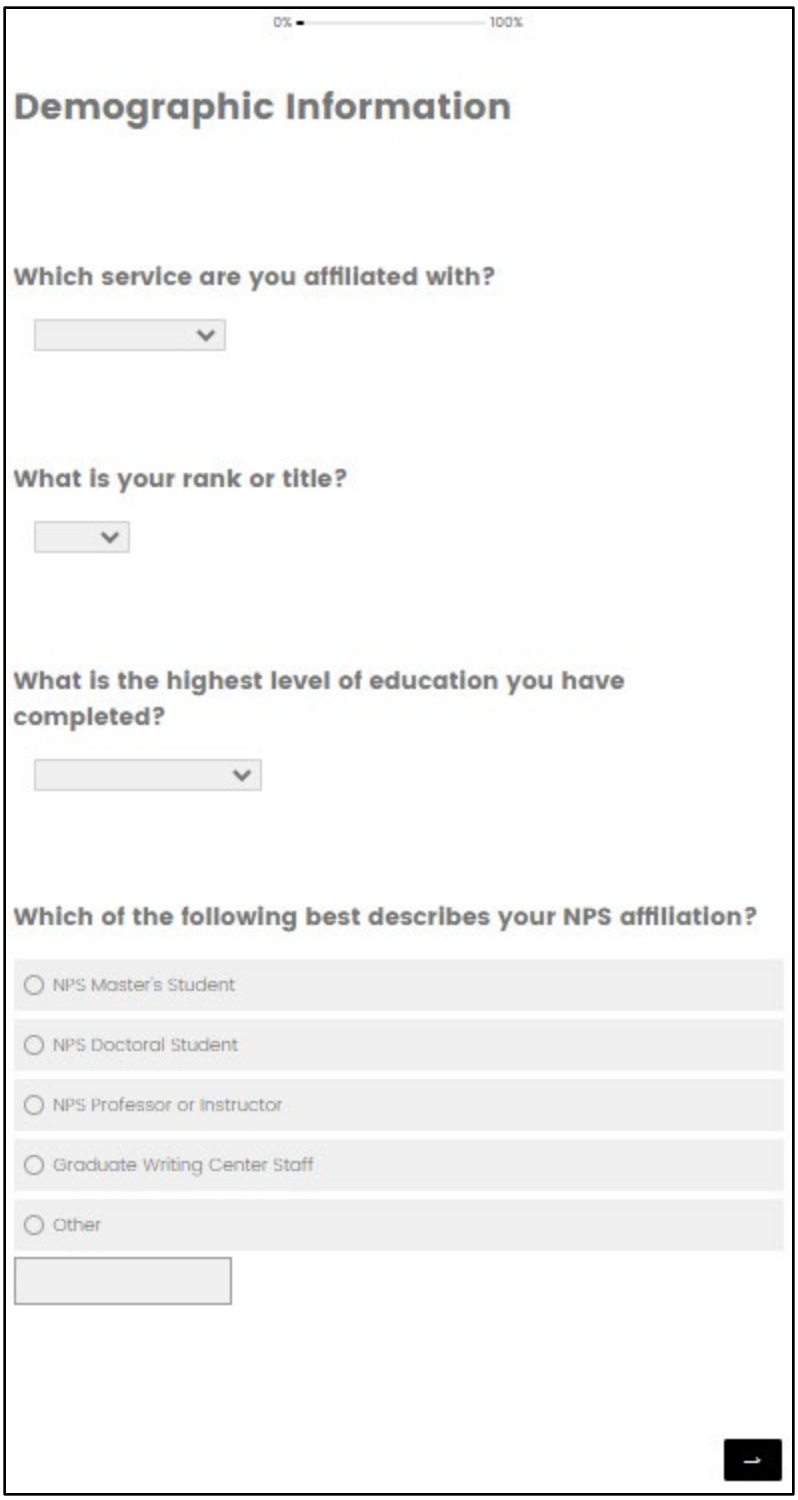
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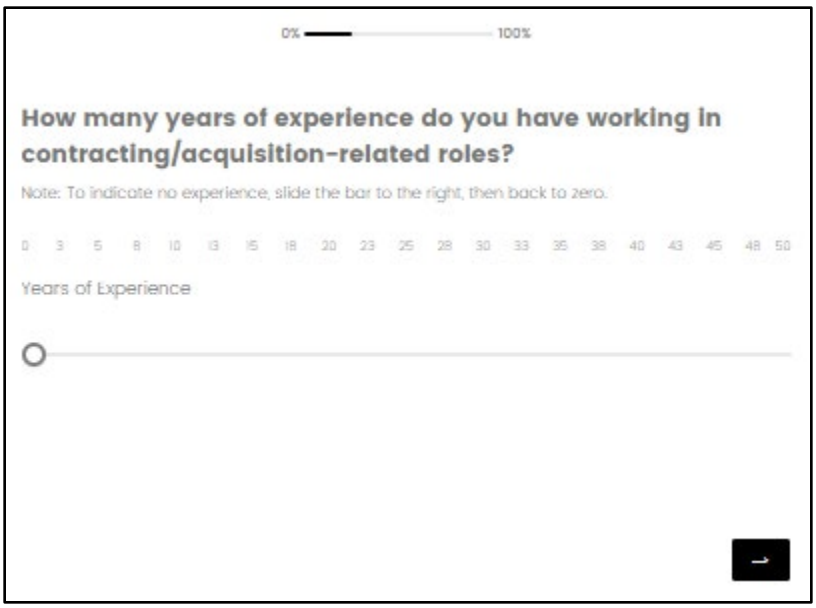
APPENDIX B. PHASE 2 – SURVEY SCREEN CAPTURES FOR ANALYSIS OF PLAIN WRITING PRINCIPLES

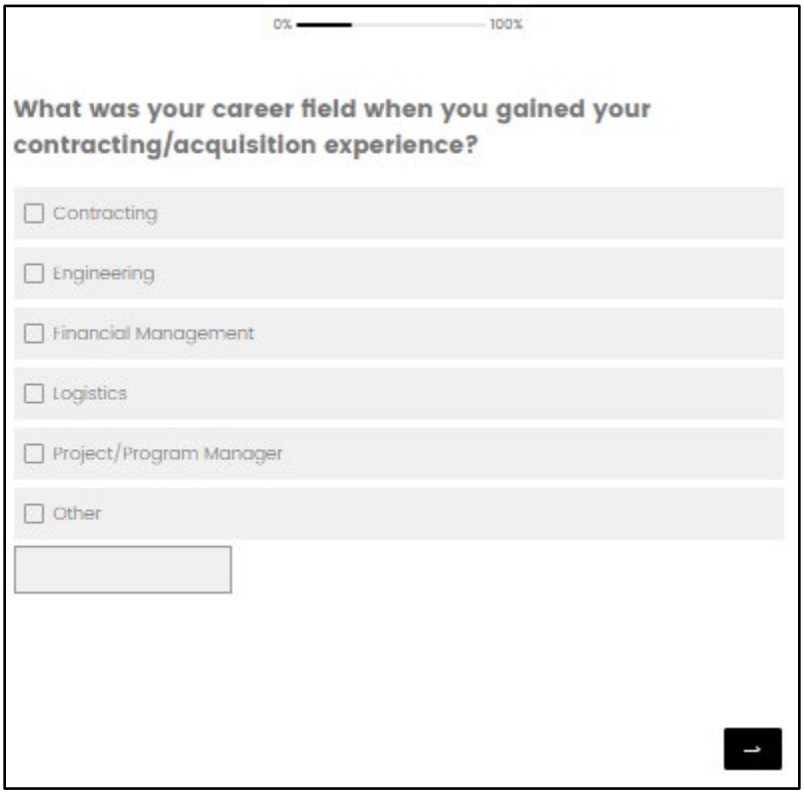
In Phase 2 of the study, all participants were presented with a consistent set of screen captures as part of the survey process. These captures included detailed survey instructions and sections for demographic information. The survey instructions provided participants with essential guidance on how to complete the survey, ensuring uniform understanding and approach across all respondents. The demographic information section was designed to gather relevant background data about the participants, which was crucial for the subsequent analysis and interpretation of the survey results. The following pages in this appendix display the exact screen captures as seen by the participants, ensuring a transparent and comprehensive representation of the survey content.

1. General Survey Screens Viewed by All Participants




0%
100%
Demographic Information
Which service are you affiliated with?
What is your rank or title?
What is the highest level of education you have completed?
Which of the following best describes your NPS affiliation?
NPS Master's Student
NPS Doctoral Student
NPS Professor or Instructor
Graduate Writing Center Staff
Other


0%
100%
How many years of experience do you have working in contracting/acquisition-related roles?
Note: To indicate no experience, slide the bar to the right, then back to zero.
0 3 5 8 10 13 15 18 20 23 25 28 30 33 35 38 40 43 45 48 50
Years of Experience


0%
100%
What was your career field when you gained your contracting/acquisition experience?
Contracting
Engineering
Financial Management
Logistics
Project/Program Manager
Other

0% 100%

Review of the Plain Writing Principles

When reviewing the sample text passages, please evaluate how well they follow these 6 plain writing principles.

While these government communications can be viewed by the general public, the intended audience is prospective contractors interested in bidding on government contracts, as well as acquisition personnel who may evaluate their offers.

Please keep this key audience in mind as you evaluate the clarity and readability of the text passages.

Plain Writing Principles:

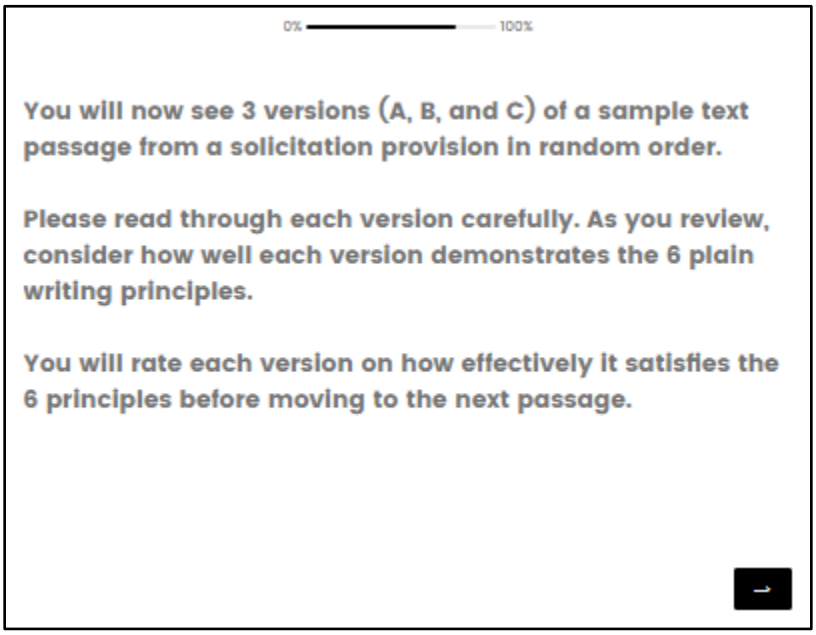
1. **Audience-Focused Writing:** The passage uses language the intended audience understands and relates to. It considers their knowledge level.
2. **Clear Organization:** The passage presents information in a logical order starting with the main point. It uses headings to guide readers.
3. **Simple Language:** The passage uses simple, commonly understood words and phrases. It avoids unnecessary jargon, keeps verbs in present tense, and uses "must" for clarity. Words are placed carefully to prevent ambiguity.
4. **Concise Language:** The passage uses short sections, sentences, and words. It eliminates unnecessary language and leads with key details.
5. **Active Voice:** The passage uses active voice. It avoids turning verbs into nouns and makes clear who is performing the action.
6. **Reader-Friendly Design:** The passage incorporates lists, tables, and visuals to simplify complex information. It uses easy-to-scan formatting.

Note: The plain writing principles outlined above will also be available when making your selections.

→

At this juncture of the survey, participants who provided consent were randomly allocated to one of three distinct between-subjects conditions. These conditions were determined based on the origin of the original document being evaluated. The three categories were: FAR1, which included documents under FAR 52.212-1; FAR2, comprising documents associated with FAR 52.212-3; and Contract Document, involving a specific PWS that delineated technical and administrative requirements pertinent to an Air Force Space and Missile Systems Center contract (J. Bair, email to author, August 2, 2023).

2. Screen Captures for FAR1 as Viewed by Participants in this Between-Subjects Condition (n=34):



0% 100%

Version A:

(f) Late submissions, modifications, revisions, and withdrawals of offers. (1) Offerors are responsible for submitting offers, and any modifications, revisions, or withdrawals, so as to reach the Government office designated in the solicitation by the time specified in the solicitation. If no time is specified in the solicitation, the time for receipt is 4:30 p.m., local time, for the designated Government office on the date that offers or revisions are due.

(2) (i) Any offer, modification, revision, or withdrawal of an offer received at the Government office designated in the solicitation after the exact time specified for receipt of offers is "late" and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late offer would not unduly delay the acquisition; and-

(A) If it was transmitted through an electronic commerce method authorized by the solicitation, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of offers; or

(B) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of offers and was under the Government's control prior to the time set for receipt of offers; or

(C) If this solicitation is a request for proposals, it was the only proposal received.

(ii) However, a late modification of an otherwise successful offer, that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.

(3) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the offer wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

(4) If an emergency or unanticipated event interrupts normal Government processes so that offers cannot be received at the Government office designated for receipt of offers by the exact time specified in the solicitation, and urgent Government requirements preclude amendment of the solicitation or other notice of an extension of the closing date, the time specified for receipt of offers will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

(5) Offers may be withdrawn by written notice received at any time before the exact time set for receipt of offers. Oral offers in response to oral solicitations may be withdrawn orally. If the solicitation authorizes facsimile offers, offers may be withdrawn via facsimile received at any time before the exact time set for receipt of offers, subject to the conditions specified in the solicitation concerning facsimile offers. An offer may be withdrawn in person by an offeror or its authorized representative if, before the exact time set for receipt of offers, the identity of the person requesting withdrawal is established and the person signs a receipt for the offer.

Please review the 6 plain writing principles below.

Then, rate Version A on a scale of 1-3 based on how effectively it satisfies each principle:

1 - Not Effective: This version does not satisfy the plain writing principle
2 - Somewhat Effective: This version moderately satisfies the plain writing principle
3 - Very Effective: This version strongly satisfies the plain writing principle

As a reminder, the intended audience is prospective contractors and acquisition personnel.

	1 - Not Effective	2 - Somewhat Effective	3 - Very Effective
1. Audience-Focused Writing: The passage uses language the intended audience understands and relates to. It considers their knowledge level.	○	○	○

2. Clear Organization: The passage presents information in a logical order starting with the main point. It uses headings to guide readers.	○	○	○
3. Simple Language: The passage uses simple, commonly understood words and phrases. It avoids unnecessary jargon, keeps verbs in present tense, and uses "must" for clarity. Words are placed carefully to prevent ambiguity.	○	○	○
4. Concise Language: The passage uses short sections, sentences, and words. It eliminates unnecessary language and leads with key details.	○	○	○
5. Active Voice: The passage uses active voice. It avoids turning verbs into nouns and makes clear who is performing the action.	○	○	○
6. Reader-Friendly Design: The passage incorporates lists, tables, and visuals to simplify complex information. It uses easy-to-scan formatting.	○	○	○

→

0% 100%

Version B:

Offer Submission Guidelines

1. **Timely Submissions:**

- You must submit your offers, and any related modifications, revisions, or withdrawals, to the designated Government office by the solicitation deadline. If the solicitation does not specify a time, ensure your documents arrive by 4:30 p.m., local time, on the due date.

2. **Handling Late Submissions:**

- We define any offer or related document arriving after the specified deadline as "late."
- We will not consider late submissions unless:
  - We receive it before making the award,
  - The Contracting Officer confirms that considering the late offer will not cause undue acquisition delays, and
  - It meets one of the following criteria:
    - It arrived at the initial point of entry to the Government infrastructure no later than 5:00 p.m., one working day before the deadline (for electronically transmitted submissions only),
    - Acceptable evidence demonstrates it was under Government control before the deadline,
    - It was the only proposal received (applies to requests for proposals only).
- We will consider and may accept a late modification of an otherwise successful offer if it provides more favorable terms to the Government.

3. **Validating Receipt Time:**

- Acceptable proof of timely receipt at the Government installation includes:
  - The installation's time/date stamp on the offer wrapper,
  - Other documentable evidence of receipt maintained by the installation,
  - Oral testimony or statements of Government personnel.

4. **Emergency Protocols:**

- In the event of an emergency or unexpected event that disrupts normal Government processes, preventing offers from being received at the designated office by the specified time, and if urgent Government needs prevent the extension of the closing date through solicitation amendment or other notification, we will extend the time specified for receipt of offers to the same time on the next business day that normal Government processes resume.

5. **Offer Withdrawals:**

- You may withdraw offers via written notice at any time before the set deadline for offer receipt.
- If the solicitation permits, you may withdraw oral offers in response to oral solicitations orally and facsimile offers via facsimile.
- Offer withdrawal in person requires:
  - Verification of the identity of the person requesting withdrawal, and
  - That person's signature on the offer receipt.

Please review the 6 plain writing principles below.

Then, rate Version B on a scale of 1-3 based on how effectively it satisfies each principle:

1 - Not Effective: This version does not satisfy the plain writing principle
2 - Somewhat Effective: This version moderately satisfies the plain writing principle
3 - Very Effective: This version strongly satisfies the plain writing principle

As a reminder, the intended audience is prospective contractors and acquisition personnel.

	1 - Not Effective	2 - Somewhat Effective	3 - Very Effective
1. Audience-Focused Writing: The passage uses language the intended audience understands and relates to. It considers their knowledge level.	○	○	○

2. Clear Organization: The passage presents information in a logical order starting with the main point. It uses headings to guide readers.	○	○	○
3. Simple Language: The passage uses simple, commonly understood words and phrases. It avoids unnecessary jargon, keeps verbs in present tense, and uses "must" for clarity. Words are placed carefully to prevent ambiguity.	○	○	○
4. Concise Language: The passage uses short sections, sentences, and words. It eliminates unnecessary language and leads with key details.	○	○	○
5. Active Voice: The passage uses active voice. It avoids turning verbs into nouns and makes clear who is performing the action.	○	○	○
6. Reader-Friendly Design: The passage incorporates lists, tables, and visuals to simplify complex information. It uses easy-to-scan formatting.	○	○	○

→

0% 100%

Version C:

(f)(1) Submitting, Changing, and Withdrawing Offers

You must submit your offers, including any changes or withdrawals, to the specified Government office by the deadline in the solicitation. If no time is listed, offers are due by 4:30 p.m. local time on the due date.

(2) Late Offers

Any offer received after the deadline is "late", and will not be considered unless:

- It reaches the office before the award is made and the Contracting Officer determines that accepting the late offer will not unreasonably delay the acquisition and;
  - One of the following situations applies:
    - It was sent electronically through a method authorized in the solicitation and was received at the initial Government point of entry by 5:00 p.m. one working day before the deadline.
    - There is evidence that it arrived at the Government installation and was under the government's control prior to the deadline.
    - It is the only proposal received and the solicitation was a request for proposals.

However, a late change to an otherwise successful offer that benefits the Government will be considered at any time.

(3) Evidence of Timely Receipt

Acceptable evidence that and offer arrived on time at the Government installation includes:

- The installation's date/time stamp on the offer wrapper.
- Other documentation of receipt maintained by the installation.
- Oral statements of Government personnel.

(4) Extensions for Unexpected Interruptions

If an emergency or unexpected event disrupts normal Government operations and prevents offers from reaching the designated Government office on time, and if urgent needs prevent amending the solicitation, the deadline for receiving offers will automatically extend to the same time of day as stated in the solicitation on the first workday when normal Government operations resume.

(5) Offer Withdrawal

Offers maybe withdrawn at any time before the deadline:

- In writing.
- Orally, if responding to an oral solicitation.
- Via fax, if allowed in the solicitation.
- In person, if the contractor or an authorized representative provides identification and signs a receipt.

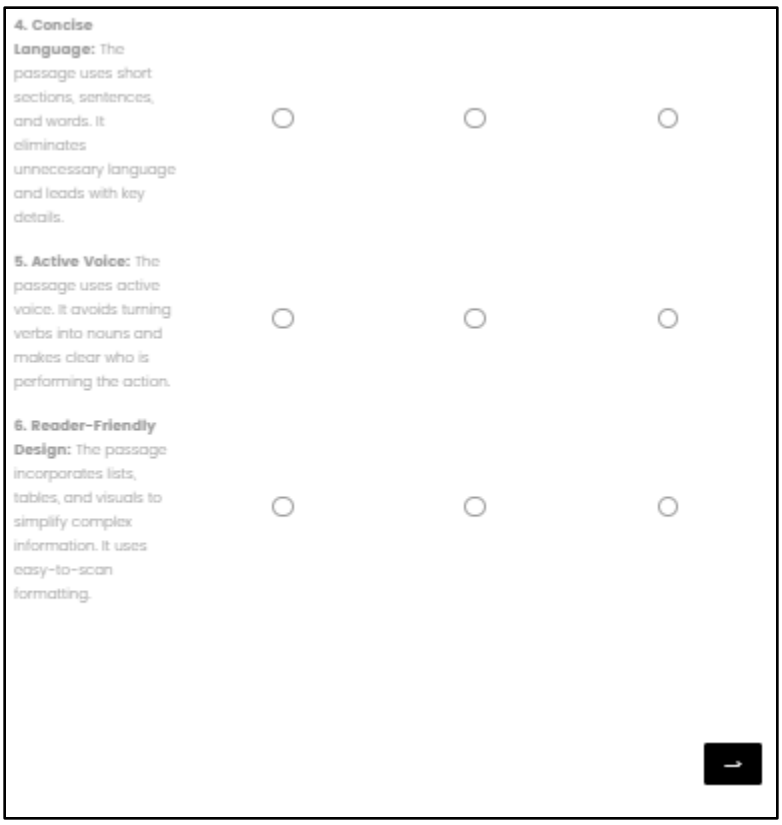
Please review the 6 plain writing principles below.

Then, rate Version C on a scale of 1-3 based on how effectively it satisfies each principle:

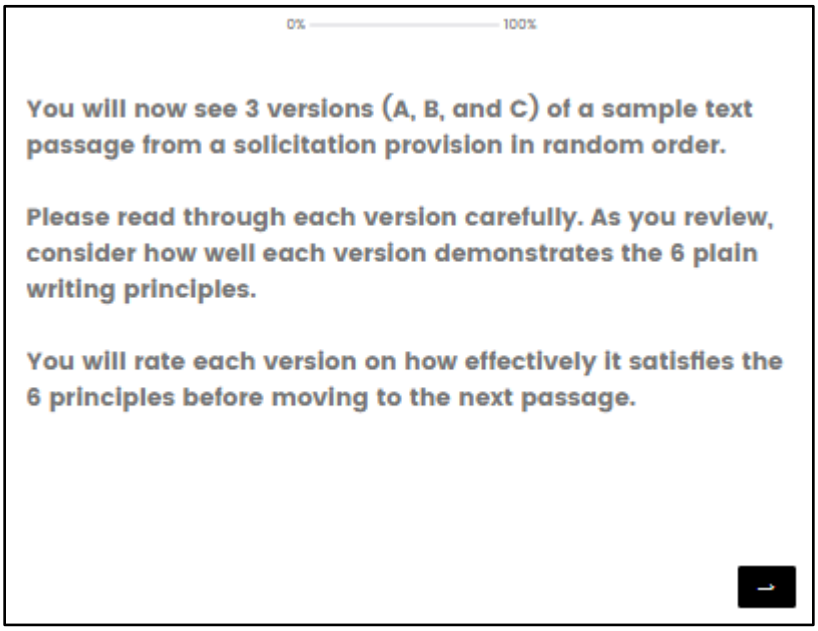
1 - Not Effective: This version does not satisfy the plain writing principle
2 - Somewhat Effective: This version moderately satisfies the plain writing principle
3 - Very Effective: This version strongly satisfies the plain writing principle

As a reminder, the intended audience is prospective contractors and acquisition personnel.

	1 – Not Effective	2 – Somewhat Effective	3 – Very Effective
1. Audience-Focused Writing: The passage uses language the intended audience understands and relates to. It considers their knowledge level.	○	○	○
2. Clear Organization: The passage presents information in a logical order starting with the main point. It uses headings to guide readers.	○	○	○
3. Simple Language: The passage uses simple, commonly understood words and phrases. It avoids unnecessary jargon, keeps verbs in present tense, and uses "must" for clarity. Words are placed carefully to prevent ambiguity.	○	○	○


4. Concise Language: The passage uses short sections, sentences, and words. It eliminates unnecessary language and leads with key details.
5. Active Voice: The passage uses active voice. It avoids turning verbs into nouns and makes clear who is performing the action.
6. Reader-Friendly Design: The passage incorporates lists, tables, and visuals to simplify complex information. It uses easy-to-scan formatting.
→

3. Screen Captures for FAR2 as Viewed by Participants in this Between-Subjects Condition (n=33):



Version A:

The Offeror shall complete only paragraph (b) of this provision if the Offeror has completed the annual representations and certification electronically in the System for Award Management (SAM) accessed through https://www.sam.gov. If the Offeror has not completed the annual representations and certifications electronically, the Offeror shall complete only paragraphs (c) through (v) of this provision.

(b) (1) Annual Representations and Certifications. Any changes provided by the Offeror in paragraph (b)(2) of this provision do not automatically change the representations and certifications in SAM.

(2) The offeror has completed the annual representations and certifications electronically in SAM accessed through http://www.sam.gov. After reviewing SAM information, the Offeror verifies by submission of this offer that the representations and certifications currently posted electronically at FAR 52.212-3, Offeror Representations and Certifications-Commercial Products and Commercial Services, have been entered or updated in the last 12 months, are current, accurate, complete, and applicable to this solicitation (including the business size standard(s) applicable to the NAICS code(s) referenced for this solicitation), at the time this offer is submitted and are incorporated in this offer by reference (see FAR 4.1201), except for paragraphs _ _.

[*Offeror to identify the applicable paragraphs at (c) through (v) of this provision that the offeror has completed for the purposes of this solicitation only, if any.*

These amended representation(s) and/or certification(s) are also incorporated in this offer and are current, accurate, and complete as of the date of this offer.

Any changes provided by the offeror are applicable to this solicitation only, and do not result in an update to the representations and certifications posted electronically on SAM.]

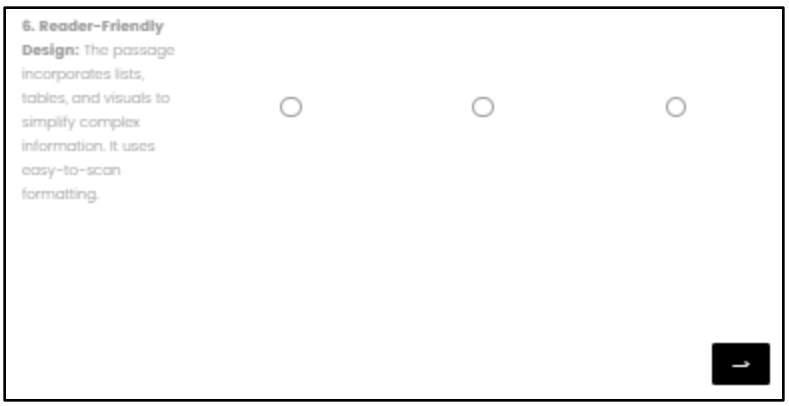
Please review the 6 plain writing principles below.

Then, rate Version A on a scale of 1-3 based on how effectively it satisfies each principle:

1 - Not Effective: This version does not satisfy the plain writing principle
2 - Somewhat Effective: This version moderately satisfies the plain writing principle
3 - Very Effective: This version strongly satisfies the plain writing principle

As a reminder, the intended audience is prospective contractors and acquisition personnel.

	1 - Not Effective	2 - Somewhat Effective	3 - Very Effective
1. Audience-Focused Writing: The passage uses language the intended audience understands and relates to. It considers their knowledge level.	○	○	○
2. Clear Organization: The passage presents information in a logical order starting with the main point. It uses headings to guide readers.	○	○	○
3. Simple Language: The passage uses simple, commonly understood words and phrases. It avoids unnecessary jargon, keeps verbs in present tense, and uses "must" for clarity. Words are placed carefully to prevent ambiguity.	○	○	○
4. Concise Language: The passage uses short sections, sentences, and words. It eliminates unnecessary language and leads with key details.	○	○	○
5. Active Voice: The passage uses active voice. It avoids turning verbs into nouns and makes clear who is performing the action.	○	○	○


6. Reader-Friendly
Design: The passage incorporates lists, tables, and visuals to simplify complex information. It uses easy-to-scan formatting.

Version B:

Submitting Your Offer: A Step-by-Step Guide

Step 1: Determine Your Completion Section

- If you've finished the annual electronic representations and certifications in the System for Award Management (SAM), complete only paragraph (b). Access SAM here.
- If not, complete paragraphs (c) through (v) only.

Step 2: Understand Annual Representations and Certifications (paragraph b)

(b)(1) Clarifications

Any changes you provide in paragraph (b)(2) won't automatically alter the representations and certifications in SAM.

(b)(2) Validation of Information

After reviewing SAM's information:

- Confirm that the representations and certifications at FAR 52.212-3 are current and accurate.
- Ensure they have an entry or update within the last 12 months.
- Verify they apply to this solicitation, including the business size standard(s) relevant to the NAICS code(s) referenced.

Ensure the following:

- Your submission verifies the accuracy, completeness, and applicability of the information.
- Your offer includes the aforementioned data by reference (refer to FAR 4.1201), excluding paragraphs ___. [Specify applicable paragraphs, if any.]

Step 3: Special Situations (Paragraphs c through v)

Specify and identify any applicable paragraphs from (c) to (v) that you've completed for this solicitation only, if any. Ensure the following:

- Any amended representations and/or certifications you include are accurate and complete as of the offer's date.
- Any changes you provide apply only to this solicitation, and won't update the representations and certifications posted electronically on SAM.

Important Note: Be mindful to regularly check and confirm the accuracy of your details in SAM. Your annual electronic updates keep your information current and applicable to future solicitations.

Please review the 6 plain writing principles below.

Then, rate Version B on a scale of 1-3 based on how effectively it satisfies each principle:

1 - Not Effective: This version does not satisfy the plain writing principle
2 - Somewhat Effective: This version moderately satisfies the plain writing principle
3 - Very Effective: This version strongly satisfies the plain writing principle

As a reminder, the intended audience is prospective contractors and acquisition personnel.

	1 – Not Effective	2 – Somewhat Effective	3 – Very Effective
1. Audience-Focused Writing: The passage uses language the intended audience understands and relates to. It considers their knowledge level.	○	○	○
2. Clear Organization: The passage presents information in a logical order starting with the main point. It uses headings to guide readers.	○	○	○
3. Simple Language: The passage uses simple, commonly understood words and phrases. It avoids unnecessary jargon, keeps verbs in present tense, and uses "must" for clarity. Words are placed carefully to prevent ambiguity.	○	○	○


4. Concise Language: The passage uses short sections, sentences, and words. It eliminates unnecessary language and leads with key details.
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6. Reader-Friendly Design: The passage incorporates lists, tables, and visuals to simplify complex information. It uses easy-to-scan formatting.

0% 100%

Version C:

Completing Required Representations and Certifications

The Offeror must complete one of the following instructions:

- Only paragraph (b) of this provision if the offeror has completed the annual representations and certifications electronically in the System for Award Management (SAM) accessed through https://www.sam.gov.
- Paragraphs (c) through (v) of this provision if the offeror has not completed the annual representations and certifications electronically in SAM.

(b)(1) Annual Representations and Certifications

Any changes the offeror makes in paragraph (b)(2) do not automatically update the offeror's representations and certifications in SAM.

(b)(2) Confirmation of SAM Details:

1. The Offeror confirms that the representations and certifications in SAM:
   - Have been completed or updated within the last 12 months.
   - Are current, accurate, complete, and applicable to this solicitation, including the business size and NAICS codes.
   - Are incorporated in this offer by reference (see FAR 4.1201).
2. If there are any changes to the representations and certifications, the Offeror must:

- Identify the amended representations and certifications contained in paragraphs (c) through (v). Amended paragraphs: _____.
  - Understand and confirm that these amendments are incorporated in this offer, are current, accurate, and complete as of this offer's date, and apply only to this solicitation.

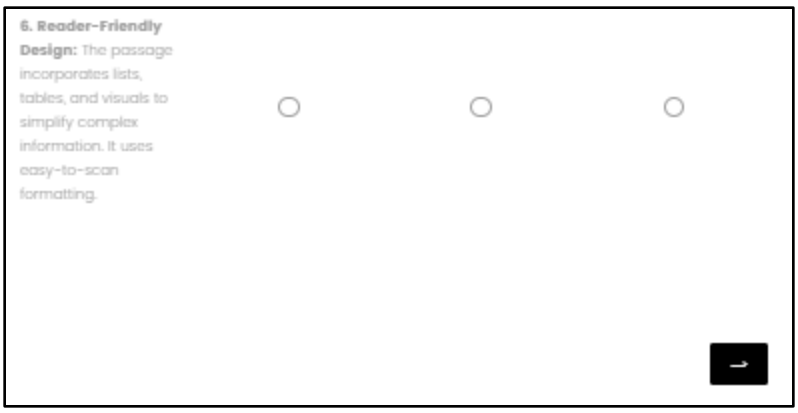
Please review the 6 plain writing principles below.

Then, rate Version C on a scale of 1-3 based on how effectively it satisfies each principle:

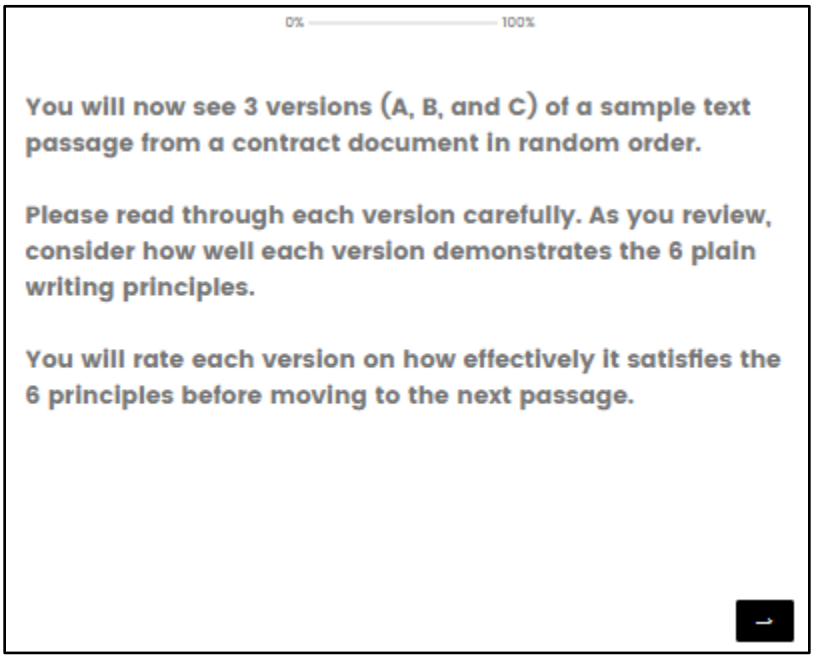
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As a reminder, the intended audience is prospective contractors and acquisition personnel.

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1. Audience-Focused Writing: The passage uses language the intended audience understands and relates to. It considers their knowledge level.	○	○	○
2. Clear Organization: The passage presents information in a logical order starting with the main point. It uses headings to guide readers.	○	○	○
3. Simple Language: The passage uses simple, commonly understood words and phrases. It avoids unnecessary jargon, keeps verbs in present tense, and uses "must" for clarity. Words are placed carefully to prevent ambiguity.	○	○	○
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5. Active Voice: The passage uses active voice. It avoids turning verbs into nouns and makes clear who is performing the action.	○	○	○


6. Reader-Friendly Design: The passage incorporates lists, tables, and visuals to simplify complex information. It uses easy-to-scan formatting.
→

4. Screen Captures for PWS as Viewed by Participants in this Between-Subjects Condition (n=37):



Version A:

Contract Objectives

Provide unbiased space systems knowledgeable, experienced professional A&AS services support to Advanced Systems and Development Directorate (SMC/AD), Space Rapid Capabilities Office (SpRCO), Launch Enterprise, Experimental Launch and Test Division (SMC/LEX) & Space Defense Task Force (SDTF). Contract tasks include but are not limited to Acquisition Management; Business Manager/Financial Analysis Support; Cost Estimating and Analysis Support; Financial Reconciliation (Commitment/Obligation/Expenditure); PPBE Analysis Support; Contracting Training and ConWrite System Support; Commander Action Group Support; Defense Travel System Support; Schedule Analysis Support; Earned Value Management; Administration Management/Personnel Support. This Performance-based Work Statement (PWS) presents contractual scope and tasking required for this TO. It provides a framework that aligns assignment tasks and other contractual requirements with the intention of this acquisition, which is to provide integrated government led A&AS services support to the government.

Please review the 6 plain writing principles below.

Then, rate Version A on a scale of 1-3 based on how effectively it satisfies each principle:

1 - Not Effective: This version does not satisfy the plain writing principle
2 - Somewhat Effective: This version moderately satisfies the plain writing principle
3 - Very Effective: This version strongly satisfies the plain writing principle

As a reminder, the intended audience is prospective contractors and acquisition personnel.

	1 – Not Effective	2 – Somewhat Effective	3 – Very Effective
1. Audience-Focused Writing: The passage uses language the intended audience understands and relates to. It considers their knowledge level.	○	○	○

2. Clear Organization: The passage presents information in a logical order starting with the main point. It uses headings to guide readers.	○	○	○
3. Simple Language: The passage uses simple, commonly understood words and phrases. It avoids unnecessary jargon, keeps verbs in present tense, and uses "must" for clarity. Words are placed carefully to prevent ambiguity.	○	○	○
4. Concise Language: The passage uses short sections, sentences, and words. It eliminates unnecessary language and leads with key details.	○	○	○
5. Active Voice: The passage uses active voice. It avoids turning verbs into nouns and makes clear who is performing the action.	○	○	○
6. Reader-Friendly Design: The passage incorporates lists, tables, and visuals to simplify complex information. It uses easy-to-scan formatting.	○	○	○

→

Version B:

Contract Objectives

Goal

Offer comprehensive and expert Advisory and Assistance Services (A&AS) to various space systems entities including Advanced Systems and Development Directorate (SMC/AD), Space Rapid Capabilities Office (SpRCO), Launch Enterprise, Experimental Launch and Test Division (SMC/LEX), and Space Defense Task Force (SDTF).

Scope of Tasks

Prospective contractors will provide:

- Acquisition Management
- Business and Financial Analysis
- Cost Estimation and Analysis
- Financial Reconciliation, covering Commitment, Obligation, and Expenditure
- Planning, Programming, Budgeting, and Execution (PPBE) Analysis
- Contracting Training and ConWrite System Support
- Commander Action Group Support
- Defense Travel System Assistance
- Schedule Analysis
- Earned Value Management
- Administration and Personnel Support

Details

This Performance-based Work Statement (PWS) outlines the contractual scope and tasks needed for this Task Order (TO). It ensures that assignment tasks and other contract necessities directly support the acquisition's goal: delivering cohesive, government-led A&AS to governmental entities.

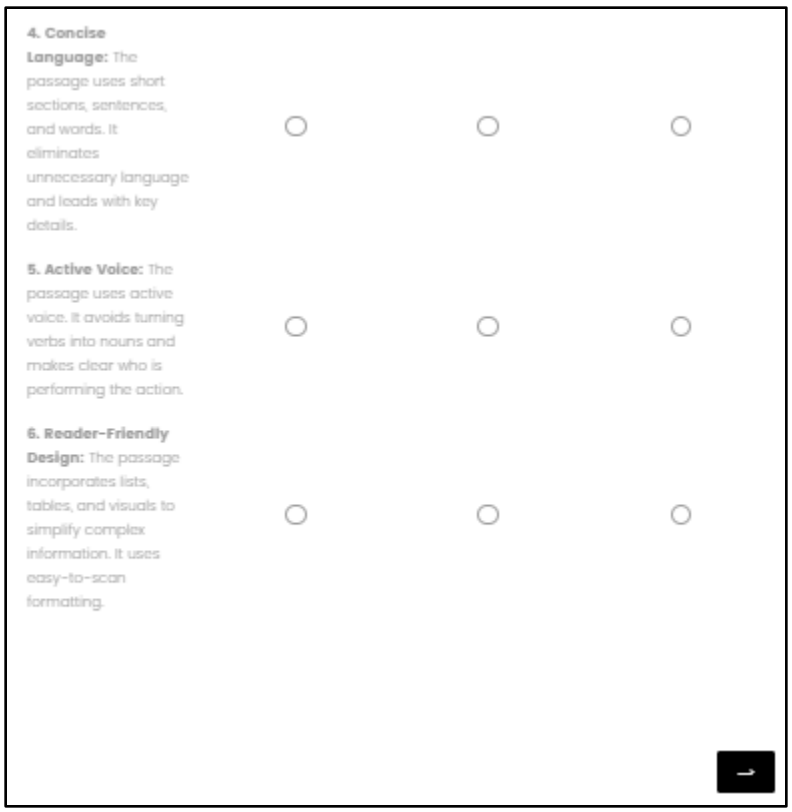
Please review the 6 plain writing principles below.

Then, rate Version B on a scale of 1-3 based on how effectively it satisfies each principle:

1 - Not Effective: This version does not satisfy the plain writing principle
2 - Somewhat Effective: This version moderately satisfies the plain writing principle
3 - Very Effective: This version strongly satisfies the plain writing principle

As a reminder, the intended audience is prospective contractors and acquisition personnel.

	1 – Not Effective	2 – Somewhat Effective	3 – Very Effective
1. Audience-Focused Writing: The passage uses language the intended audience understands and relates to. It considers their knowledge level.	○	○	○
2. Clear Organization: The passage presents information in a logical order starting with the main point. It uses headings to guide readers.	○	○	○
3. Simple Language: The passage uses simple, commonly understood words and phrases. It avoids unnecessary jargon, keeps verbs in present tense, and uses "must" for clarity. Words are placed carefully to prevent ambiguity.	○	○	○


4. Concise Language: The passage uses short sections, sentences, and words. It eliminates unnecessary language and leads with key details.
5. Active Voice: The passage uses active voice. It avoids turning verbs into nouns and makes clear who is performing the action.
6. Reader-Friendly Design: The passage incorporates lists, tables, and visuals to simplify complex information. It uses easy-to-scan formatting.

Version C:

Contract Objectives:

Provide professional A&AS space systems support to the following organizations:

- Advanced Systems and Development Directorate (SMC/AD)
- Space Rapid Capabilities Office (SpRCO)
- Launch Enterprise, Experimental Launch and Test Division (SMC/LEX)
- Space Defense Task Force (SDTF)

Contract tasks and required support include, but are not limited to:

- Acquisition Management
- Business Management and Financial Analysis
- Cost Estimating and Analysis
- Financial Reconciliation (Commitment/Obligation/Expenditure)
- PPBE Analysis
- Contracting Training (to include contract writing systems such as ConWrite)
- Commander Action Group
- Travel System Management (DTS)
- Schedule Analysis
- Earned Value Management
- Administration Management and Personnel Support

This Performance-based Work Statement (PWS) outlines the required tasks and other contractual requirements essential for this Task Order (TO) to deliver integrated, government-led A&AS support.

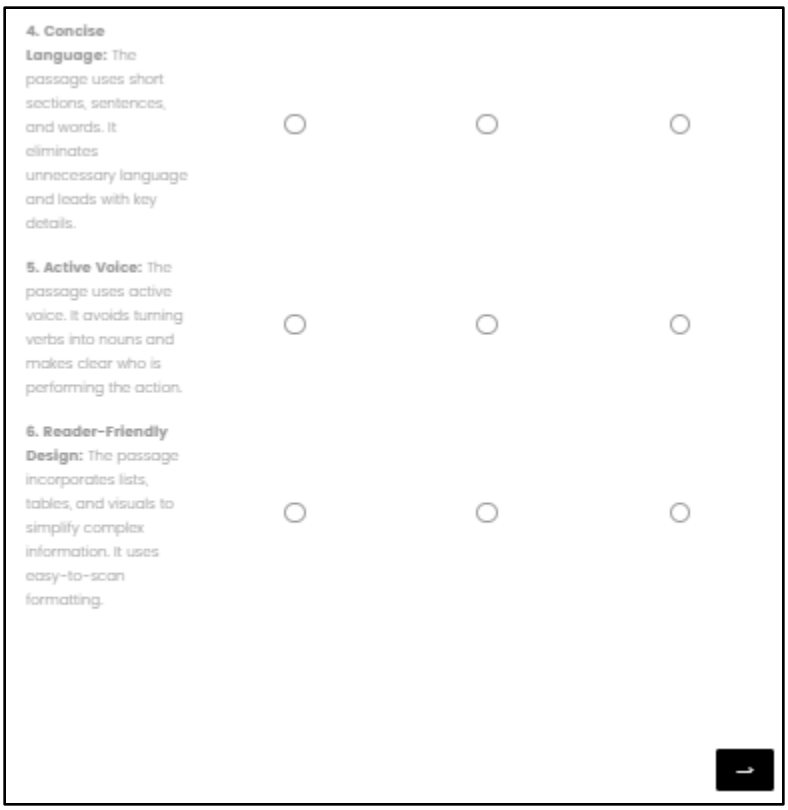
Please review the 6 plain writing principles below.

Then, rate Version C on a scale of 1-3 based on how effectively it satisfies each principle:

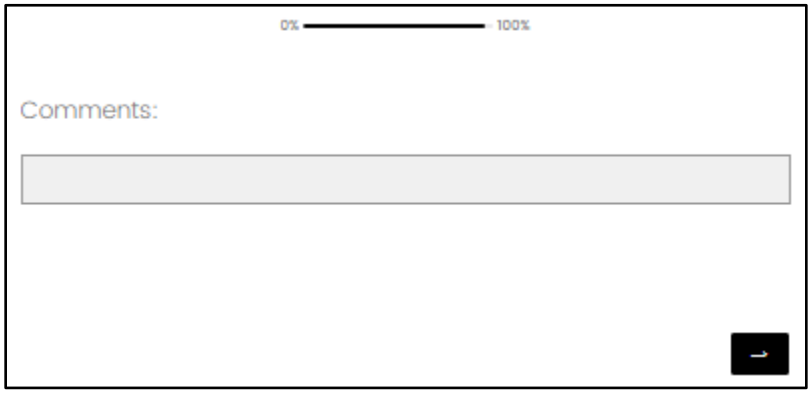
1 - Not Effective: This version does not satisfy the plain writing principle
2 - Somewhat Effective: This version moderately satisfies the plain writing principle
3 - Very Effective: This version strongly satisfies the plain writing principle

As a reminder, the intended audience is prospective contractors and acquisition personnel.

	1 – Not Effective	2 – Somewhat Effective	3 – Very Effective
1. Audience-Focused Writing: The passage uses language the intended audience understands and relates to. It considers their knowledge level.	○	○	○
2. Clear Organization: The passage presents information in a logical order starting with the main point. It uses headings to guide readers.	○	○	○
3. Simple Language: The passage uses simple, commonly understood words and phrases. It avoids unnecessary jargon, keeps verbs in present tense, and uses "must" for clarity. Words are placed carefully to prevent ambiguity.	○	○	○



At the conclusion of the survey, all participants were provided with an opportunity to offer comments.



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Acquisition Research Program
Naval Postgraduate School
555 Dyer Road, Ingersoll Hall
Monterey, CA 93943

www.acquisitionresearch.net