

COMMUNICATING IMPACT EVALUATION FINDINGS: AN AUDIENCE-CENTERED DATA VISUALIZATION EXPERIMENT

by

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(Under the Direction of Alexa J. Lamm)

ABSTRACT

Access to evaluation findings of interdisciplinary research and extension initiatives is essential for informed decision-making and trust-building by decision makers, wider stakeholders, and the public in general. The ways these findings are communicated publicly can limit their effectiveness. Communication formats like graphs and infographic offer promising solutions for improving perceptions, but their effectiveness may depend on more than visual clarity. This dissertation examined how communication strategies influenced cognitive processing, trust, and attitude of the wider public through a quantitative research design. Respondents from diverse demographic backgrounds were exposed to evaluation findings of interdisciplinary research and extension initiatives in different formats. Findings indicated that while visual formats like graphs improved cognitive processing, trust in organizations remained the strongest covariate of perceptions toward trust in the scientific source. Infographic, while visually engaging, did not consistently outperform other formats. The results implied that enhancing the accessibility of evaluation findings through visual design was important but insufficient without building organizational credibility. This research contributed to the

evaluation and science communication discourse by providing insights for designing communication strategies that promote public engagement with evaluation findings of interdisciplinary research and extension initiatives. Implications for evaluators and science communicators included the need for clear, culturally responsive messaging and a stronger emphasis on trust-building practices in organizational communication.

INDEX WORDS: Impact evaluation, audience-centered communication, utilization-focused evaluation, data visualization, experiment

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CHAPTER 1

INTRODUCTION

Effective communication in evaluation science plays a fundamental role in shaping public perception, trust, and the utilization of evaluation findings. As evaluation science expands, the need for accessible, transparent, and strategically tailored communication methods has grown, particularly as public trust in scientific institutions fluctuates (National Academies of Sciences, Engineering, and Medicine [NASEM], 2017). A significant challenge in this domain arises from the complexity of scientific information, the varying degrees of audience familiarity with evaluation processes, and the evolving landscape of digital misinformation (Fischhoff, 2019). Addressing these challenges requires a deeper understanding of how communication strategies influence cognitive processing and trust in both scientific findings and the institutions that disseminate them.

The evolution of science communication has shifted from a unidirectional ‘deficit model,’ wherein experts disseminate knowledge to a passive audience, to a more dynamic and participatory ‘dialogue model’ (Trench, 2008). In evaluation science communication, this shift highlighted the necessity of using evidence-based strategies that not only inform but also engage audiences through multimodal approaches, such as textual explanations, data visualizations, and infographic (Mason & Azzam, 2019). These communication modalities influenced how evaluation findings are interpreted and trusted, particularly when organizations prioritize clarity, transparency, and responsiveness to audience needs (Evergreen, 2013). Trust remained a critical component of evaluation science communication, affecting how audiences engage with and

utilize scientific findings (Reif et al., 2022). Previous research underscores that trust in scientists and organizations was shaped by factors such as perceived expertise, transparency, and the consistency of communication (Hancock et al., 2023). This dissertation explored how different communication methods influenced attitude toward evaluation science communication, examining trust as a covariate.

Defining the Scope of the Problem

Evaluation findings serve as a foundation for evidence-based decision-making, policy development, and public engagement with science (Patton, 2008). However, communicating these findings effectively remains a persistent challenge due to audience heterogeneity, cognitive biases, and the complexity of evaluation data (Christie & Lemire, 2019). Traditional methods of disseminating evaluation findings, such as lengthy technical reports, often fail to engage broader audiences, leading to limited comprehension and application of the information provided (Evergreen, 2011). Additionally, digital misinformation has exacerbated public skepticism toward scientific communication, underscoring the urgency of trust-building mechanisms in evaluation discourse (Huber et al., 2019).

An emerging strategy to enhance evaluation communication is the use of data visualization, including graphs and infographic, to present complex findings in accessible formats (Mason & Azzam, 2019). Research has demonstrated that visual representations of data improve cognitive processing, engagement, and retention of information, making them valuable tools in science communication (Mahmoud & Zoghaib, 2023). However, the effectiveness of these methods depends on their alignment with audience expectations and capacity to convey messages clearly and credibly (Douville et al., 2025).

Evaluation science communication faces many challenges, particularly in balancing technical accuracy with accessibility. The increasing complexity of data and the need for audience-friendly interpretation presents difficulties in ensuring that evaluation findings are credible and comprehensible (Christie & Lemire, 2019). Research highlights that technical jargon and lengthy reports often disengage non-expert audiences, reducing acceptance of key insights from evaluations (Evergreen, 2013). Addressing these barriers requires adopting approaches prioritizing accuracy and clarity, ensuring that evaluation findings are accessible to various stakeholders.

The digitalization of media also presents additional challenges, particularly regarding spreading misinformation and destroying public trust in scientific institutions (Huber et al., 2019). Social media platforms, while offering opportunities for broader dissemination of evaluation findings, also contribute to the increase of misleading or misrepresented scientific information (Reif et al., 2022). Navigating these challenges requires a proactive approach to science communication, emphasizing transparency, open dialogue, and audience engagement.

Another key challenge involved the role of public trust in influencing attitude toward evaluation science. Research showed that trust in science and institutions was not static; instead, it fluctuated based on factors such as past experiences, media exposure, and perceived biases in how evaluating findings are presented (Fischhoff, 2019). Organizations conducting evaluations must, therefore, consider strategies to build and maintain trust, including ensuring transparency in methodology, ethical rigor in reporting, and accessibility in communication approaches (Christie & Fleischer, 2010).

Data visualization has been identified as a valuable tool in making complex evaluation findings more accessible to diverse audiences. Research demonstrates that well-structured visual

presentations, such as graphs and infographic, enhance comprehension and facilitate decision-making by reducing cognitive load (Mahmoud & Zoghaib, 2023). However, the effectiveness of data visualization in evaluation communication depends on careful design and alignment with audience needs (Douville et al., 2025). Poorly designed visuals may introduce ambiguity or distort findings, potentially undermining trust in evaluation outcomes (Evergreen, 2013). As such, evaluation professionals must integrate best practices in visual communication to ensure clarity, accuracy, and engagement.

Understanding the intersection of communication methods, audience trust, and data visualization has important implications for science communication and evaluation practices. This study aimed to contribute to improved communication strategies by identifying effective and practical ways to present evaluation findings that foster engagement and trust. By integrating audience-centered approaches, including audience segmentation and sociolinguistic considerations, this research seeks to advance best practices in evaluation science communication (Mason & Azzam, 2019). As evaluation plays a critical role in evidence-based policy and decision-making, ensuring that findings are effectively communicated remains a priority. This dissertation aimed to bridge existing gaps in evaluation communication research, offering practical recommendations for how organizations can optimize communication methods to enhance trust and comprehension among diverse audiences.

CHAPTER 2

LITERATURE REVIEW AND OVERVIEW OF STUDIES

Study Context

This dissertation examines evaluation science communication within the context of a multidisciplinary five-year project to enhance public trust in pork production and products through strengthened communication, research, and training. The research explored how different communication methods (including text, graphs, and infographic) affected public trust in evaluation findings and the institutions disseminating them. By focusing on the intersection of science communication, data visualization, and audience trust, this study aimed to inform best practices for effectively engaging diverse stakeholders.

The research was conducted within the framework of a multidisciplinary project that integrated evaluation science, communication strategies, and data visualization to enhance public engagement with evaluation findings. In complex scientific and policy environments, ensuring the effective communication of evaluation results is crucial for maintaining public trust and facilitating informed decision-making (Fischhoff, 2019). Multidisciplinary initiatives often require collaboration across diverse fields, including social sciences, public policy, and information science, to address communication challenges associated with scientific uncertainty and data complexity (NASEM, 2017). A primary focus of this research was to assess how audience segmentation, trust dynamics, and data visualization contribute to effective communication of evaluation findings to the public.

Science Communication

Effective science communication (SciCom) involves a complex interplay between communicators, audiences, and communication channels within specific social contexts (NASEM, 2017). Among others, barriers to effective science communication include the unique nature of scientific inquiry, uncertainties, and evolving conclusions. Audience factors such as limited familiarity with science and cognitive shortcuts also pose challenges, further hindering science communicators efforts by failing to set clear goals or overestimating audience knowledge. To make complex and uncertain scientific information more accessible, science communicators often use narratives, structured stories incorporating data, including intricate numerical or statistical details, to convey meaning effectively (NASEM, 2017). Successful science communication requires collaboration between scientists and decision-makers. Scientists must translate their knowledge into accessible terms to ensure comprehension. Establishing reliable two-way communication channels is crucial for this process. Additionally, ongoing assessment and adjustments help improve communication effectiveness (Fischhoff, 2019).

SciCom is a growing area of practice within the communication field (Burns et al., 2003). There is no clear consensus on the definition of SciCom, and some researchers argue SciCom is not simply a way to encourage scientists to talk more about their academic research but as a field of study considered an “offshoot of the discipline of communication” (Burns et al., 2003, p. 183). The term SciCom is used to promote public awareness of science communication, public understanding of science communication, scientific culture, or scientific literacy. However, a comprehensive definition of SciCom grounds it as “Awareness, Enjoyment, Interest, Opinion-forming, and Understanding of science (AEIOU)” (Burns et al., 2003, p. 198). A multifaceted approach to the definition of SciCom hinges on scientific awareness, understanding, literacy, and

culture while personalizing “the impersonal aims of scientific awareness, understanding, literacy, and culture, and thereby defines the purpose of science communication.” (Burns et al., 2003, p. 190).

Modern science communication depicts a shift from the traditional ‘deficit model,’ characterized by one-way communication from experts to the uninformed public, towards the contemporary ‘dialogue model’ (Trench, 2008). The dialogue model emphasizes two-way communication, actively involving the public and leveraging public knowledge and experiences (Trench, 2008). Science communication extends beyond merely conveying scientific developments to the public (Treise & Weigold, 2002). It situates scientific endeavors within broader frameworks of public understanding, policy decision-making, ethical considerations, media representation, and technological dissemination (Treise & Weigold, 2002). These frameworks shape how science is communicated, perceived, and integrated into societal discourse, influencing public literacy and institutional trust in science (Treise & Weigold, 2002). Consequently, science communication transfers crucial information to the public for shaping opinions on public policy and evaluating the advantages and drawbacks of government investments in scientific activities (Treise & Weigold, 2002).

SciCom employs diverse channels of communication, including mass media (TV, radio, newspapers), online platforms, citizen science projects, and others, to engage with a broad public audience (Brondi et al., 2021). It extensively uses the power of digital and social media, including traditional websites and social media (White et al., 2014). Reflecting on Shannon and Weaver's communication transmission model (Shannon & Weaver, 1949), which describes information source, transmitter, channel, receiver, and destination, the discipline utilizes the components of communication channels actively. However, the transmission of information is

entirely from a different perspective depending on the receiver (audience) (Stone, 1999). SciCom may also engage in advocacy but tends to focus more broadly on promoting scientific literacy, public engagement with science, and evidence-based decision-making across various scientific disciplines (Burns et al., 2003). SciCom also disseminates knowledge and fosters understanding of complex topics (Harder et al., 2021).

Trust

Public trust in science is essential for societal progress and addressing global challenges. Public trust in science and scientists remains consistently high, with 88% of U.S. adults in 2022 agreeing that scientific research advancing knowledge deserves federal support (National Science Board, 2024). However, familiarity with scientific processes varies; while 60% of Americans understand experimental controls, only 50% can correctly identify a scientific hypothesis, highlighting a gap in deeper engagement with science (National Science Board, 2024). For instance, the Public Trust in Science Scale (PuTS) identifies expertise, integrity, benevolence, transparency, and dialogue as dimensions that influence trust in science (Reif et al., 2022). These factors are critical for the public's reliance on scientific knowledge, which is closely linked to the credibility of scientists and institutions. A study by Huber et al. (2019) found engagement with science news on social media positively correlates with trust in science, particularly in collectivist societies where social validation of shared content enhances trustworthiness. Furthermore, Marthe et al. (2020) demonstrated that communicating uncertainty in numerical formats does not significantly reduce trust and may even reinforce perceptions of transparency and credibility when paired with clear explanations (Marthe et al., 2020).

In science communication and evaluation, trust is critical in shaping public perceptions of credibility and acceptance of findings. Research highlights that individuals are more likely to

trust communicators who demonstrate expertise, transparency, and ethical behavior (Fischhoff, 2019). For instance, the perceived trustworthiness of evaluators can enhance public engagement with evaluation findings, making them more likely to be considered in decision-making processes (Patton, 2008). Conversely, a lack of trust can lead to skepticism, resistance, and disengagement, undermining the impact of communicated messages (Lewandowsky, 2012; Marthe et al., 2020; Stern, 2018).

Challenges of Science Communication: How is Trust Affected?

Trust in science faces significant challenges despite its importance, particularly in the digital age. Social media platforms have expanded access to scientific information but also contribute to spreading misinformation, which can undermine public confidence in science (Huber et al., 2019). For example, contentious issues such as vaccine hesitancy and climate change are often exacerbated by misinformation campaigns that exploit distrust in scientific institutions. Marthe et al. (2020) found that verbal communication of uncertainty sometimes reduces trust, whereas numerical presentations are less likely to provoke skepticism. Reif et al. (2022) also highlighted the need for transparent and dialogic science communication to rebuild trust, especially during crises like the COVID-19 pandemic (Reif et al., 2022). Other scholars have underlined the need for science communicators to adopt trust-building approaches that resonate with diverse audience needs (Huber et al., 2019; Marthe et al., 2020; Reif et al., 2022).

The pandemic generated significant challenges in all spheres of life – social, economic, environmental, and governance (United Nations [UN], 2023). It revealed the vulnerability of global systems due to a lack of access to nutritional and healthy foods, uncertainties around government-imposed social distancing policies and practices, lockdowns affecting the mental well-being of the public and other determinants (Torero, 2020). A major challenge for science

communicators has been the ‘infodemic’ - an overflow of accurate and inaccurate information-posing challenges in accessing reliable sources (Augustine, 2021; Fernández-Torres et al., 2021). Hence, science communication should target combating misinformation and disinformation (Tam et al., 2022), emphasizing the importance of transparent communication (Liu et al., 2022), and shifting the communication model from reactive communication toward a proactive one. Proactive communication involves anticipating issues and shaping perceptions to prevent crises (Jablin & Putnam, 2001; Zhang et al., 2013). Unlike proactive strategies, reactive communication responds to crises as they occur (Coombs & Holladay, 2012). The pandemic emphasized the role of proactive and efficient communication as the most significant intervention in responding to public health crises (Adebisi et al., 2021). The pandemic further outlined the necessity for providing precise and timely information and combating disinformation and misinformation, which has never been more vital (Adebisi et al., 2021).

The context of communication encompasses societal needs and priorities, such as combating misinformation, disinformation, and infodemics (Fernández-Torres et al., 2021; Tam et al., 2023). Additionally, enhancing public trust toward science and research is imperative, especially considering the decline of US public trust in science to 57%, an eight-point decrease since 2021 (Kennedy, 2023). For example, in a global study of how government response measures affected public trust during the COVID-19 pandemic, the authors underscored the importance of open, honest, and timely communication with the public to counteract misunderstandings about government strategies and promote collaboration across all community levels (Liu et al., 2022). Research also showed that public trust can be further enhanced by consistently demonstrating public information and campaigns that convey official policies, measures, and actions to all involved parties (Liu et al., 2022). One of the avenues to enhance

public trust in scientists could be disseminating transparent, high-quality evaluation findings (Evaluation Task Force, 2022). Given that the importance of evidence-based decision-making and policymaking continues to grow, there will likely be increased demand for rigorous evaluation of science communication efforts and greater integration of evaluation into communication planning and implementation processes (Evaluation Task Force, 2022). Establishing firm grounds for evaluators' distinctive and valuable contributions is essential to furthering the growth of the field and increasing public perception, understanding, and trust in evaluation discourse (Mason & Hunt, 2019).

Attitude

Attitude is a psychological construct representing favorable or unfavorable evaluations, feelings, or tendencies toward an object, person, or concept (Ajzen, 1991). It is central to understanding human behavior and decision-making and is often considered a mediator between information and actions. For instance, research by Li et al. (2024) developed an information dissemination model based on user attitude and public opinion. The study concluded that user attitude significantly impacted how information was processed and acted upon in social networks (Li et al., 2024).

In evaluation contexts, attitude toward science and evaluators can significantly affect how individuals interpret and trust evaluation findings. Research by Fischhoff (2019) highlights the importance of presenting information in accessible and meaningful ways to positively influence attitude and encourage engagement with scientific data (Fischhoff, 2019). Similarly, the role of attitude in audience segmentation is critical, as audience members with shared attitude can be grouped for targeted communication strategies (Grunig, 1989). A study by Mason and Azzam (2019) explored how the use of visual communication techniques, such as graphs and

infographic, can impact stakeholders' attitude toward evaluation and subsequently increase the likelihood of utilizing evaluation results (Mason & Azzam, 2019). The authors found that well-designed data visualizations improve comprehension and foster more positive attitude by making findings more engaging and accessible to diverse audiences (Mason & Azzam, 2019). Moreover, the study emphasizes the importance of tailoring visualizations to align with stakeholders' needs, values, and cognitive preferences to maximize the impact of evaluation communication (Mason & Azzam, 2019).

A study by Kallemeyn et al. (2015) underscored the pivotal role of context in shaping attitude toward evaluation practices, highlighting the influence of regional and disciplinary traditions (Kallemeyn et al., 2015). Their cross-continental analysis revealed that attitude are often shaped by the perceived alignment of evaluation methods with stakeholders' needs and values. For example, in North America, evaluations are frequently tied to the practical use of findings, emphasizing quantitative methods that facilitate decision-making, while in Europe, evaluations often emphasize valuing, focusing on qualitative methods to assess merit and worth. These findings demonstrated that attitude toward evaluation was not static but was shaped by the evaluation process's methodological and contextual relevance (Kallemeyn et al., 2015). Incorporating such contextual considerations into the design of evaluation science communication could foster positive attitude, increasing stakeholder engagement and the utilization of findings. This perspective was directly relevant to understanding how different communication interventions, such as textual, graphs, and infographic, might influence attitude in evaluation contexts.

Data Visualizations

Data visualizations are practical tools for simplifying complex information, facilitating easier cognitive processing, and enhancing learning outcomes (Mahmoud & Zoghaib, 2023; Mason & Azzam, 2019). Techniques such as dashboards, graphs, charts, and infographic have proven their value in effectively communicating intricate messages to stakeholders, donors, and project beneficiaries, although they remain non-interactive and may limit participant feedback (Azzam et al., 2013; Burnett et al., 2019; Evergreen, 2011).

Research has extensively examined the role of data visualization and pictorial information in enhancing comprehension, decision-making, conveying complex information and others. For example, a study by Quadri et al. (2024) explored how individuals interpret various visualizations, emphasizing the alignment between designers' intentions and audience perceptions to improve the effectiveness of data communication. The study found discrepancies between these interpretations can hinder comprehension, underscoring the need for intentional design strategies (Quadri et al., 2024). Similarly, another study explored semantic context integration into charts using text-to-image generative models (Xiao et al., 2023). Their findings revealed that embedding contextual semantics enhances pictorial visualizations' clarity and effectiveness, particularly in conveying complex and abstract information. Additionally, a study by Arunkumar et al. (2023) examined how design elements influenced viewers' perceptions of visualizations as images or information, shedding light on the impact of these perceptions on message effectiveness. The main finding suggests that viewers' classification of visualizations significantly affects their engagement and understanding (Arunkumar et al., 2023).

Fischer et al. (2023) investigated the role of data visualizations in agricultural infographic, particularly their impact on knowledge retention and recall. Their findings

demonstrated that pictographs significantly enhanced participants' ability to recall key design elements and information, underscoring the importance of visually salient representations for conveying complex topics like sustainable beef production (Fischer et al., 2023). These studies contribute to understanding how visual elements can be optimized to improve information dissemination and audience engagement.

Purpose and Objectives

The overarching purpose of this dissertation was to investigate the role of communication strategies in shaping public trust in evaluation science communication findings. Specifically, this research aimed to:

1. Examine how different communication methods (text, graphs, and infographic) influenced public attitude toward evaluation science communication.
2. Explore the controlling role of trust in scientists and organizations in shaping audience engagement with evaluation findings.
3. Identify best practices for enhancing the accessibility and credibility of evaluation communication across diverse stakeholder groups.

Conceptual Framework

This research was guided by the Data-driven Audience-centered Communication Framework for Evaluation (Chapter III), which integrates audience segmentation theory (Grunig, 1989), sociolinguistic approaches (Labov, 1966), and Utilization-focused evaluation approach (Patton, 2008). The framework emphasized that effective communication must be data-driven, ensuring accuracy and reliability, and audience-centered, aligning with the cognitive and informational needs of diverse stakeholders. Chapter III (Article I) discusses the proposed framework in the context of a multidisciplinary project bridging the gap of context (audience),

data (evaluation data) and communication (data visualization) for tailored and more efficient interaction with the target audiences.

Review of Dissertation Articles

Chapter III (Article I): Proposing a Data-Driven Audience-Centered Communication

Framework For Evaluation

Article I introduces the Data-driven Audience-centered Communication Framework for Evaluation to enhance science communication in evaluation contexts. This conceptual piece responded to challenges such as complex evaluation language, audience segmentation, and ineffective dissemination strategies of evaluation findings. The framework integrates the utilization-focused evaluation approach, audience segmentation theory, and sociolinguistic approaches to improve the accessibility and impact of evaluation findings.

This article builds upon existing communication models by emphasizing the role of tailored, evidence-based communication in fostering engagement and trust in evaluation findings. Specifically, this study examined how evaluation communication could be structured to support engagement and comprehension among diverse audiences. It also explored the potential of data-driven approaches to increase public trust in evaluation findings, while investigating how segmentation strategies might ensure that messages are appropriately tailored and effectively delivered to target audiences.

Chapter IV (Article II): Communicating Interdisciplinary Project Findings to Change Attitude and Build Trust: Insights from an Evaluation Data Visualization Experiment

Article II aimed to examine the impact of different communication methods (text, graphs, and infographic) on public attitude toward evaluation science communication, with trust in scientists as a covariate. The study employed a quantitative experimental design with a sample of

1,025 U.S. survey respondents who were exposed to evaluation findings presented in different communication formats and then assessed for their attitude and trust levels. The study examined whether communication methods (text, graphs, infographic) influenced attitude toward evaluation science communication and whether this influence was controlled by trust in science.

The following research objectives and hypotheses guided the study:

Objective 1: Describe respondents' attitude toward evaluation science communication, and trust in scientists.

Objective 2: Determine if differences exist in respondents' attitude toward evaluation science communication depending on an evaluation science communication intervention received (text, graphs, or infographic).

Objective 3: Determine if differences exist in respondents' attitude toward evaluation science communication depending on the communication intervention they received (text, graphs, or infographic), while controlling for trust in scientists as a covariate.

Hypothesis 1: Respondents receiving the infographic intervention will exhibit a more positive attitude toward evaluation science communication than respondents receiving the text or graphs interventions.

Hypothesis 2: Respondents receiving the graph intervention will exhibit a more positive attitude toward evaluation science communication than respondents receiving the text or infographic interventions.

Hypothesis 3: Trust in scientists will impact the effect of the interventions.

Chapter V (Article III): Trust in Organizations: Implications for Evaluation Science Communication

Article III examined how trust in organizations influenced audience engagement with evaluation findings. The study explored the role of text, graphs, and infographic in shaping cognitive processing and trust in organizations. The purpose of this study was to examine whether communication methods (text, graphs, and Infographic) influenced the *cognitive processing* of evaluation findings and *trust in a scientific consortium* and whether this influence was controlled by *trust in organizations*. The following research objectives and hypotheses guided the study:

Objective 1: Describe respondents' cognitive processing of evaluation findings and their trust in a scientific consortium and trust in organizations.

Objective 2: Determine if differences exist in respondents' cognitive processing of evaluation findings and trust in scientific consortium depending on the communication intervention they receive (text, graphs, or infographic).

Objective 3: Determine if differences exist in respondents' cognitive processing of evaluation findings and trust in scientific consortium depending on the communication intervention they receive (text, graphs, or infographic), while controlling trust in organizations as a covariate.

H1: Respondents receiving the infographic intervention will exhibit greater cognitive processing of evaluation findings and higher trust in scientific consortium than those receiving the text or graphs interventions.

H2: Respondents receiving the graphs intervention will exhibit greater cognitive processing of evaluation findings and higher trust in scientific consortium than those receiving the text or infographic interventions.

H3: Trust in organizations will control the relationship between the communication intervention and cognitive processing of evaluation findings.

H4: Trust in organizations will control the relationship between communication intervention and trust in scientific consortium.

Each article builds upon the proposed conceptual framework, offering theoretical and empirical insights into the role of science communication in shaping public trust and perceptions of evaluation findings.

Institutional Review Board (IRB) Information

The University of Georgia Institutional Review Board (IRB) approved this study as exempt (IRB #00008098; Appendix A).

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CHAPTER 3

ARTICLE 1

PROPOSING A DATA-DRIVEN AUDIENCE-CENTERED COMMUNICATION FRAMEWORK FOR EVALUATION IN IMPACT EVALUATION DISCOURSE¹

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Abstract

Effective science communication is critical for enhancing public understanding and engagement with scientific findings. However, barriers such as complex information, varying audience knowledge levels, and ineffective communication strategies hinder this process. Therefore, the *Data-driven Audience-centered Communication Framework for Evaluation* was designed to address these challenges using the Utilization-focused evaluation approach, audience segmentation perspectives, and sociolinguistic approaches. The framework emphasized the importance of tailoring communication to specific audience needs, ensuring evaluation data was not only accessible but also actionable. The primary goal of this framework is to foster greater accountability, learning, and innovation within impact evaluation practices and to contribute to addressing communication gaps in evaluation practices, considering audience segments and the use of evaluation results for a wider public. The framework aims to enhance public perception and trust in evaluation discourse by highlighting the relationship between data-driven approaches and human-centered communication. Finally, the proposed framework is adaptable, allowing it to be tailored to diverse contexts. By enhancing the efficacy of communication in complex evaluation environments, this framework contributes to a more informed and engaged public in science communication and evaluation.

Introduction

One of the most persistent challenges faced by the evaluation field is communicating findings in ways that resonated with both professional and public audiences. Mason (2023) noted that “communication is a persistent challenge” and that “evaluators’ struggles communicating about evaluation are” among others, for such a “fuzzy” approach by the public at large (Mason, 2023, para. 6). Other factors also included the “field’s inability to clearly articulate what

evaluation is” (Mason, 2023, para. 6). The importance of conveying evaluation findings to wider audiences cannot be overstated as a fundamental measure of the “sustained growth” of the evaluation field, “advancing the development of professions,” and influencing “the field’s ability to attract young and emerging evaluators” (Mason, 2023, para. 10). Communication also established firm grounds for evaluators’ distinctive and valuable contributions to further growth of the field, ultimately increasing public perception, understanding, and trust in evaluation discourse (Mason & Hunt, 2019; Mason, 2023).

According to Russ-Eft and Preskill (2009), communication of evaluation results was most effective when it occurred regularly and included both process-oriented updates (throughout the project life cycle) and impact data (after findings were compiled). Correctly timing communication with key audiences entailed several phases: focusing on decision-making in the early stages of an evaluation, providing process-related updates during implementation, and finally disseminating evaluation findings via targeted channels and methods as the project concluded (Russ-Eft & Preskill, 2009).

Building on these insights, the intersection of evaluation and science communication emerged as a rich domain for further inquiry. Rigorous evaluation methodologies can validate the effectiveness of communication strategies, while science communication principles ensure that evaluation findings resonate with diverse publics. Science communication aimed to make scientific information more accessible and engaging, and evaluation practice was uniquely positioned to measure whether such communicative efforts achieved their intended purposes. Yet, “making sense of scientific information is not easy” (National Academies of Sciences, Engineering, and Medicine [NASEM], 2017, para. 3), and science communicators often faced the same challenges as evaluators—navigating uncertainties, addressing cognitive shortcuts, and

capturing audience feedback (NASEM, 2017). Recognizing these shared challenges underscored the importance of an integrated approach; evaluation methodologies were employed to assess and refine communication efforts by enhancing the effectiveness, credibility, and societal impact of both fields (Fischhoff, 2019; Jensen, 2014).

The purpose of this manuscript was to articulate a framework that connected evaluation methodologies with science communication practices, highlighting how evaluators and communicators could together address the essential uncertainties and complexities of scientific information. By recognizing the intersection of evaluation and science communication, this article emphasized that understanding and applying scientific evidence required accurate and data-driven evaluative insights. Likewise, to ensure that evaluation findings are effectively shared with stakeholders, sound communication strategies are needed. Together, aligning these two fields fostered a systematic approach to strengthening accountability and innovation across scientific and communication initiatives.

Literature Review

‘Evaluation’ as a Challenge

People have interpreted the term evaluation differently (Alkin & King, 2017). In a discussion about variability in evaluation practice, Schwandt (2015) outlined several core challenges, including the “absence of a universally agreed upon definition of evaluation” (p. 17). He emphasized that “evaluation is a matter of asking and answering questions about the value of that object (its quality, merit, worth, or significance),” but this notion was not unanimously accepted within the evaluation community (Schwandt, 2015, p. 18). The definition of evaluation also sparked controversy when it was categorized as a distinct type of applied social science research, influencing the selection of methods—such as experiments, surveys, interviews, and

field observations—employed to monitor processes and conduct formative or summative evaluations (Schwandt, 2015).

In international development, the term Monitoring and Evaluation (M&E) often appeared, focusing on performance measurement rather than deeper analytical questions about what constituted authentic “evaluating” (Schwandt, 2015, p. 19). Moreover, research showed that a lack of trust and understanding of evaluation persisted among the public. For instance, Picciotto (2011, 2017) contended that people remained unclear on what the evaluation discipline entailed, perceiving its boundaries with auditing, inspection, and social research as “fuzzy” (Picciotto, 2011, p. 170). Thus, evaluators faced inherent challenges stemming from varied definitions, inconsistent methods, and public uncertainty regarding the value and purpose of evaluation.

‘Communication’ as a Challenge for Evaluators

Human communication is inherently multidimensional, shaped by socio-cultural contexts, the choice of symbols, and the broader ecosystems in which messages are formed (Stone, 1999; Getchell et al., 2023). Stone (1999) explained that “human communication [was] a process by which one person stimulate[d] the meaning in the mind(s) of another person or persons through verbal or nonverbal messages” (p. 48), underscoring its dynamic nature and capacity to create or solve problems. However, evaluators consistently struggled to communicate technical findings clearly and persuasively to decision-makers, staff, funders, and the general public, leading to what some referred to as “a fuzzy approach” or a persistent challenge (Mason, 2023, para. 6).

In addition, communicating complex evaluation results often requires synthesizing data from multiple sources, methods, and time points in ways that resonate with diverse audiences (McAlindon et al., 2019). Evaluators who aim to produce “well-synthesized and translated

reports” (McAlindon et al., 2019, p. 292) encounter constraints such as time-sensitive implementation targets, limited financial or human resources, and institutional requirements (Sanders et al., 2023). Beyond these resource hurdles, evaluators need to translate results into context-specific implications, ensuring the findings were relevant and accessible (Powell, 2006; Russ-Eft & Preskill, 2009). McAlindon et al. (2019) argued that thoughtfully integrating visual communication design and marketing principles, such as branding, clear objectives, storytelling narratives, and purposeful design (BOND), could enhance how evaluators presented data and elicited “productive responses” from stakeholders (p. 293). Without such intentional design choices, data visualizations and reports risk being overlooked or misunderstood.

Further complicating matters, evaluators frequently operate at the intersection of research and practice, a position Berry et al. (2023) deemed crucial for bridging the ‘research-to-practice gap.’ However, bridging that gap require evaluators to collect evidence and translate it into clear, actionable insights for practitioners and community members. Berry et al. (2023) noted that ineffective communication perpetuated silos, wherein researchers and practitioners remained disconnected. In response, evaluators are urged to adopt frameworks that systematically incorporate stakeholder collaboration and culturally responsive practices into their communication strategies (Berry et al., 2023; Hood et al., 2015). Doing so can narrow the research-to-practice divide by producing findings that guide evidence-informed decisions rather than failing in inaccessible formats (Mason, 2023).

Ultimately, while evaluation literature underscores the importance of timely and audience-focused communication (Russ-Eft & Preskill, 2009), the practice remains challenging. Reports are sometimes too dense, lack meaningful narratives, or are disconnected from stakeholder realities, leading to minimal uptake (Franz, 2014; Powell, 2006). By embedding

visual communication design strategies (McAlindon et al., 2019) and ensuring “intentional, bi-directional” translation of findings (Berry et al., 2023, p. 503), evaluators enhance the likelihood that results will be understood and applied. This intentional approach helps move beyond transmitting raw data to a more nuanced, stakeholder-centered method of communication, one that fosters evaluation use, improves accountability, and ensures that evaluation findings genuinely inform practice.

Utilization-Focused Evaluation

The multifaceted communication challenges described above underscore the necessity for evaluation approaches that explicitly prioritize stakeholder use of findings. One well-established method that addressed the relevance and applicability of evaluation results is Utilization-focused Evaluation (UFE), which emerged primarily to address limitations in traditional evaluation approaches (Hogan, 2007; Patton, 2008; Worthen et al., 1997). At its core, UFE prioritizes the use of evaluation results by *intended users* (Patton, 2008). Stakeholders are not passive recipients; instead, they actively influence both the design and the application of findings, thereby enhancing evaluation relevance (Mason & Azzam, 2019; Patton, 2008). Patton (2008) identifies multiple types of use, including *instrumental*, *conceptual*, and *symbolic uses*, each reflecting how stakeholders might adopt or respond to evaluation outcomes.

However, the UFE approach also presents unique challenges. Evaluators often have to assume facilitative roles, navigate situational complexities, and remain mindful of power dynamics (Patton, 2008; Schwandt, 2015). Turnover among primary users, resource constraints, and political contexts could limit effective utilization (Dobbins et al., 2021). Communication is integral to UFE, as Patton (2008) argued that “the very conduct of evaluation is, itself,

communication” (p. 506), highlighting the necessity of clear messaging, interactive data visualizations, and formats accessible to non-expert audiences (Patton, 2012; Patton, 2013).

Audience Segmentation

Audience segmentation is used in communication and marketing to help better understand different audiences and improve the effectiveness of tailored communication efforts (Grunig, 1989). Audience segmentation identifies groups or subgroups of people within a larger population with similar values, beliefs, behaviors, political ideology, and political preferences and is homogeneous concerning these critical attributes (Hine et al., 2014; Maibach et al., 2011). The effectiveness of audience segmentation largely depends on developing a “concise, reliable, and valid measure describing individual differences in public opinion” (Chryst et al., 2018, p. 2). At its core, audience segmentation produces a cluster of socially motivated groups within a bigger, more diversified population (Leiserowitz et al., 2021; Slater, 1996) and is commonly used to distinguish homogeneous groups of customers who can be targeted in the same way because they have similar needs and preferences (Wedel & Kamakura, 1998). Previous studies used audience segmentation to develop effective interventions in various domains. For instance, Lamm et al. (2019) applied audience segmentation in agricultural communication studies in extension through demographic characteristics (sex, age, employment level of education, and geographical region). They found audience segmentation can effectively deliver tailored content to specific audiences (Lamm et al., 2019). In evaluation contexts, audience segmentation helped evaluators identify distinctive stakeholder groups, such as donors, policymakers, implementers, and beneficiaries, and craft messages to address their specific concerns and cultural contexts (Wedel & Kamakura, 1998).

Understanding Users and Stakeholders

Patton (2008) differentiates between users and stakeholders. Primary intended users refer to individuals with a direct and identifiable interest in the evaluation, who will ultimately utilize the evaluation findings to make decisions, inform actions, or implement changes (Patton, 2008). Evaluation stakeholders are those who have a stake – a vested interest in evaluation findings, including program funders, staff, clients, and program participants (Patton, 2008). In UFE, the definition of primary users is open to different stakeholders: they may be the funders of a project, its implementers, or even its beneficiaries, or a mix of these groups (Ramirez et al., 2016). This differentiation and determination of the vested interests of users and stakeholders are crucial for their degree of involvement in the evaluation design, process, and implementation (Patton, 2012). For instance, “funders, chief executives and other top managers can be the primary users of overall effectiveness results, while lower-level stakeholders and participants may be involved in using implementation and monitoring data for program development” (Patton, 2012, p. 77).

Tailoring Evaluation to Users

In UFE determining primary users' interests is vital for their involvement in the evaluation process (Ramirez et al., 2016). Patton (2012) emphasizes involving users in decision-making regarding evaluation methods to ensure relevance and buy-in. Engagement during data collection enhances ownership of results and fosters interest in implementing recommendations (Patton & Campbell-Patton, 2021).

Sociolinguistic Approaches

Sociolinguistics explores the interplay between language and society, tracing back to the work of Labov (Labov, 1966). Researchers viewed language as a dynamic reflection of societal evolution (Labov, 1966), offering insight into culture, identity, and broader social structures

(Marshall et al., 2021). By examining spoken and written forms, sociolinguistics provides a lens to uncover hidden meanings and values embedded in language use (Abdullaev, 2023). Labov (1966) underscores how language variation emerges among social groups and reflects societal norms, while language influences those norms. Consequently, linguistic choices have the potential to either reinforce or challenge dominant beliefs (Abdullaev, 2023).

Beyond academia, sociolinguistics has practical implications. Policymakers, educators, and marketing professionals can benefit from understanding language's role within different communities (Abdullaev, 2023). Such insights inform inclusive policymaking, tailor-made educational approaches, and culturally responsive marketing campaigns (Abdullaev, 2023). In evaluation contexts, sociolinguistic approaches can illuminate how evaluators can navigate diverse linguistic landscapes and engage stakeholders effectively. Understanding language's social function can help practitioners anticipate how audiences may interpret certain terminology or rhetorical structures, particularly when presenting complex evaluation findings.

Sociolinguistic approaches in this study refer to the intentional application of language variation awareness to enhance communication effectiveness across audiences we communicate with. This includes tailoring vocabulary, tone, framing, and narratives to align with linguistic norms, cultural and social values of stakeholders, by ensuring messages built around communicating evaluation findings are contextually appropriate.

Finally, sociolinguistics bridges theory and practice by clarifying how language shapes societal norms and individual identities (Abdullaev, 2023). This bridging capacity is especially relevant for audience segmentation and message framing, both key to designing impactful communication strategies (Grunig, 1989; Myers, 2010). By acknowledging language variation

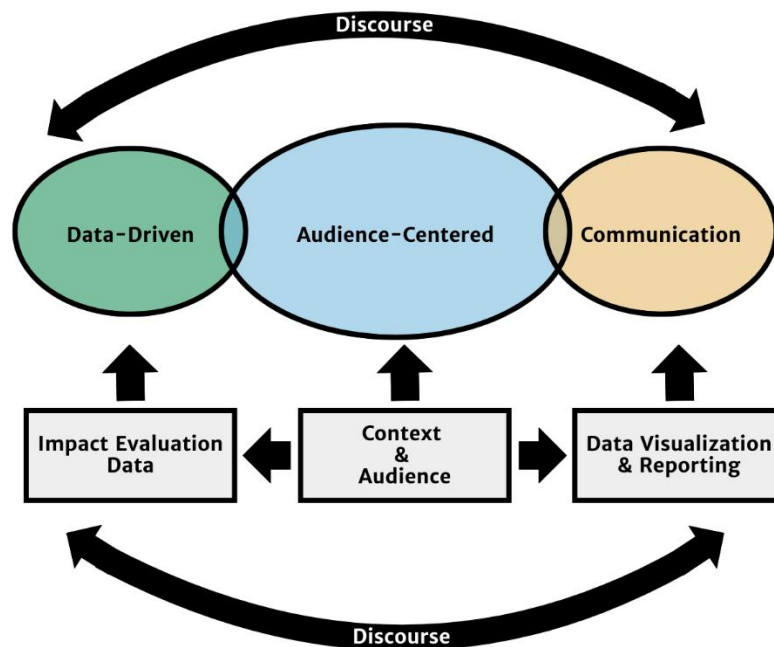
across audiences, evaluators can improve clarity, respect for cultural nuances, and overall reception of evidence-based messages.

Bridging Toward the Framework

The studies discussed in this review underscored the centrality of communication in addressing definitional ambiguity, stakeholder engagement, and cultural diversity within effective evaluation practice. For example, Mason (2023) and Picciotto (2011, 2017) highlighted persistent challenges related to public misunderstanding and definitional inconsistency in evaluation. Russ-Eft and Preskill (2009) emphasized the importance of timing and audience-tailored communication, while McAlindon et al. (2019) and Berry et al. (2023) proposed practical strategies such as visual communication design and bi-directional engagement. Further, sociolinguistic perspectives (Labov, 1966; Abdullaev, 2023) and audience segmentation framework grounded in the Situational Theory of Publics (Grunig, 1989) reinforced the need for culturally responsive, audience-specific message construction. These insights formed the foundation for proposing a *Data-driven Audience-centered Communication Framework for Evaluation* (see Figure 3.1), which aims to unite evidence-based evaluation with strategic communication methods to maximize impact, credibility, and inclusivity with stakeholders.

Figure 3.1

Data-driven Audience-centered Communication Framework for Evaluation



The model was built at the nexus of impact evaluation and science communication. Impact evaluation systematically identifies the effects, positive or negative, intended or unintended, that a project, program, or policy has on individuals, households, institutions, or communities (Gertler et al., 2016). Its purpose is to determine whether and to what extent observed findings can be attributed to a specific intervention, rather than to other factors (Gertler et al., 2016).

The model hinges on several approaches and guiding principles. First, regardless of the medium or style used to communicate impact evaluation findings, the aim is to minimize the creation of additional noise in the communication channel, ensuring that messages reach their intended destination as accurately as possible (Stone et al., 1999). To achieve this goal, evaluation communication should be data-driven and audience-centered. This means evaluation data is not simply presented as is but is translated into tailored messages that reflect the intended audience's values, needs, and information processing preferences. Using human-centered

approaches, evaluators consider cultural context, language, and stakeholder priorities when deciding how to format and share findings, ensuring that communication is accurate and accessible. Such an approach also respects the evaluation context and employs symbols and language that align with the needs and expectations of the target audience (McQuail, 2010; Montrosse-Moorhead & Griffith, 2017).

This framework, grounded in the existing literature, was informed by the Utilization-focused evaluation approach (Patton, 2008), the principles of audience segmentation, guided by the Situational Theory of Publics (Grunig, 1989), and socio-linguistic approaches (Prasad, 2017). It aims to define data-driven communication and explain its value in impact evaluation discourse. It also clarifies audience-centered evaluation communication and highlights its significance. These discussions illustrate how integrating data-driven and audience-centered approaches can serve as a promising foundation for designing and delivering human-centered messages. Conceptually, such approaches aim to enhance the accessibility and potential use of evaluation findings among funding agencies, stakeholders, and the public.

Communication: Data Visualizations

With the evolving evaluation field and more standardized approach to reporting, style, communications, and visualization, Evergreen (2011) noted that some evaluators acknowledge potential shortcomings in their communication styles. Limited studies have been conducted on the role of communication, particularly in evaluator credibility, audience needs for communication, and presentation formats (Evergreen, 2011). Evaluators continually seek innovative approaches and methodologies to communicate the outcomes of their evaluations accurately (Mason & Azzam, 2019; McAlindon et al., 2019). Given the diversity, needs, and interests of specific audiences, including donors, project beneficiaries, and implementers,

communication strategies and tools should be selected carefully to facilitate the interpretation, efficient transfer, and understanding of the impact evaluation results achieved (Rossi et al., 2018).

Data visualizations simplify complex information by presenting it graphically, facilitating easier cognitive processing and learning (Mahmoud & Zoghaib, 2023; Mason & Azzam, 2019). Generally, visual communication proves more effective than other forms of communication (Mahmoud & Zoghaib, 2023). Advanced features of data visualizations, including dashboards, charts, graphs, and infographic, have proven their potential as compelling mediums to communicate various forms of data to target audiences but are not interactive, ensuring program participant feedback and input is captured (Evergreen, 2011; Azzam et al., 2013). Data visualization has proven its potential as a powerful and effective medium for reaching diverse audiences, including stakeholders, donor communities, and project beneficiaries, when communicating complex messages (Burnett et al., 2019).

Properly visualized evaluation findings can enhance stakeholders' understanding of evaluation results, facilitate evaluators' communication process, and increase community engagement and participation in evaluation processes (Azzam et al., 2013). However, communicating impact evaluation results to communities is a challenge not only for evaluators but also for stakeholders (Patton, 2008). The selection of data to communicate to stakeholders poses a risk, narrowing the evaluator's ability to fully demonstrate the successes and longitudinal impact of community development projects (Azzam et al., 2013).

Evaluators often struggle to develop efficient and appealing data visualizations, as they require specific skills and capacities that are often outside the immediate radar and scope of interest for the evaluation community. Previous studies indicated that misinterpretation (Azzam et al.,

2013; Mason & Azzam, 2019). ng designed visuals may lead to community participants' misunderstanding findings and erroneous decision-making (Azzam et al., 2013; Mason & Azzam, 2019). The evaluation community should utilize the advanced features of data visualizations to collect and analyze various forms of data and effectively design and communicate evaluation results to broader audiences (Azzam et al., 2013; Mason & Azzam, 2019).

Drawing on the suggested *Data-driven Audience-centered Communication Framework for Evaluation*, one potential strategy to address the identified gap in evaluation science communication research and practice is delivering information in easily assimilated forms, such as verbal presentations, concise reports, jargon-free language, and visually integrated graphics (Torres et al., 2017).

Data-driven Communication

Impact evaluations (IEs) generate evidence for greater accountability, innovation, and learning (Gertler et al., 2017). IEs strengthen program implementation quality, lead to more efficient interventions, increase program efficacy, and enhance accountability and visibility for results (Diaz et al., 2019; Gertler et al., 2017). Data-driven communication in impact evaluation discourse refers to using data and evidence-based communication strategies to effectively convey the results, findings, and insights of evaluations (Alkin et al., 2004; Patton, 2015). The term *data-driven* signifies the use of (big) data to support informed decisions (Schwarz et al., 2023), which has the advantage of being evidence-based (Kaspi & Venkatraman, 2023). Data-driven communication involves tailoring the communication of evaluation results to different stakeholders, such as funders, policymakers, program implementers, communities and stakeholders, and the public, with the goal of *informing decision-making, promoting*

accountability, and *facilitating positive change* based on the findings, lessons learned and main outcomes of evaluations (Alkin et al., 2004; Patton, 2015).

Discourse

The term discourse has multiple definitions and needs clarification for usage (Marshall, 2021; Teubert, 2010). It broadly refers to “talk and text, explor[ing] how language shape[d] lives” (Marshall, 2021, p. 31), encompassing not just communication artifacts but also the meaning-making processes within social interactions (Teubert, 2010). Language plays a central role in shaping one’s perception of reality (Kövecses, 2009; Teubert, 2010), since discourse represents how language materializes through structured thinking in societal contexts (Teubert, 2010). Discourse analysis, therefore, examines how language impacts social dynamics and power relations (Kövecses, 2009), often revealing how seemingly “objective” messaging carries implicit cultural or political undertones.

In discourse, van Dijk emphasized context as a crucial element, calling it the “social situation” of language use (van Dijk, 2009, p. 2). Context includes cultural norms, historical background, audience expectations, and the speaker’s position. Evaluators who communicate impact evaluation findings need to grasp these contextual factors to avoid introducing unintended ‘noise’ and to align messages with stakeholder needs (McQuail, 2010; Montrosse-Moorhead & Griffith, 2017). Socio-linguistic approaches further intersect with discourse, stressing how variations in language use among different groups could influence the reception of evaluation results. For example, audience segmentation based on demographic or cultural factors can allow for more precise alignment of discourse to audience preferences (Abdullaev, 2023; Grunig, 1989).

Using discourse analysis, evaluators and communicators could investigate how language constructs meaning in a given setting (Teubert, 2010; van Dijk, 2009). For instance, discourse analysis has been used in agricultural communication to identify how messages about farming practices or policies were framed (Myers, 2010). This more profound knowledge facilitates more inclusive and effective communication, ensuring that critical technical or cultural references resonate with intended audiences. As evaluation utilization hinges on audience engagement (Franz, 2014), harnessing discourse effectively became paramount. Through discourse analysis, evaluators can potentially uncover power imbalances, terminology biases, or rhetorical strategies that either support or hinder the uptake of findings. Ultimately, a user-focused evaluation approach (Patton, 2020) thrives on robust discourse practices, bridging evaluation and communication theories through socio-linguistic methods.

Role of Language in Evaluation

“Language matters, jargon creates barriers, understandable language facilitates access to evaluative thinking” (Patton, 2008, p. 53)

Language plays a pivotal role in shaping how evaluators and stakeholders engaged with findings (Hopson, 2000). In sociocultural contexts, such as educational settings, agricultural extension, or policy arenas, addressing language-related issues can critically affect an evaluation’s success. Yet evaluators often struggle to achieve consensus on language use in research and practice, revealing that even shared languages contain multiple “sub-languages” or registers (Hopson, 2000). Hopson (2000) distinguished *language of* (the overarching terms and concepts that framed evaluation) from *language in* (the specific language that cast questions, data, and findings). Evaluators who neglect either form risk alienating stakeholders, particularly

when specialized jargon or academic style overshadow clarity and local cultural norms (Patton, 2008).

Definitional ambiguity also persists regarding the term evaluation itself (Alkin & King, 2017; Schwandt, 2015). Such ambiguity influences how data are collected, presented, and interpreted across different sectors, especially in large organizations or international development contexts (Schwandt, 2015). Reports often follow academic norms, featuring heavy technical language and methodological detail (Rossi et al., 2004; Evergreen, 2011; Alkin, 2013). Although such rigor maintains accountability and transparency (Alkin, 2013; Evergreen, 2011; Patton, 2008), it also makes comprehension difficult for frontline stakeholders (Alkin, 2013; Evergreen, 2011; Patton, 2008).

Science communication requires more than merely translating jargon (NASEM, 2017). Sociolinguistic approaches enrich the understanding of how agricultural knowledge is transmitted and how language shapes public perception of farming practices, food policies, and sustainability (NASEM, 2017). Researchers noted that framing and linguistic nuances (Grunig, 1989; Myers, 2010) significantly affected how audiences interacted with evaluative content (Monterrosa et al., 2020). For instance, marketing or community outreach strategies that employed inclusive language and vivid narratives proved more successful in changing attitude or behaviors than highly technical, data-heavy presentations (Thorn et al., 2023).

Moreover, language barriers frequently hinder effective communication among policymakers, farmers, and consumers, calling for improved engagement practices (Szüdi et al., 2023). Discourse analysis provides a valuable tool to identify potential obstacles (Richardson, 1990), such as technical jargon, cultural misalignments, or unwarranted assumptions. Enhanced clarity and accessibility heighten the dissemination of agricultural knowledge (Monterrosa et al.,

2020; Thorn et al., 2023). In turn, socio-linguistic approaches offer evaluators practical strategies to account for diverse linguistic backgrounds (Abdullaev, 2023; Labov, 1966) and to tailor messages that resonate with, rather than alienate audience segments. This alignment is crucial to evaluation use, since effectively delivered findings are more likely to inform real-world decisions (Franz, 2014; Patton, 2008).

Context: Culturally Responsive Evaluation

Over the past two decades, there has been an increased focus on how cultural factors shaped evaluation processes, reflecting community norms, histories, and values (Kushnier et al., 2023; Thomas & Parsons, 2016). Numerous terms arose to denote these culturally attentive methodologies, including cross-cultural, culturally competent, culturally appropriate, culturally relevant, culturally congruent, and culturally responsive evaluation (Hall et al., 2020; Kushnier et al., 2023). Culturally responsive evaluation (CRE) highlights hidden social and political factors, like norms, relationships, and stereotypes, underscoring the risks of ignoring local contexts (Kirkhart & Hopson, 2010; Thomas & Parsons, 2016). Historically, evaluators operated under a postpositivist paradigm emphasizing quantitative measures and pursuit of a singular truth (Parker, 2004; Patton, 2008), but alternative models emerged, promoting naturalistic inquiry and multiple viewpoints (Guba & Lincoln, 1989; Patton, 2008).

Meanwhile, Utilization-Focused Evaluation (UFE) recognizes that cultural sensitivity is central to stakeholder engagement (Patton, 2008). Patton discussed the need for evaluators to demonstrate “cultural sensitivity and competence” (p. 83), especially when power disparities existed between evaluators and local communities. Research on focus groups with vulnerable populations (Hall et al., 2022) showed how empowerment and control over one’s narrative could be fostered by countering “othering,” a dynamic that emerged from power differentials.

Culturally Responsive Evaluation integrated concepts like Cultural Intelligence (CQ) (Ang et al., 2007; Van Dyne & Livermore, 2010), which helped evaluators develop metacognitive, motivational, and behavioral skills for adapting to diverse cultural settings (Patton, 2008). The approach also emphasized diversity and inclusion, viewing them as catalysts for dialogue and transformative practices (Hogg, 2016; Lucas & Baxter, 2012; Mertens, 2007). The American Evaluation Association's Guiding Principles reinforce these ideals, encouraging respect for people and acknowledging the cultural dimensions across communities (AEA, 2011). Global guidelines, like the UNDP's (IEO, 2021), advance these commitments by requiring evaluators to address gender equality, disability, and marginalized voices in their evaluations.

Cultural biases further complicate evaluation settings (Mate et al., 2019), making reflexivity and self-awareness critical for evaluators (Symonette, 2004). Engaging local stakeholders, through bilingual facilitators, adapted instruments, or culturally relevant indicators, enhanced trust and addressed power imbalances (Frierson et al., n.d.; Patton, 2008). By remaining flexible and incorporating local knowledge, evaluators can accommodate each community's needs (Thomas & Parsons, 2016). Capacity-building in local contexts and clear, culturally responsive communication strategies can also serve to mitigate ethnocentrism, defined as the tendency to view one's own culture as central or superior, which can hinder cross-cultural understanding and equitable engagement (Minnican & O'Toole, 2020; Young et al., 2017). Ultimately, CRE requires a lifelong dedication to learning, reflection, and inclusive practice, ensuring evaluation design and findings genuinely honor those most affected by its outcomes (Hopson, 2000; Hood et al., 2015; Symonette, 2004).

Implications

Implications of the proposed framework from a *developmental evaluation* perspective, which has the purpose of helping develop an *innovation* or *program* (Patton, 2011), is that the model could be used in both science communication and research and development (R&D) context, where “social innovators are engaged in bringing about system change under conditions of complexity” (Patton, 2011, p. 20). From the purposes and use perspective, developmental evaluation also calls for *ongoing development* of an innovation to new conditions in complex dynamic settings (Patton, 2011). The discussed complex communication environment for evaluation entails a positive opportunity for the proposed framework (innovation), further exploration, advancement, and adaptation (Patton, 2011). Given the importance of evidence-based decision-making and policy making continues to grow there will likely be increased demand for rigorous evaluation of science communication efforts and greater integration of evaluation into communication planning and implementation processes (Evaluation Task Force, 2022). Establishing firm grounds for evaluators’ distinctive and valuable contributions is essential to furthering the growth of the field and increasing public perception, understanding, and trust in evaluation discourse (Mason & Hunt, 2019; Mason, 2023). The aforementioned factors will play a crucial role in the proposed framework in the future. Future advancements may include integrating interactive multimedia tools into evaluation and science communication practices, particularly social media sentiment analysis (Draus & Khalid, 2019). As Draus and Khalid (2019) highlighted in their systematic literature review, sentiment analysis was applied across healthcare, political forecasting, and program evaluation to assess public opinions and emotional responses from platforms like Twitter and Facebook. These interactive tools could be used to monitor real-time reactions to evaluation findings, assess trust and comprehension, and

identify gaps in message delivery based on sentiment trends. Applying such techniques to evaluation communication would help evaluators to dynamically adjust dissemination strategies based on audience feedback.

Conclusions

The *Data-driven Audience-centered Communication Framework for Evaluation* has been proposed to address the complexity of conveying impact evaluation findings to stakeholders. By integrating concepts from the UFE approach, audience segmentation, and sociolinguistic approaches, the framework aims to address key challenges in science communication, including audience comprehension and the effective use of data-driven insights. Grounded in relevant theories and approaches and supported by empirical studies, the framework emphasizes the importance of tailoring communication to specific audiences, ensuring that evaluation data is not only accessible but also meaningful and actionable (Fischhoff, 2019; Grunig, 1989; Labov, 1966; Patton, 2008).

The interaction between data-driven approaches and human-centered communication is crucial in impact evaluation, particularly fostering greater accountability, learning, and innovation (Fischhoff, 2019; Patton, 2013). Research showed effective science communication involved the collaboration of professionals across disciplines to address the needs of diverse audiences and facilitate understanding of complex information (Jensen, 2014; Martinez et al., 2023). The proposed framework suggests that evaluators can enhance the utilization of findings by prioritizing audience needs and refining communication channels, thereby improving decision-making and maximizing the societal return on investment in evaluation processes (Alkin & King, 2017; Patton, 2008). The proposed framework extends UFE approach by integrating audience segmentation and message tailoring as core components of the evaluation

process. By extending the UFE approach to integrate CRE as a contextual foundation, the framework acknowledges that effective evaluation communication must also reflect the cultural norms, values, and lived experiences of stakeholders. While UFE emphasizes use and stakeholder engagement, CRE enhances this by calling attention to equity, power, and inclusion issues, ensuring that communication is strategic and culturally situated (Hood et al., 2015; Hopson, 2000). Drawing from audience segmentation principles, the framework aims to help evaluators consider what different audiences need to know, how engaged they are, and how much they trust the information source. Instead of viewing communication as something that happens only at the end, this framework weaves communication planning into every stage of the evaluation process, supporting deeper engagement, learning, and meaningful use of the findings.

This study has important limitations to consider. The framework is a conceptual model that has not yet been empirically tested. While it draws from established theories and practices, its effectiveness and adaptability in real-world evaluation settings, particularly across sectors and cultures, have yet to be validated. The framework builds upon UFE approach, which assumes the primary intended users are identifiable, available, and actively engaged throughout the evaluation process (Patton, 2008). However, practically stakeholder turnover, political dynamics and other factors may affect and limit user engagement and potentially undermine the intended use of evaluation findings (Patton, 2012; Dobbins et al., 2021; Schwandt, 2015). Effectively applying culturally responsive principles in evaluation may require context-specific expertise (Hopson, 2000; Hood et al., 2015), which can be challenging for evaluators due to limited time, capacities, and resource constraints.

Further research and application in diverse contexts, including science communication, could help test, refine and expand the utility of this framework, ultimately contributing to a more informed and engaged public (Mason, 2023; Russ-Eft & Preskill, 2009).

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CHAPTER 4

ARTICLE 2

COMMUNICATING INTERDISCIPLINARY PROJECT FINDINGS TO CHANGE ATTITUDE AND BUILD TRUST: INSIGHTS FROM AN EVALUATION DATA VISUALIZATION EXPERIMENT²

² Markosyan, T., Lamm, A. J., Lu, P., Sanders, C. E., Lamm, K. W. To be submitted to Journal of Applied Communications.

Abstract

This study examined the impact of three communication methods, textual, graphs, and infographic, on public attitude toward evaluation science communication, with trust in scientists as a covariate. A quantitative experimental design was used to collect data from 1,025 U.S. respondents via an online survey. Survey respondents were presented with evaluation findings in textual, graphical, or infographic formats and subsequently assessed on their attitude toward evaluation science communication and trust in scientists. The results revealed graphical interventions significantly improved a more positive attitude compared to infographic, while textual interventions performed comparably to both. Trust in scientists emerged as a critical covariate, explaining substantial variance in attitude ($\eta^2 = 0.07$). The findings underscore the importance of clarity in data visualizations and highlight the foundational role of trust in enhancing the effectiveness of science communication strategies. The results aligned with the Data-driven Audience-centered Communication Framework for Evaluation, emphasizing the need for tailored, audience-centric communication approaches that integrate trust-building practices. Implications for science communicators and evaluators included prioritizing graphical visualizations and fostering public trust through transparent communication. Future research should explore the long-term effects of communication methods and the potential of interactive visualizations to enhance engagement with evaluation findings.

Introduction

As agricultural and environmental challenges grow increasingly complex, ranging from climate resilience and soil health to sustainable food systems, interdisciplinary research has become essential (Dougill et al., 2021). Yet, the ability of such projects to drive meaningful change hinges not only on robust data collection but also on how effectively findings are

communicated to stakeholders (Shakeri & Khalilzadeh, 2020). Research showed communication strategies often lag behind the interdisciplinary nature of agricultural research, resulting in fragmented messaging and diminished public impact (Gibson et al., 2021). Project outcomes risk being misunderstood without integrated, audience-centered communication that reflects environmental and agricultural perspectives (Gibson et al., 2021). Strategic communication is thus crucial in ensuring project evaluation findings resonate with broader audiences and the public in general, bridging knowledge gaps and enhancing support for the research needed to develop sustainable practices (Langović Milićević et al., 2014).

Evaluation communication is vital for ensuring that diverse audiences understand, trust, and utilize findings (Mason & Hunt, 2018). However, it often overlooks the transformative potential of data visualizations in shaping public attitude (Mason & Azzam, 2019). Well-designed visualizations, such as dashboards, infographic, and pictographs, have significantly enhanced comprehension, decision-making, and engagement with complex information (Burnett et al., 2019; Mason & Azzam, 2019). These tools are not merely outputs but integral components of a systematic communication process that aligns with audience needs and facilitates actionable insights (McAlindon et al., 2018).

Research highlights evaluation communication often fails to integrate interdisciplinary design and marketing theories, leaving a critical gap in how findings are synthesized and disseminated (McAlindon et al., 2018). The BOND framework, for instance, emphasizes branding, setting clear objectives, crafting compelling narratives, and designing actionable visual tools to enhance the impact of evaluation reporting (McAlindon et al., 2018). By adopting frameworks like BOND, evaluators can create visually compelling and audience-centered communication strategies that bridge the gap between research and practice (Berry et al., 2023).

Evaluation communication often undervalues the transformative potential of data visualizations in shaping public attitude, despite growing evidence of their ability to enhance comprehension and engagement (Douville et al., 2025; Franz, 2014). By distilling complex information into visually intuitive formats, data visualizations enable audiences to more effectively process, retain, and act upon key findings (Franz, 2014). This aligns with Evergreen's emphasis on strategically designed visuals (Evergreen, 2011; Evergreen, 2013), which engage viewers through tailored elements like typefaces, colors, and arrangement to improve information uptake and decision-making (Franz, 2014). Douville et al. (2025) further highlight the role of expert lessons learned from the field, showing that clear, actionable visualizations can elevate the accessibility and utility of evaluation results for diverse stakeholders. Integrating visual elements into evaluation communication can potentially improve cognitive processing, simplify complex concepts, and bridge the trust gap between evaluators and their audiences (Mahmoud & Zoghaib, 2023; Quadri et al., 2024). Research exploring how specific visualizations impact public attitude and trust remains sparse (Arunkumar et al., 2023; Fischer et al., 2023).

This study aimed to address these gaps by examining the role of data visualization in fostering public trust in evaluation science communication through project outcomes findings. Information overload and digital misinformation require effective communication strategies to ensure evaluation results are accessible, understandable, and actionable (Douville et al., 2025; Franz, 2014). By situating evaluation communication within the broader field of science communication, this paper explored the role of data visualizations, such as textual presentations, graphs, and infographic, on public trust. This study aimed to add to the growing literature on supporting visual communication as a key tool for engaging diverse audiences and emphasizing

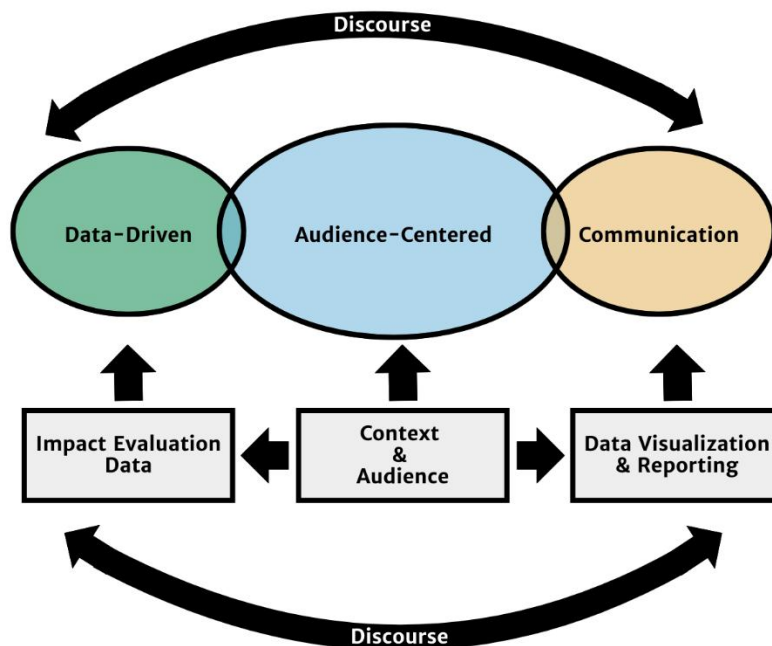
the need for thoughtful and evidence-based approaches to integrating visualizations into evaluation practices (Douville et al., 2025).

Conceptual Framework

The conceptual framework guiding the current study was the Data-driven Audience-centered Communication Framework for Evaluation (see Chapter II; Markosyan et al., 2025). The framework (see Figure 4.1) addressed communication challenges in evaluation by providing an integrated model that emphasizes data-driven communication tailored to audiences. The model proposed a novel approach to impact evaluation data communication by specifying the audience, channels chosen, and the impact of types of data selected while aiming to minimize noise in communication channels and ensure messages are meaningful and understandable by target audiences for the trust building.

Figure 4.1

Data-driven Audience-centered Communication Framework for Evaluation



The study adopted the principles of audience segmentation, guided by the Situational Theory of Publics (Grunig, 1989), to explore the role of tailored communication strategies in fostering public perceptions and trust in the context of evaluation science. The theory offered insights into how and why certain groups respond to communication efforts (Grunig, 2005), segmenting publics based on their recognition of a problem, perceived constraints, and level of involvement. These factors determined whether individuals are likely to seek information actively or remain passive (Grunig, 2005). Publics were classified as latent, aware, or active depending on their engagement with the issue, making this approach particularly valuable for customizing messages for wider audiences (Grunig, 1989). Grounded in Grunig's (1989) audience segmentation principles which emphasized the need for tailoring communication efforts to meet the distinct characteristics and needs of subgroups within a larger population, this framework posits that effective segmentation can enhance the accessibility and relevance of evaluation findings. Audience segmentation identified groups based on shared values, beliefs, and behaviors, allowing communicators to craft messages that resonate with specific audience clusters (Maibach et al., 2011). This approach was particularly valuable in evaluation contexts, where conveying complex, data-driven insights to diverse stakeholders often poses significant challenges (Fischhoff, 2019). By integrating segmentation methods, such as demographics, this study aimed to assess how differentiated communication strategies influence audience attitude and trust in evaluation outcomes.

The conceptual framework also incorporated socio-linguistic approaches to understand how language and cultural dynamics intersect with audience segmentation. Sociolinguistic theory, as advanced by Labov (1966) and Prasad (2017), provided insights into how linguistic variations and cultural nuances shape the reception of messages within different audience

segments. This integration recognized that communication effectiveness relied on the segmentation process and the ability to use language that aligns with target groups' cultural and contextual realities. Furthermore, the framework acknowledged the role of discourse in shaping perceptions, as language constructed meaning and frames evaluation findings in ways that resonate with distinct audiences (Teubert, 2010; van Dijk, 2009). These theoretical underpinnings supported this study on tailored communication strategies, informed by audience segmentation, that facilitated greater stakeholder engagement and understanding.

Finally, the framework applied data-driven communication methods that align with audience segmentation strategies. Advanced data analysis tools, such as cluster analysis, enhanced the precision of audience profiling and message design (Chryst et al., 2018; Hine et al., 2014). Combining these tools with the principles of utilization-focused evaluation approach (Patton, 2008), the study examined how audience segmentation contributed to effectively translating evaluation findings into actionable insights for diverse audiences. The approach highlighted the theoretical intersections of audience segmentation, sociolinguistics, and data visualization and underscored their practical implications for improving communication in evaluation contexts. By addressing these dimensions, the framework provided a robust foundation for exploring how segmentation-driven strategies could bridge the gap between evaluation data and public attitude, ultimately fostering trust with evaluation findings from interdisciplinary agricultural research and extension teams.

Purpose and Research Objectives

This study examined whether communication methods (text, graphs, infographic) influenced attitude toward evaluation science communication and whether this influence was

controlled by trust in scientists. The following research objectives and hypotheses guided the study:

Objective 1: Describe respondents' attitude toward evaluation science communication, and trust in scientists.

Objective 2: Determine if differences exist in respondents' attitude toward evaluation science communication depending on an evaluation science communication intervention received (text, graphs, or infographic).

Objective 3: Determine if differences exist in respondents' attitude toward evaluation science communication depending on the communication intervention they received (text, graphs, or infographic), while controlling for trust in scientists as a covariate.

Hypothesis 1: Respondents receiving the infographic intervention will exhibit a more positive attitude toward evaluation science communication than respondents receiving the text or graphs interventions.

Hypothesis 2: Respondents receiving the graph intervention will exhibit a more positive attitude toward evaluation science communication than respondents receiving the text or infographic interventions.

Hypothesis 3: Trust in scientists will impact the effect of the interventions.

Methods

Data Collection

The quantitative study (Leedy & Ormrod, 2020) presented here was part of a larger research project and used an online survey platform, Qualtrics, to capture the public opinion of U.S. residents about consumer trust in the production of safe and nutritious pork products, animal welfare, and environmental sustainability in March 2024 with non-probability opt-in

sampling methods (Baker et al., 2013). Studies on public opinion frequently rely on non-probability, opt-in sampling methods (Baker et al., 2013). The target population for this study was U.S. citizens of 18 years or older who were representative of the population based on gender, age, and race/ethnicity. Although the data collected was part of a larger study, the analysis was conducted independently from other variables.

In this study, respondents' demographic information was assessed, and respondents' attitude were measured after each intervention. The methodology employed here investigated the impact of textual and different data visualization formats (i.e., charts and infographic) on respondents' attitude. The study had certain limitations, such as collecting data through an online survey, which restricted the respondent participation to those with internet access, which could impact or negatively affect sampling bias (Lamm & Lamm, 2019). Another limitation was the reliance on self-reported data, which could be problematic due to limitations in memory and variations in perception (Leedy & Ormrod, 2020). A further limitation involved the audience sampled. While the study followed audience segmentation principles from the conceptual framework, the sample consisted of a broad general public rather than more targeted groups, such as policymakers or practitioners who regularly engage and interact with the evaluation findings. This may have limited our ability to assess how communication strategies resonate with intended users of evaluation, a key consideration in UFE (Patton, 2008).

To enhance the validity and reliability of the research, an expert panel consisting of specialists and faculty members in communications, evaluation, and agricultural and environmental science communication reviewed the survey (Dillman et al., 2014). The survey was reviewed by a panel of experts specializing in science communication and evaluation to ensure content accuracy and face validity. The study design was approved by the University of

[State] Institutional Review Board (IRB #00008098) before data collection. A pilot test was conducted with 50 participants representing the target population. Furthermore, a pilot test was conducted with graduate students in the Department of Agricultural Leadership, Education, and Communication to ensure the clarity of the instrument. Reliability was assessed using Cronbach's alpha (Cortina, 1993). The internal consistency was acceptable for all scales: *Attitude* ($\alpha = .92$), *Trust in Scientists* ($\alpha = .87$) (Cortina, 1993). No modifications were made to the survey following the pilot test.

Instrument Development

Attitude

Respondents' attitude toward evaluation science communication was measured using five semantic differential items. The items were adapted from validated science communication and evaluation literature (Mason & Azzam, 2019; Wanzer et al., 2021). An attitude construct was created by averaging the responses to the five semantic differential items: *inefficient/efficient*, *unsuccessful/successful*, *not sustainable/sustainable*, *ineffective/effective*, and *not impactful/impactful*. Each item was rated on a five-point scale, with higher scores indicating more positive attitude toward evaluation science communication and a one indicating a more negative attitude. Preliminary item refinement was conducted through expert review to ensure conceptual clarity and contextual relevance.

Trust in Scientists

Trust in Scientists (Reif et al., 2022), hypothesized as a covariate in this study, was measured using five Likert-scale items on the same five-point scale. These items assessed participants' trust in scientific practices, communication, and transparency. Respondents indicated their agreement or disagreement with statements such as: "*Scientists can be trusted*

because they are experienced experts in their particular topic,” “Scientists can be trusted because they adhere to strict rules and standards in their work,” etc. A trust in science construct was created by averaging responses to five Likert-scale items adapted from Reif et al. (2022), each rated on a 5-point scale from *Strongly Disagree (1)* to *Strongly Agree (5)*. The items assessed multiple facets of trust, including expertise, adherence to scientific standards, communication, public engagement, and social responsibility.

Participants were randomly assigned to one of three communication intervention groups: Text ($n = 339$), Graphs ($n = 343$), or Infographic ($n = 343$). Each group was exposed to a specific type of science communication method designed to convey evaluation findings. The text in the interventions was adapted from previous science communication studies to maximize clarity and consistency across treatments. Respondents in all groups were required to spend at least 20 seconds reviewing the communication materials to ensure adequate exposure.

Following exposure to the communication intervention, participants were asked to complete the Likert-scale items for attitude and trust in scientists. Respondents who failed an attention check question regarding the communication material (e.g., identifying key visual or textual elements) were excluded from the analysis.

Demographics

A total of 1,025 respondents participated in the study. Table 4.1 provides a summary of demographic characteristics.

Table 4.1

Demographics of respondents (N = 1,025)

Variables	<i>F</i>	%
Sex		

Female	521	50.8
Male	504	49.2
Age*		
18-34 years	289	28.2
35-54 years	336	32.8
55+ years	400	39.0
Race		
White	785	76.6
Black/African American	137	13.4
Asian or Pacific Islander	63	6.1
American Indian or Alaskan Native	20	2.0
Other	44	4.3
Ethnicity		
Hispanic	185	18.0
Non-Hispanic	840	82.0
Educational Level		
Less than 12 th grade	43	4.2
High school diploma	247	24.1
Some college, no degree	241	23.5
2-year college degree	142	13.9
4-year college degree	229	22.3
Graduate or Professional degree	123	12.0

Note. *Age at time of survey. **Respondents were allowed to select more than one race.

Research Design

This study adopted an experimental between-subjects design (Leedy & Ormrod, 2020) with participants randomly assigned to one of three communication intervention treatments (text, graphs, or infographic) to assess the impact of visualization format on attitude toward evaluation science communication. The study utilized a 3 (communication modes: textual, graphs, and infographic) x 1 (message content was the same across all communication modes) design.

Communication Mode

The respondents were presented with the evaluation outcome findings in three different formats with identical content related to the main key performance indicators of an interdisciplinary project aimed at increasing consumer trust in pork production. All three communication modes were presented in DM Sans font with colorful headers in red (font size: 40), center positioned. Further, a fictitious red logo of PorkTrust! Consortium and a Disclaimer were used across all three communication modes, which were placed in the footer area. All communication modes presented in Figure 4.2 followed the standards and recommendations appropriate to textual and data visualizations from previous studies (Evergreen, 2013; Fischer et al., 2023; Mason & Azzam, 2019; Wanzer et al., 2021). The data visualizations were selected based on the research findings and recommendations from similar studies (Evergreen, 2013; Fischer et al., 2023; Mason & Azzam, 2019; Wanzer et al., 2021), which were the most popular and persuasive when incorporated into graphs and infographic.

Figure 4.2

Communication modes (Text) used in the Study

PorkTrust! Consortium: Enhancing Public Trust in Pork Production and Product

The PorkTrust! Consortium is implementing a five-year project to enhance public trust in pork production and product through strengthened communication, research, and training. It aims to establish a continuous process integrating communication, research, and training focused on consumers, society, and production. The innovative training practices will help to generate new knowledge and cultivate emerging subject matter experts. The project successfully trained 278 subject matter experts (155 females and 123 males) and conducted 23 listening sessions with over 432 stakeholders, including representatives from the pork industry, students, consumers, and other key players. PorkTrust! Consortium's communication efforts thrive with creating a new website and establishing and maintaining three primary social media platform pages, achieving a 5% click-through rate.



Disclaimer: Information provided by the PorkTrust! Consortium is for general purposes only.

Figure 4.3

Communication modes (Graphs) used in the Study

PorkTrust! Consortium: Enhancing Public Trust in Pork Production and Products

A five-year project to enhance public trust in pork production and products through strengthened communication, research, and training

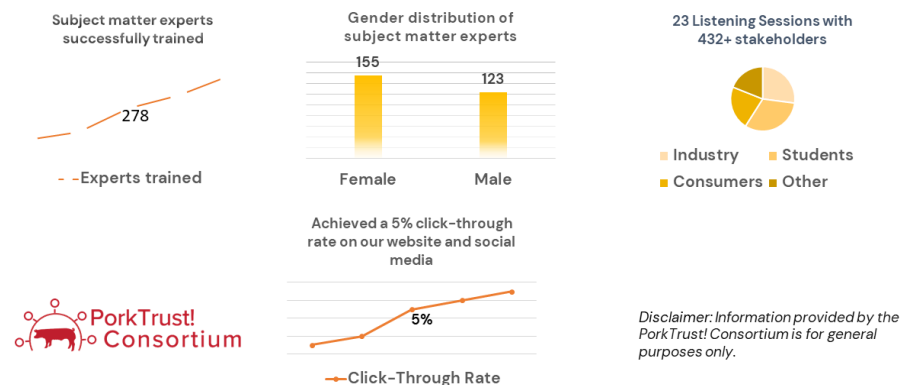
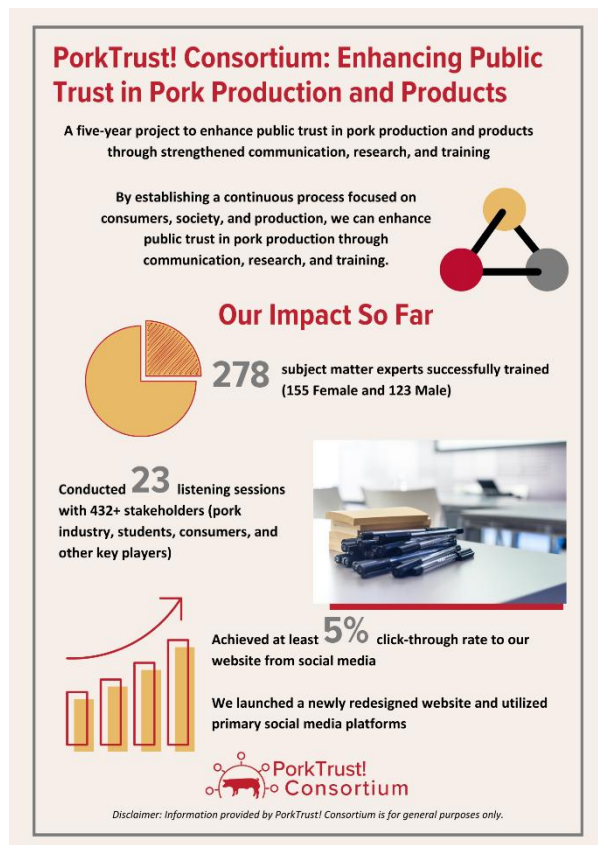


Figure 4.4

Communication modes (Infographic) used in the Study



Textual Presentation

The study respondents were presented with impact evaluation outcome data on the fictional PorkTrust! Consortium a five-year interdisciplinary project to enhance public trust in pork production and product through strengthened communication, research, and training. PorkTrust! Consortium aimed to establish a continuous process integrating communication, research, and training focused on consumers, society, and production. The core elements of the impact evaluation data were the key performance indicators of innovative training practices to generate new knowledge and cultivate emerging subject matter experts and thriving communication efforts thrive with creating a new website and establishing and maintaining three primary social media platform pages. The content of the text was enhanced with numerical data, as well as additional details on certain elements of indicators, such as the gender-disaggregated information.

Graphs

Following the textual presentation of the fictional PorkTrust! Consortium project impact evaluation data was visualized through graphs, including a total of 4 graph types: a line graph, a bar chart, a pie chart, and a line chart. All graphs contained informative titles, visualized numerical data, and a footer with detailed explanations of the elements.

Infographic

Following the graphs of the fictional PorkTrust! Consortium project, impact evaluation data was presented to the respondents through infographic. This contained heavily designed elements of visualization techniques, including icons, photography, and highlighted and large-fronted numerical impact data. PorkTrust! Consortium project logo and disclaimer were positioned in the center.

Measures

In this study, respondents were asked to reflect on their attitude by marking the most applicable circle between each set of adjectives (Wanzer et al., 2021) related to the statement on PorkTrust! Consortium enhancing public trust in pork production and product. Participant attitude was measured to determine whether the program description, through textual, graphical, and infographic means, changed their attitude toward PorkTrust! Consortium project.

Data Analysis

Data were analyzed using analysis of variance (ANOVA) and analysis of covariance (ANCOVA) through SPSS 29.0 software. Descriptive statistics were used to present the means, standard deviations, frequencies, and percentages. Normality assumptions were assessed through skewness and kurtosis values. The *attitude* construct had a skewness of 0.22 and a kurtosis of 0.19, both of which fall within the acceptable range of ± 3 for skewness and ± 10 for kurtosis

(Kline, 2015), indicating no significant deviation from normality. The *trust in scientists* construct had a skewness of -0.68 and kurtosis was 0.96 , both of which fall within the acceptable range of ± 3 for skewness and ± 10 for kurtosis, indicating approximate normality (Kline, 2015). Despite the significant Shapiro-Wilk test ($p < .001$), the large sample size ($n = 1,025$) allows for minor deviations from normality without substantially affecting ANCOVA results (Tabachnick & Fidell, 2019). A one-way ANOVA was conducted to examine differences in attitude toward evaluation science communication across the communication intervention groups (text, graphs, infographic). A one-way ANCOVA was conducted to determine if significant differences remained between the communication intervention groups on attitude toward evaluation science communication when trust in scientists was included as a covariate.

Results

Objective 1: Describe respondents' attitude toward evaluation science communication, and trust in scientists.

Respondents generally reported neutral to slightly positive attitude, with variations based on the communication intervention groups (see Table 4.2). The graph intervention group exhibited the highest overall mean score for attitude ($M = 2.59$, $SD = 0.99$), followed by the text group ($M = 2.49$, $SD = 1.00$) and the infographic group ($M = 2.40$, $SD = 1.03$). The overall mean score for trust in scientists across all groups indicated that respondents generally trusted scientists ($M = 3.66$, $SD = 0.78$), highlighting its critical role in shaping public perceptions of evaluation findings communication.

Table 4.2

Descriptive Statistics of Attitude Toward Evaluation Science Communication

Intervention Group	<i>M</i>	<i>SD</i>
--------------------	----------	-----------

Text	2.48	1.00
Graphs	2.59	0.99
Infographic	2.41	1.03

For most individual items, the majority of respondents selected *Agree* or *Strongly Agree*, particularly for statements such as *scientists being experienced experts* ($M = 3.86$, 73.1%) and *adhering to strict rules* ($M = 3.80$, 69.3%). However, trust was lower for items such as *scientists sufficiently involving the public in their research* ($M = 3.30$, 41.5%), where responses were more neutral overall (see Table 4.3).

Table 4.3

Frequencies for individual items in the trust in scientists

Item	Strongly Disagree (%)	Disagree (%)	Neither Agree nor Disagree (%)	Agree (%)	Strongly Agree (%)
Scientists can be trusted because...					
they are experienced experts in their particular topic	3.3	4.0	19.5	50.1	23.0
they adhere to strict rules and standards in their work	2.8	5.8	22.1	47.3	22.0
they work for the common good	2.5	6.2	30.0	42.0	19.3
they inform the public about the relevant results	4.1	7.9	25.0	44.0	19.0
they sufficiently involve the public in their research	4.7	15.0	38.8	29.0	12.5

Objective 2: Determine if differences exist in respondents' attitude toward evaluation

science communication depending on an evaluation science communication intervention received (text, graphs, or infographic).

To determine if differences existed in respondents' attitude toward evaluation science communication based on the intervention received (text, graphs, or infographic), a one-way

ANOVA was conducted (see Table 4.4). The results indicated a statistically significant difference in attitude between the intervention groups, $F(2, 1022) = 3.88, p = 0.021, \eta^2 = 0.01$. The effect size was small.

Table 4.4

ANOVA results for attitude toward evaluation science communication

Source	Sum of Squares	df	Mean Square	F	p
Between Groups	6.032	2	3.016	3.882	0.021
Within Groups	794.129	1022	0.777		
Total	800.162	1024			

Post-hoc comparisons using the Bonferroni test (see Table 4.5) revealed respondents who received the graphical intervention reported significantly higher attitude toward evaluation science communication compared to those who received the infographic intervention ($p = 0.01$). However, no significant differences were observed between the textual and graphical interventions ($p = 0.37$) or between the textual and infographic interventions ($p = 0.65$). These results suggest that graphical communication interventions had a more positive influence on respondents' attitude compared to infographic, while textual communication performed similarly to both.

Table 4.5

Bonferroni post-hoc comparisons for attitude toward evaluation science communication

Group Comparison	Δ (I-J)	SE	p-value	95% CI Lower	95% CI Upper
Text vs. Graphs	-0.10	0.06	0.37	-0.26	0.05

Text vs. Infographic	0.08	0.06	0.65	-0.07	0.24
Graphs vs. Infographic	0.18*	0.06	0.01	0.02	0.34

Note. * $p < 0.05$.

Objective 3: Determine if differences existed in respondents' attitude toward evaluation science communication depending on the communication intervention they received (text, graphs, or infographic), while controlling for trust in scientists.

A one-way ANCOVA was conducted to evaluate whether differences existed between communication intervention groups (text, graphs, or infographic) on attitude toward evaluation science communication while controlling for trust in scientists. The results indicated trust in scientists significantly influenced attitude ($F(1, 1021) = 77.27, p < .001, \eta^2 = 0.07$).

After accounting for the covariate, significant differences were found between the communication intervention groups ($F(2, 1021) = 3.95, p = .019, \eta^2 = 0.01$). However, the small effect size indicated that while the differences between the communication interventions are statistically significant, their practical impact was minimal. ANCOVA results are summarized in Table 4.6.

Table 4.6

Differences in respondents' attitude towards evaluation science communication

	<i>df</i>	<i>F</i>	<i>p</i>	<i>Partial η^2</i>
Trust in Scientists	1	77.27	<.001	0.07
Communication Intervention	2	3.95	.019	0.01

Planned comparisons using a Bonferroni test were calculated to examine specific differences between the intervention groups (see Table 4.7). The first hypothesis, that respondents receiving the infographic intervention would exhibit a more positive attitude toward

evaluation science communication than those receiving the text or graphs interventions, was not supported.

The second hypothesis, that respondents receiving the graph intervention would exhibit a more positive attitude toward evaluation science communication than those receiving the text or infographic interventions, was partially supported. The results suggest that while the graphs intervention was more effective than infographic in fostering positive attitude, it did not significantly outperform textual interventions. Text and infographic interventions demonstrated comparable impacts on respondents' attitude toward evaluation science communication.

The third hypothesis that trust in scientists would impact the effect of the intervention was supported. Trust in scientists significantly impacted respondents' attitude toward evaluation science communication, regardless of the intervention received ($F(1, 1021) = 77.27, p < .001, \eta^2 = 0.07$). While differences between interventions persisted after controlling for trust ($F(2, 1021) = 3.95, p = .019, \eta^2 = 0.01$), the effect of trust was notably stronger, accounting for 7.0% communication. The results indicated that trust significantly influenced attitude ($F(1, 1021) = 1289.016, p < .001, \eta^2 = 0.55$). This large effect size suggests that trust accounts for a substantial proportion of the variance in attitude, highlighting its critical role in shaping public perceptions.

Table 4.7

Bonferroni test results of the differences in the communication interventions on respondents' attitude toward evaluation science communication

(I) Intervention Group	(J) Intervention Group	Δ (I-J)	<i>SE</i>	<i>p</i>
Text	Graphs	-0.09	0.06	0.40
Text	Infographic	0.08	0.06	0.57

Graphs	Text	0.09	0.06	0.40
Graphs	Infographic	0.18*	0.06	0.01
Infographic	Text	-0.08	0.06	0.57
Infographic	Graphs	-0.18*	0.06	0.01

Discussion

The study examined the effects of three communication methods, text, graphs, and infographic, on respondents' attitude toward evaluation science communication, with trust in scientists as a covariate. These findings were particularly relevant in agricultural and environmental research and specifically within this study's general public audience, where interdisciplinary projects seek to address complex issues such as climate resilience, sustainable land use, food security and others. As previous research highlighted, the success of such initiatives depended not only on robust methodologies but also on how effectively findings were communicated to stakeholders and the public (Shakeri & Khalilzadeh, 2020; Gibson et al., 2021). The findings provided insights into how communication strategies, informed by data visualization techniques, influenced public attitude. The results also validated key propositions from the conceptual framework of *Data-driven Audience-centered Communication Framework for Evaluation* which emphasized the role of tailored, data-driven communication in fostering trust and engagement.

The first hypothesis, predicting that respondents exposed to infographic would exhibit more positive attitude than those exposed to text or graph interventions, was not supported. Instead, respondents in the infographic group reported significantly lower attitude. These findings suggested that while infographic could enhance recall of key design elements, as shown

by Fischer et al. (2023), their complexity may hinder audience comprehension and engagement if not carefully designed. This aligned with the framework's socio-linguistic dimension, which emphasized aligning visual and linguistic elements with audience needs (Labov, 1966; Prasad, 2017). From this perspective, the less favorable response to infographic highlighted the need to balance aesthetics with cognitive load, a recommendation confirmed in prior studies (Evergreen, 2011; Mason & Azzam, 2019). In addition, design choices such as symbols and icons embedded in visual formats carry culturally specific meanings that may not be universally understood (Kress & van Leeuwen, 2006; Labov, 1966). If these elements do not align with the audience's expectations or cultural context, the communication may be misinterpreted or lose effectiveness (Abdullaev, 2023). This reinforces the importance of integrating sociolinguistic principles into visual design decisions.

The second hypothesis, which posited that graphical interventions would foster more positive attitude than text or infographic interventions, was partially supported. Respondents exposed to graphs demonstrated significantly higher attitude toward evaluation science communication compared to those in the infographic group. However, no significant differences were found between the graph group and the text group. These results aligned with the framework's focus on minimizing noise in communication channels, supporting the idea that straightforward visual tools like graphs were particularly effective in simplifying complex data and fostering positive attitude (Chryst et al., 2018; Hine et al., 2014). This finding also built on research by Mason and Azzam (2019), who emphasized that clear and interpretable visualizations enhance comprehension and engagement. It is important to note that these findings reflect how this specific audience, comprising members of the general public, responded to the communication methods and may not be generalizable to all stakeholder groups.

The third hypothesis, proposing that trust in scientists would impact the effectiveness of communication interventions, was strongly supported. Trust in scientists emerged as a significant covariate, explaining 7.0% of the variance in attitude. Notably, the effect of trust was stronger than that of the intervention type, underscoring its foundational role in shaping audience perceptions. This finding aligned with the framework's emphasis on trust-building practices, such as transparency and ethical communication, as essential components of effective science communication. It also confirmed prior studies by Reif et al. (2022) and Marthe et al. (2020), which highlight trust as a critical factor in strengthening the impact of communication strategies.

The moderate effect sizes observed in this study suggest that while communication methods influence attitude, their impact was secondary to overall factors such as trust. This finding reflected insights from Huber et al. (2019), who emphasized that trust amplifies the effectiveness of science communication, particularly in contexts where information complexity was high. The relatively neutral to slightly positive attitude observed across all groups suggested the communication method alone may not be sufficient to significantly shift public attitude. Instead, combining effective data visualization techniques with trust-building strategies was necessary to achieve meaningful engagement. Frameworks, such as the BOND framework, emphasized the importance of aligning visual tools with audience needs, branding, and narrative-building to bridge the gap between research and practice (McAlindon et al., 2018). Additionally, Douville et al. (2025) highlighted the role of actionable and clear data visualizations in enhancing the accessibility and utility of evaluation results for diverse stakeholders.

From the perspective of the *Data-driven Audience-centered Communication Framework for Evaluation*, the results reinforced the importance of tailoring communication strategies to audience needs using data-driven and audience-centered approaches. The framework highlighted

effective audience segmentation and strategic communication formats helped to improve accessibility and relevance in evaluation discourse, ensuring stakeholders, such as policymakers, funders, program implementers, and the public, could meaningfully interpret and utilize evaluation findings. In this study, the communication method of graphs was particularly effective for the target audience of the general public surveyed. However, the same strategy may not hold for more specialized audiences such as technical experts or policymakers, whose preferences and trust levels may differ. The findings confirmed this assertion, as graphical interventions prioritizing clarity and simplicity were more effective in positively shaping audience attitude toward the evaluation findings. However, while the framework underscored the value of audience-centered communication in improving engagement and useability, our results indicate variation in effectiveness based on audience characteristics. Specifically, while graphical formats improved audience engagement with evaluation findings, their impact on long-term attitude and trust building depended on the audience's preexisting perceptions of evaluation science communication. This suggested that although visual clarity enhances accessibility, additional contextual elements, for instance interactive components, may be necessary to strengthen engagement with and application of evaluation results.

Future research could examine the interaction between different communication modalities, such as static versus interactive visuals, and their influence on audience attitude. Additionally, studies could explore how individual differences, including prior knowledge and socio-cultural backgrounds, affect attitude toward different communication channels. Qualitative research approaches could be incorporated to complement quantitative findings and provide a richer understanding of how audiences process evaluation messages. While the structured survey items measured attitude toward evaluation findings, open-ended qualitative questions could be

included to provide deeper insight into how participants rationalized their perspectives. This approach, aligned with the framework's emphasis on audience-centered communication, would allow participants to articulate their interpretations of textual, graphical and infographic communication messages in their own words. These approaches could help identify hidden barriers to trust in evaluation findings, particularly among underrepresented or skeptical audiences, while also exploring social and contextual factors that influence attitude. Furthermore, qualitative research could provide a better perspective on how audiences apply or act upon evaluation insights in decision-making contexts, thus bridging the gap between communication strategies and the practical use of evaluation findings. Additionally, expanding the scope to socio-linguistic nuances, such as the choice of language, terminology, or avoidance of jargonisms, would provide a more comprehensive understanding of how evaluation science communication influences public attitude across different social and cultural contexts. By integrating these insights, future research could further refine and strengthen the *Data-driven Audience-centered Communication Framework for Evaluation*, ultimately enhancing science communication strategies in impact evaluation discourse.

Conclusions

This study contributed to the literature on science and evaluation communication by examining how text, graphs, and infographic influence public attitude toward evaluation science communication. The findings underscored the advantages of graphical interventions in fostering positive attitude and the pivotal role of trust in controlling these effects. Notably, the results validate key elements of the *Data-driven Audience-centered Communication Framework for Evaluation*, emphasizing the importance of tailoring communication strategies to audience needs and integrating trust-building practices.

Graphics emerged as the most effective intervention, outperforming infographic and performing comparably to textual presentations. These results highlighted the value of clarity and simplicity in communication efforts, aligning with prior studies (e.g., Mason & Azzam, 2019; Burnett et al., 2019). Moreover, the significant impact of trust observed in this study reinforced the need for communicators to emphasize transparency and ethical practices in their strategies.

While infographic had the potential to enhance recall and engagement, their effectiveness depended on achieving a balance between design complexity and audience comprehension. These findings suggested that science communicators and evaluators must carefully consider the interaction between design elements and audience perceptions to optimize the effectiveness of visual communication tools. Furthermore, the findings emphasized the need for science communicators and evaluators to focus on building trust through transparent and accessible communication practices. Graphical presentations, supplemented by clear textual explanations, can enhance engagement and comprehension while fostering greater public trust in evaluation findings.

By advancing our understanding of how different communication strategies influence attitude toward evaluation science, this study contributed to the literature, bridging the gap between data-driven impact evaluation and effective audience engagement. As the field continued to evolve, communicators and evaluators must remain responsive to audience needs, trust-building mechanisms, and message clarity to ensure evaluation findings are effectively communicated.

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CHAPTER 5

ARTICLE 3

TRUST IN ORGANIZATIONS: IMPLICATIONS FOR EVALUATION SCIENCE
COMMUNICATION³

³ Markosyan, T., Lamm, A. J., Lamm, K. W., Lu, P., Sanders, C. E. To be submitted to New Directions for Evaluation.

Abstract

This study explored how different communication methods, text, graphs, and infographic, affect public engagement with evaluation findings, specifically examining cognitive processing and trust in a scientific consortium. Grounded in the Data-driven Audience-centered Communication Framework for Evaluation, the study explored trust in organizations as a covariate influencing audience responses. Using a randomized between-subjects design ($n = 1,025$), U.S. adults were exposed to one of three presentation formats conveying identical evaluation results from a fictional scientific consortium, PorkTrust! Consortium. Data were analyzed using descriptive statistics and analysis of covariance in SPSS 29. Findings revealed that the graphs intervention significantly enhanced cognitive processing compared to textual and infographic formats. However, no communication format significantly influenced trust in the scientific consortium. Instead, trust in organizations emerged as a strong predictor of both cognitive processing and trust in the consortium, highlighting the central role of organizational credibility in shaping audience perceptions. These findings suggested that while clear visual communication could enhance understanding, building and maintaining organizational trust was essential for fostering public engagement with evaluation findings. The study underscored the importance of transparent communication practices, offering actionable insights for evaluators and science communicators aiming to improve the impact and utility of evaluation results.

Introduction

Trust in organizations has emerged as a fundamental determinant of effective communication and engagement in evaluation science (Christie & Fleischer, 2010; Hancock et al., 2023). The credibility of organizations conducting evaluations is a critical factor influencing public acceptance and utilization of evaluation findings (Christie & Lemire, 2019; Morra Imas &

Rist, 2009). Schwandt (2015) emphasized that trust is cultivated through reflective evaluation practices that ensure methodological rigor and ethical transparency. Given the increasing complexity of evaluation science communication, researchers and practitioners should understand how organizational trust affects audience engagement with evaluation findings and decision-making processes (Ford, 2024; Hancock et al., 2023).

At its core, trust in organizations encompasses perceptions of competence, reliability, and integrity (Hancock et al., 2023). Christie and Lemire (2019) highlighted that trust significantly influenced how stakeholders, ranging from policymakers to practitioners, interpreted evaluation results. Therefore, organizations engaged in program evaluation must navigate challenges such as skepticism, misinformation, and varying audience needs (Morra Imas & Rist, 2009). Establishing and maintaining trust enhances the credibility of evaluation reports and promotes engagement with key stakeholders (Christie & Fleischer, 2010; Ford, 2024). Trust also mitigates cognitive biases that may otherwise distort how audiences perceive evaluation findings (Fischhoff, 2019).

Role of Communication in Evaluation Science

Effective communication plays a pivotal role in enhancing public trust and engagement with evaluation findings (National Academies of Sciences, Engineering, and Medicine, 2017). Christie and Lemire (2019) suggest that tailoring communication strategies, such as executive summaries and infographic, can enhance comprehension among non-expert audiences. Schwandt (2015) argued that transparent communication fosters public confidence in evaluation processes. However, the effectiveness of communication tools largely depends on the credibility of the organizations producing them (Hancock et al., 2023). Studies have shown audiences are more

likely to engage with and act upon evaluation findings from organizations they perceive as transparent, ethical, and methodologically sound (Christie & Fleischer, 2010; Ford, 2024).

A key challenge in evaluation communication is balancing technical accuracy with accessibility. Yarbrough et al. (2011) highlighted the importance of ethical and effective evaluation practices, which require communicators to present findings in ways that uphold accuracy while ensuring they are interpretable for diverse stakeholders. The Program Evaluation Standards (Yarbrough et al., 2011) emphasized propriety, feasibility, utility, and accuracy in evaluation reporting, all of which are essential for fostering organizational trust. Furthermore, Ofir and Rugg (2021) argued evaluation practices must evolve to remain relevant and trustworthy in dynamic social and policy contexts. They stress that communicators must move beyond static reporting formats to more engaging and responsive communication models.

Data Visualization and Trust in Organizations

Data visualization has become a critical tool for enhancing comprehension and engagement with evaluation findings (Evergreen, 2011; Douville et al., 2025). Well-designed visuals improve the accessibility of complex data, making evaluation results more actionable for stakeholders (Evergreen, 2013). Douville et al. (2025) emphasize that effective visual communication enhances trust in organizations by reinforcing credibility and methodological transparency. However, poorly designed visualizations can lead to misinterpretation, diminishing stakeholder confidence in evaluation findings. As Fischhoff (2019) noted, communicators must align visualization strategies with audience expectations and cognitive processing patterns to maximize impact. For instance, Franz (2014) highlighted that data visualization should not merely present findings but also facilitate decision-making, arguing that strategically designed visuals help audiences retain information, foster engagement, and promote long-term trust in the

institutions presenting the data. Similarly, Berry et al. (2023) stress that communication strategies should bridge the gap between research and practice, ensuring evaluation findings are not only accessible but also actionable for diverse stakeholders.

Trust dimensions: Institutional vs. Individual

Interdisciplinary consortiums rely on the combined credibility of multiple institutions, making trust in the collective more complex than trust in individual scientists. Research on trust distinguishes between interpersonal trust, which is trust in other individuals, and institutional trust, which reflects confidence in systems, organizations, or authorities (Hamm et al., 2019; Siegrist, 2021). While interpersonal trust influences personal relationships and small-group interactions, institutional trust plays a critical role in shaping public responses to organizational messages, policies, and risk communication (Devine et al., 2021). Studies have shown that institutional trust is often more predictive of compliance with health, science, and evaluation messaging than interpersonal trust, especially in contexts involving uncertainty or collective action (Han et al., 2021).

This study aimed to address these gaps by examining the role of trust in organizations associated with the communication of evaluation findings. In an era of increasing skepticism and digital misinformation, effective communication strategies are crucial for ensuring that evaluation results are perceived as credible, understandable, and actionable. By situating evaluation communication within the broader field of science communication, this study explored how cognitive processing and trust in a scientific consortium influenced the perception of evaluation findings. Specifically, the study addressed how different communication methods (ext, graphs, and infographic) affected audience engagement, while also exploring the controlling role of trust in organizations. Findings from this study contribute to the literature about evidence-

based communication strategies, reinforcing the need for data-driven approaches in fostering trust and enhancing the impact of evaluation findings (Ford, 2024; Douville et al., 2025; Hancock et al., 2023).

Conceptual Framework

The conceptual framework guiding this study is grounded in the *Data-driven Audience-centered Communication Framework for Evaluation*. This study tests the framework from the distinct perspective of examining evaluation science communication through the lens of trust in organizations. Trust is a critical factor influencing how audiences engage with evaluation findings and perceive the credibility of organizations through the lens of exposure to evaluation outcome communication.

The framework leverages principles of *audience segmentation* to explore how tailored communication strategies foster public trust in evaluation contexts. Grounded in Grunig's (1989) audience segmentation theory, the framework posits that effectively tailored communication can address the specific needs, values, and behaviors of diverse audience segments. By applying advanced data analysis techniques, such as clustering, the study identifies subgroups based on their levels of trust, prior experiences with evaluation practices, and demographic attributes. This segmentation allows for designing communication strategies that resonate with distinct audience clusters, enhancing the relevance and credibility of evaluation outputs.

Building on insights from sociolinguistic theory (Labov, 1966; Prasad, 2017), the framework examines how linguistic and cultural factors influence the reception of messages. The study emphasizes the importance of crafting communication that aligns with target audiences' linguistic norms and cultural realities. Additionally, discourse explains how language frames evaluation findings in ways that reflect organizational credibility and foster trust (Teubert, 2010;

van Dijk, 2009). These approaches aim to enhance message clarity and ensure alignment with audience expectations.

The framework also highlights the role of data visualization as a tool for improving trust in organizations. Effective visual representation of evaluation findings can make complex data more accessible and engaging, thereby increasing audience confidence in the reliability of the information presented. Drawing on evidence from communication and cognitive sciences (Fischhoff, 2019; Evergreen, 2011; Evergreen 2013), this framework investigates how visual tools influence public attitude toward evaluation findings and organizational trustworthiness.

Purpose, Objectives, and Hypotheses

The purpose of this study was to examine whether communication methods (text, graphs, and Infographic) influenced the *cognitive processing* of evaluation findings and *trust in a scientific consortium* and whether this influence was controlled by *trust in organizations*. The following research objectives and hypotheses guided the study:

Objective 1: Describe respondents' cognitive processing of evaluation findings and their trust in a scientific consortium and trust in organizations.

Objective 2: Determine if differences exist in respondents' cognitive processing of evaluation findings and trust in scientific consortium depending on the communication intervention they receive (text, graphs, or infographic).

Objective 3: Determine if differences exist in respondents' cognitive processing of evaluation findings and trust in scientific consortium depending on the communication intervention they receive (text, graphs, or infographic), while controlling trust in organizations as a covariate.

H1: Respondents receiving the infographic intervention will exhibit greater cognitive processing of evaluation findings and higher trust in scientific consortium than those receiving the text or graphs interventions.

H2: Respondents receiving the graphs intervention will exhibit greater cognitive processing of evaluation findings and higher trust in scientific consortium than those receiving the text or infographic interventions.

H3: Trust in organizations will control the relationship between the communication intervention and cognitive processing of evaluation findings.

H4: Trust in organizations will control the relationship between communication intervention and trust in scientific consortium.

Methods

The methods for this study closely align with those outlined in a study by Markosyan et al. (2025). Following the recommendations in the literature (Lamm et al., 2019; Zhang et al., 2013), only a concise summary of the methods is presented here. For additional details on the methods, readers are encouraged to refer to the study by Markosyan et al. (2025), which explored the influence of communication methods (text, graphs, infographic) on attitude toward evaluation science communication and whether this influence is controlled by trust in scientists.

This quantitative study, conducted in March 2024, aimed to explore U.S. residents' cognitive processing and trust in scientific consortium, using a non-probability opt-in sampling method (Baker et al., 2013). Data were collected via the online platform Qualtrics from a target population of U.S. citizens aged 18 and older, representing diverse demographics in terms of gender, age, and race/ethnicity. While non-probability sampling is widely used in public opinion research, it may introduce limitations related to sampling bias (Gibson et al., 2021). Although the

study was grounded in audience segmentation principles from the conceptual framework, participants were drawn from the general public rather than more specific audiences, such as policymakers or practitioners, who are more directly involved in using evaluation results. This may have constrained our ability to evaluate how well the communication strategies aligned with the needs of intended evaluation users, a central focus of UFE (Patton, 2008). An expert panel of specialists in communication and evaluation reviewed the survey instrument to ensure content validity (Dillman et al., 2014). A pilot test was conducted with 50 participants. The internal consistency was acceptable for all scales: *Cognitive processing* ($\alpha = .85$), *Trust in scientific consortium* ($\alpha = .80$), *Trust in organizations* ($\alpha = .70$) (Cortina, 1993). No modifications were made to the survey following the pilot test.

Measures

Cognitive Processing

Cognitive Processing was assessed using four semantic differential items that captured respondents' mental effort and perceived ease in engaging with the information presented by the PorkTrust! Consortium. The items included pairs such as "*Took very little mental effort/Took a lot of mental effort*" and "*Was pleasant to review/Was tedious to review.*" Each item was rated on a five-point scale, with higher scores reflecting more cognitive strain and lower processing fluency. Scores were averaged to create a single cognitive processing construct.

Trust in Scientific Consortium

Trust in Scientific Consortium was measured using six semantic differential items adapted to evaluate participants' perceptions of the PorkTrust! Consortium's credibility, accuracy, and transparency. Adjective pairs included "*Believable/Unbelievable,*" "*Biased/Unbiased,*" and "*Credible/Not Credible.*" Responses were recorded on a five-point scale, with higher scores

indicating greater trust in the scientific consortium. A composite score was calculated by averaging responses across all items.

Trust in Organizations

Trust in Organizations, hypothesized as a mediator in this study, was measured using four Likert-scale items adapted from Reif et al. (2022). The items assessed respondents' perceptions of organizational transparency, message alignment, and communication format preferences.

Participants rated their agreement with statements such as *“I trust the information from an organization that aligns with what I already believe to be true”* and *“My trust can be enhanced when an organization shares their information using multiple formats (text, photos, visual images).”* All items were rated on a five-point scale ranging from *Strongly Disagree (1)* to *Strongly Agree (5)*, and were averaged to create a single construct, with higher scores indicating greater trust.

Overview of the scientific consortium

The scientific consortium, the fictional PorkTrust! Consortium, refers to a fictional five-year interdisciplinary project created solely for the purposes of this research study. This interdisciplinary project aimed to enhance public trust in pork production and product through strengthened communication, research, and training. Within this framework, PorkTrust! Consortium integrated communication, research, and training activities focused on consumers, broader society, and pork production stakeholders.

Study Design

This study employed a 3 (communication modes: textual, graphs, and infographic) $\times$ 1 (identical message content) between-subjects design to compare how variations in presentation style might influence stakeholder perception of project evaluation findings. Regardless of

whether data were presented textually, through graphs, or via infographic, the content communicated the same core message regarding the scientific consortium key performance indicators.

Participants ($N = 1,025$) were randomly assigned to one of three communication intervention groups, Text ($n = 339$), Graphs ($n = 343$), or Infographic ($n = 343$), designed to present identical evaluation findings from the fictional scientific consortium. Textual presentations were supplemented with numerical data, while the graph intervention included bar, line, and pie charts, following best practices in visualization design (Evergreen, 2013). The infographic incorporated visually engaging elements, including icons and photography, to enhance cognitive processing and engagement (Mason & Azzam, 2019; Fischer et al., 2023).

Data were analyzed using descriptive statistics, analysis of variance (ANOVA), and analysis of covariance (ANCOVA) via SPSS 29.0 software. To account for multiple comparisons, Bonferroni post-hoc pairwise tests were performed. *Cognitive processing* and *Trust in scientific consortium* were dependent variables, while *Trust in organizations* construct was included as a covariate in the ANCOVA to examine its controlling effect on the variables. This design allowed for a comprehensive assessment of how various communication methods affected respondents' cognitive processing and trust. Skew and kurtosis were assessed for normality assumptions for each of the variables, which fell within generally acceptable thresholds (skewness $< |3|$ and kurtosis $< |10|$), indicating approximate normality (Kline, 2015). For the *cognitive processing* variable Levene's Test indicated a violation of the assumption of homogeneity of variances, $F(2, 1022) = 3.15, p = .043$. Despite this, ANCOVA is generally robust to minor violations of this assumption, particularly with large sample sizes (Tabachnick &

Fidell, 2019). For the *trust in scientific consortium* variable Levene's test indicated that the assumption of equality of error variances was met, $F(2, 1022) = 1.04, p = .354$.

Results

Objective 1: Describe respondents' cognitive processing of evaluation findings and their trust in scientific consortium and trust in organizations.

Respondents generally reported moderate levels of cognitive processing (see Table 5.1) and trust in the scientific consortium (see Table 5.2), with slight variations based on the communication intervention groups. The Graphs intervention group exhibited the highest overall mean score for cognitive processing ($M = 2.94, SD = 1.04$), followed by the Text group ($M = 2.62, SD = 0.95$) and the Infographic group ($M = 2.61, SD = 1.03$). For trust in scientific consortium, the Graphs intervention group also reported the highest mean score ($M = 2.62, SD = 0.66$), followed by the Text group ($M = 2.61, SD = 0.76$) and the Infographic group ($M = 2.59, SD = 0.77$). The overall mean score for trust in organizations across all groups indicated relatively high levels of trust ($M = 3.87, SD = 0.57$), highlighting its significance in shaping public engagement with evaluation findings.

Table 5.1

Descriptive statistics of cognitive processing toward evaluation science communication

Intervention Group	<i>M</i>	<i>SD</i>
Text	2.62	0.95
Graphs	2.94	1.04
Infographic	2.61	1.03

Table 5.2*Descriptive statistics of trust in scientific consortium toward evaluation science communication*

Intervention Group	<i>M</i>	<i>SD</i>
Text	2.61	0.76
Graphs	2.62	0.66
Infographic	2.59	0.77

For most individual items within the trust in organizations construct, respondents reported moderate to high levels of agreement, reflecting overall trust in organizational communication. Most respondents *agreed* or *strongly agreed* with statements such as “*My trust can be enhanced when an organization acknowledges it has made a mistake or error when sharing information,*” with 52.4% agreeing and 25.4% strongly agreeing. Similarly, 50.5% of respondents *agreed*, and 21.4% strongly agreed: “*My trust can be enhanced when an organization shares their information using multiple formats (text, photos, visual images).*” In contrast, neutral responses were more prevalent for items like “*I trust the information from an organization that aligns with what I already believe to be true,*” where 34.7% of respondents reported neutrality; 24.5% of respondents were neutral regarding “*Visual aids, including photos and graphics, help me trust information provided by organizations.*” While trust was relatively high for most items, responses were less favorable for “*I do not trust organizations I believe withhold information,*” where 46.3% agreed, and 31.5% strongly agreed, indicating a degree of skepticism about transparency.

Table 5.3*Frequencies for individual items in trust in organizations*

Item	Strongly Disagree %	Disagree %	Neither Agree nor Disagree %	Agree %	Strongly Agree %
I trust the information from an organization that aligns with what I already believe to be true	2.0	5.3	34.7	45.4	12.7
My trust can be enhanced when an organization acknowledges it has made a mistake or error when sharing information	0.9	4.8	16.6	52.4	25.4
I do not trust organizations I believe withhold information	2.0	4.0	16.2	46.3	31.5
My trust can be enhanced when an organization shares their information using multiple formats (text, photos, visual images)	1.1	3.0	24.0	50.5	21.4
Visual aids, including photos and graphics, help me trust information provided by organizations	0.9	3.9	24.5	49.2	21.6

Objective 2: Determine if differences exist in respondents' cognitive processing of evaluation findings and trust in scientific consortium depending on the communication intervention they receive (text, graphs, or infographic).

A one-way ANOVA was conducted (see Table 5.4) to determine if differences existed in respondents' cognitive processing and trust in scientific consortium based on the intervention received (text, graphs, or infographic). The results indicated a statistically significant difference in cognitive processing between the intervention groups ($F(2, 1022) = 12.27, p < .001, \eta^2 = 0.02$). The effect size was small. However, no significant differences were observed for trust in scientific consortium ($F(2,1022) = 0.15, p = .856, \eta^2 = 0.00$).

Table 5.4

ANOVA results for cognitive processing and trust in scientific consortium toward evaluation science communication

Source	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>p</i>
Cognitive Processing					
Between Groups	24.898	2	12.449	12.270	< .001
Within Groups	1036.916	1022	1.015		
Total	1061.815	1024			
Trust in Scientific Consortium					
Between Groups	0.167	2	0.083	0.156	0.856
Within Groups	547.982	1022	0.536		
Total	548.149	1024			

Post-hoc comparisons using the Bonferroni test (see Table 5.5) revealed that respondents who received the Graphs intervention reported significantly higher cognitive processing compared to those who received the Text intervention ($p < .001$) and the Infographic intervention ($p < .001$). No significant differences were found between the Text and Infographic interventions ($p = 1.000$). For trust in scientific consortium, no comparison was conducted due to non-significant results.

Table 5.5

Bonferroni post-hoc comparisons for cognitive processing toward evaluation science communication

Group Comparison	<i>MA (I-J)</i>	<i>SE</i>	<i>p</i>	95% CI Lower	95% CI Upper
Text vs. Graphs	-0.33	0.08	< .001*	-0.51	-0.15

Text vs. Infographic	0.01	0.08	1.000	-0.18	0.19
Graphs vs. Infographic	0.33	0.08	< .001*	0.15	0.52

Note. * $p < 0.05$.

Objective 3: Determine if differences exist in cognitive processing and trust in scientific consortium depending on the communication intervention, while controlling for trust in organizations as a covariate

Cognitive Processing

A one-way ANCOVA was conducted to evaluate whether differences existed in cognitive processing between communication intervention groups (text, graphs, infographic) regarding evaluation science communication, while controlling for trust in organizations. The results indicated that trust in organizations significantly influenced cognitive processing, $F(1, 1021) = 32.76, p < .001, \eta^2 = .03$. After accounting for the covariate, significant differences were found between the communication intervention groups, $F(2, 1021) = 11.93, p < .001, \eta^2 = .02$. Although the effect size is small, it indicates a meaningful difference in participants' cognitive engagement based on the communication format received. ANCOVA results are summarized in Table 5.6.

Table 5.6

Differences in respondents' cognitive processing towards evaluation science communication

	<i>df</i>	<i>F</i>	<i>p</i>	<i>Partial η^2</i>
Trust in organizations	1	32.76	< .001	0.03
Communication Intervention	2	11.93	< .001	0.02

Planned comparisons using a Bonferroni test were calculated to examine specific differences between the intervention groups (see Table 5.7). The first hypothesis, that respondents receiving the Infographic intervention would exhibit greater cognitive processing than those receiving the Text or Graphs interventions, was not supported. The second hypothesis, that respondents receiving the Graphs intervention would exhibit greater cognitive processing than those receiving the Text or Infographic interventions, was supported. The third hypothesis, that trust in organizations would impact the effect of the intervention, was supported. Trust in organizations significantly impacted respondents' cognitive processing, regardless of the intervention received, $F(1, 1021) = 32.76, p < .001, \eta^2 = .03$. While differences between interventions persisted after controlling for trust in organizations ($F(2, 1021) = 11.93, p < .001, \eta^2 = .023$), the effect of trust in organizations was also significant and slightly stronger, accounting for 3.1% of the variance in cognitive processing.

Table 5.7

Bonferroni test results of the differences in the communication interventions on respondents' cognitive processing toward evaluation science communication

(I) Intervention Group	(J) Intervention Group	<i>MA (I-J)</i>	<i>SE</i>	<i>p</i>
Text	Graphs	-0.31	0.07	< .001*
Text	Infographic	-0.00	0.07	1.00
Graphs	Text	0.31	0.07	< .001*
Graphs	Infographic	0.31	0.07	< .001*
Infographic	Text	0.00	0.07	1.00
Infographic	Graphs	-0.31	0.07	< .001*

Note. *Significant differences are indicated at $p < .05$

Trust in Scientific Consortium

A one-way ANCOVA was conducted to evaluate whether differences existed between communication intervention groups (text, graphs, infographic) on trust in the scientific consortium, while controlling for trust in organizations. The results showed that trust in organizations significantly influenced trust in the scientific consortium, $F(1, 1021) = 96.64, p < .001$, partial $\eta^2 = .086$. However, after accounting for this covariate, no significant differences were observed between the communication intervention groups, $F(2, 1021) = 0.091, p = .913$, partial $\eta^2 = .000$. ANCOVA results are summarized in Table 5.8.

Table 5.8

Differences in respondents' trust in scientific consortium towards evaluation science communication

	<i>df</i>	<i>F</i>	<i>p</i>	<i>Partial η^2</i>
Trust in organizations	1	96.63	< .001*	0.086
Communication Intervention	2	0.09	0.913	0.000

Note. *Significant differences are indicated at $p < .05$.

Planned comparisons using a Bonferroni test were calculated to examine specific differences between the intervention groups (see Table 5.9). The first hypothesis, that respondents receiving the Infographic intervention would exhibit greater trust in the scientific consortium than those receiving the Text or Graphs interventions, was not supported. The second hypothesis, that respondents receiving the Graphs intervention would exhibit greater trust in the scientific consortium than those receiving the Text or Infographic interventions, was also not supported. The results suggest that no significant differences were observed between any of the intervention groups for trust in the scientific consortium ($p > .05$). The fourth hypothesis, that

trust in organizations would influence trust in the scientific consortium, was supported. Trust in organizations significantly impacted respondents' trust in the scientific consortium, regardless of the intervention received ($F(1, 1021) = 96.64, p < .001, \text{partial } \eta^2 = .086$). After accounting for trust in organizations, the communication intervention had no significant effect ($F(2, 1021) = 0.091, p = .913, \text{partial } \eta^2 = .000$). The effect of trust in organizations was notably more substantial, accounting for 8.6% of the variance in trust in scientific consortium.

Table 5.9

Bonferroni test results of the differences in the communication interventions on respondents' trust in scientific consortium toward evaluation science communication

(I) Intervention Group	(J) Intervention Group	$MA (I-J)$	SE	p
Text	Graphs	-0.001	.054	1.000
Text	Infographic	0.019	.054	1.000
Graphs	Text	0.001	.054	1.000
Graphs	Infographic	0.020	.053	1.000
Infographic	Text	-0.019	.054	1.000
Infographic	Graphs	-0.020	.053	1.000

Note. Significant differences are indicated at $p < .05$.

Discussion

This study examined how three communication methods, Text, Graphs, and Infographic, influence *cognitive processing* and *trust in scientific consortium*, with *trust in organizations* as a covariate. The findings contribute to literature on the role of organizational trust in evaluation science communication, reinforcing the *Data-driven Audience-centered Communication Framework for Evaluation*, while also challenging some of its assumptions. Importantly, these

findings are specific to the general public audience sampled in this study and may not generalize to other key stakeholders such as funders, practitioners, or policymakers.

Findings from this study indicated Graphs significantly improved cognitive processing compared to both Infographic and Text. These results aligned with Evergreen (2011, 2013), who emphasized that clear, well-designed visualizations enhance comprehension by reducing cognitive load. However, this study's findings contrast with expectations from the *Data-driven Audience-centered Communication Framework for Evaluation*, which assumed the use of data visualizations (such as infographic, by integrating both textual and visual elements), should enhance engagement more effectively than either text or graphs alone. The results suggested that while an infographic may enhance recall (Evergreen, 2013; Fischhoff, 2019), the effectiveness depended on how intuitively they present information. Douville et al. (2025) found that poorly designed infographics can overwhelm audiences which may have contributed to the weaker cognitive processing results observed in this study. Furthermore, visual design elements, such as symbols and icons, are shaped by cultural norms and may be interpreted differently across audiences (Kress & van Leeuwen, 2006; Labov, 1966). When these features do not align with an audience's cultural background or expectations, they risk being misunderstood or diminishing the message's clarity (Abdullaev, 2023). This highlights the need to apply sociolinguistic principles when designing visuals for communication.

The findings also mirror Berry et al. (2023), who argued effective evaluation communication must balance visual appeal and clarity. While graphs effectively simplify data presentation, they may not necessarily foster deeper engagement or trust unless paired with contextual information that enhances interpretation. This aligns with Schwandt's (2015) argument that audience comprehension is strongly influenced by how information is framed

within an evaluation context. It is important to note that the positive cognitive impact of graphs observed in this study reflects this specific public audience and may not be equally effective for other groups.

The study found that trust in organizations significantly controlled the relationship between communication methods and trust in the scientific consortium. This aligned with Christie and Lemire (2019), who emphasized that stakeholders are more likely to engage with evaluation findings when they perceive the organization producing the information as credible and transparent. Additionally, this study confirmed Hancock et al. (2023), who found that trust in entities accounted for substantial variance in how people engage with evaluation results.

However, in contrast to expectations from the conceptual framework, none of the communication interventions had a direct effect on trust in scientific consortium. This conflicts previous assumptions that effective communication formats, particularly infographic, would enhance organizational trust. Instead, trust was primarily shaped by pre-existing perceptions of organizational credibility. Fischhoff (2019) similarly noted that trust in organizations was often more influential than the mode of communication itself in shaping public engagement with scientific information. This suggested that while improving data visualization and communication strategies is important, organizational transparency and ethical consistency are stronger determinants of trust.

The *Data-driven Audience-centered Communication Framework for Evaluation* posits that tailored communication strategies enhance both cognitive engagement and trust. This study's findings confirmed that Graphs improved cognitive processing, supporting the framework's emphasis on clarity and simplicity in visual communication. However, the framework's assumption that data visualizations, such as infographic, would enhance both

cognitive engagement and trust more effectively than text or graphs was not supported. Instead, graphs outperformed infographic in cognitive processing, and trust remained independent of the communication format used.

These results aligned more closely with the work of Douville et al. (2025), which emphasized that data visualization alone does not build trust—it must be combined with transparent organizational practices. The findings also extend Christie and Fleischer (2010), who argued trust in evaluation findings stems more from perceptions of the organization’s integrity than from the way findings are presented. Thus, while communication format plays a role in engagement, this study reinforces the argument that organizational credibility remains the most significant determinant of trust.

Findings from this study reinforced the importance of integrating trust-building mechanisms alongside tailored communication strategies. While Graphs were the most effective intervention for improving cognitive processing, their impact on trust was minimal. This implies organizations should prioritize transparency and ethical communication alongside the use of clear data presentation techniques. Evergreen (2013) recommended that communicators ensure consistency in messaging and avoid overly complex visual elements that may reduce clarity. Additionally, these findings highlight the need for interactive and audience-specific approaches, as suggested by Berry et al. (2023).

Future research should explore new approaches to enhancing cognitive processing and trust in evaluation findings, especially through interactive and culturally responsive communication strategies. However, these findings must be interpreted within the bounds of this general public sample. Additional research is needed to determine whether similar patterns exist in contexts with different audiences and communication goals. The *Data-driven Audience-*

centered Communication Framework for Evaluation suggested tailored messaging can improve public trust, but this study highlights the need for additional mechanisms beyond communication modalities to enhance trust in evaluation data. For instance, a potential area for future exploration is interactive data visualization tools, such as real-time data dashboards and participatory evaluation platforms. Douville et al. (2025) emphasized that effective data visualization is not only about presenting findings clearly but also about creating engaging and interactive experiences that allow stakeholders to explore data dynamically. Thus, future studies could examine how interactive tools influence cognitive processing and trust in organizations, particularly among audiences with different levels of data literacy.

Future research should also focus on closing the research-to-practice gap by identifying ways to make evaluation findings more actionable. Berry et al. (2023) suggested using continuous quality improvement models—where evaluators and practitioners collaborate to use evaluation data in real time—can improve the utility of findings. Thus, exploring the long-term impact of communication strategies on stakeholder decision-making would be an important next step.

Christie and Fleischer (2010) argued trust in evaluation findings varies depending on contextual and cultural factors. Future research could explore how different sociocultural and socio-linguistic contexts influence public perceptions of trust in organizations sharing evaluation findings. While this study examined the impact of text, graphs, and infographics, future research could apply a hybrid communication approach, perhaps combining graphical storytelling with interactive elements. Berry et al. (2023) emphasized that combining multiple communication formats can enhance both comprehension and engagement.

Finally, future research could also explore longitudinal studies to explore how trust in organizations evolve as evaluation data is shared over time. This study found that trust in organizations is a stronger determinant of engagement than communication format alone, reinforcing previous research on the long-term nature of trust-building (Hancock et al., 2023). Longitudinal studies could assess how trust levels shift based on organizational transparency, consistency in communication strategies, and audience engagement practices.

Conclusions

This study contributes to the growing literature on evaluation communication by examining how Text, Graphs, and Infographic influence *cognitive processing* and *trust in scientific consortium*, with *trust in organizations* as a covariate. The findings validate the argument that trust in organizations is a stronger determinant of engagement than communication format alone, reinforcing the findings of Christie and Lemire (2019) and Hancock et al. (2023). While graphs outperformed infographics in cognitive processing, no communication method significantly influenced trust in scientific consortium. Instead, trust in organizations emerged as the primary factor shaping audience perceptions, aligning with Fischhoff (2019) and Christie and Fleischer (2010). These findings are most applicable to the general public audience used in this study. Communicators should prioritize trust-building strategies, such as ethical transparency and accountability, alongside improvements in data visualization. Organizations, such as PorkTrust! Consortium could apply these insights by systematically pairing graphical data visuals with explicit messaging around consumer feedback loops and transparency. By choosing visually clear and consistently branded graph designs, the Consortium could strengthen stakeholder engagement. Also, by adopting interactive and audience-specific communication tools technical

information could be communicated in a way that resonated with different public groups while maintaining trust-building with target stakeholders.

Future studies should explore the role of culturally responsive and interactive communication strategies in enhancing both cognitive processing and trust. Future studies should also explore whether communication strategies effective in one audience segment (e.g., general public) are equally impactful for other audiences (e.g., policymakers, funders, or scientific collaborators) or for other communication purposes. Additionally, integrating qualitative methods could provide deeper insights into how audiences interpret and act upon evaluation findings, complementing the quantitative findings of this study. By bridging the gap between data-driven communication and trust-building practices, communicators and evaluators can ensure evaluation findings are not only understood but also trusted and actionable.

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CHAPTER 6

DISCUSSION, RECOMMENDATIONS, AND CONCLUSIONS

The effective communication of evaluation findings remains a persistent challenge, especially when target audiences are unfamiliar with technical terminology, tend to overlook lengthy reports, or are skeptical of the organization presenting the evaluation data. This research explored whether intentionally designed communication materials, namely textual summaries, various types of graphs, or creatively produced infographics, could enhance stakeholders perception and trust in evaluation findings communication. In doing so, the research addressed an existing gap in the literature by applying theoretical insights from utilization-focused evaluation (Patton, 2008), sociolinguistic research (Labov, 1966), and audience segmentation (Grunig, 1989) through an experimental design in which participants received the same core message via different presentation modes. Chapter six synthesized the primary findings, illustrating that graphical formats showed measurable benefits for cognitive processing, while no single communication mode boosted trust in the organization. The study explored how these outcomes build on existing literature emphasizing the complexity of trust formation and the necessity of robust, transparent communication practices (Evergreen, 2013; Fischer et al., 2023). Broader implications for evaluators and communication professionals included leveraging well-designed visuals without neglecting the contextual dimensions to build credibility and trust. In addition, the chapter six outlined recommendations for future studies, such as examining audience-specific adaptations.

Key Findings and Interpretations

A key finding of the study was that graphical displays, such as bar charts, line graphs, and pie charts, significantly improved cognitive processing. Respondents in survey who encountered information in graphical form demonstrated a superior ability to recall specific data points and draw accurate conclusions, a result that aligned with existing research suggesting that visual aids can effectively reduce cognitive load and enhance information retention (Fischhoff, 2019). When respondents in survey were better able to understand the data through graphs, this heightened understanding did not translate into increased trust in the organization disseminating the information. This outcome indicated that establishing public trust in an evaluation or scientific entity required more than clear data presentation; elements such as transparency, ethical practices, reputation, and consistency were likely essential (Evergreen, 2013; Fischer et al., 2023). Furthermore, although the infographic treatment was perceived as an engaging communication tool, the study revealed minimal differences between the infographic and plain text formats in terms of their impact on trust or cognitive engagement. This suggested that the visual appeal of an infographic might not be enough if it sacrificed detail or failed to convey substantive content. The addition of trust in organizations as a covariate did not notably alter these relationships, implying that preexisting trust in one context did not automatically extend to unfamiliar or hypothetical organizations. Finally, the findings reinforced that a one-size-fits-all approach was rarely effective in evaluation communication, as variations in audience demographics, cultural backgrounds, and previous experiences could significantly influence how information was perceived.

Theoretical Implications

The study findings confirmed the integration of utilization-focused evaluation with principles of science communication. While utilization-focused evaluation emphasized the practical application of findings, science communication focused on connecting with and informing the public. The results demonstrated that enhanced cognitive processing did not necessarily lead to increased trust, revealing an important distinction between understanding data and developing confidence in its source. This discrepancy suggested that future theoretical frameworks should further incorporate sociolinguistic factors to ensure that cultural and linguistic diversity was adequately addressed alongside data presentation preferences. The minimal difference observed between textual and infographic formats also underscored that the credibility of the source and the transparency of the communication process may be more influential in trust formation than the presentation style itself. Similarly, the limited controlling role of organizational trust emphasized the complexity of trust dynamics, indicating that an established reputation does not automatically extend to new or hypothetical entities.

Practical Implications for Evaluation Science

From a practical perspective, the results highlighted the crucial importance of meticulously designed graphical elements in facilitating comprehension. Visuals that are clear, well-labeled, and logically structured enable participants to recall and interpret complex information more effectively. However, the finding that neither graphs nor infographic led to increased trust suggests that organizations aiming to build or sustain trust must implement additional strategies. These may include transparent disclosure of data sources and methodologies, proactive engagement with stakeholders, and consistent application of ethical communication practices that resonate with stakeholder values. Moreover, while infographic can

provide an attractive means of communication, the study indicated that if they do not preserve essential details, their overall impact may be diminished.

Recommendations

Organizations should enhance graph-based presentations by incorporating explicit assurances of transparency. This involves clearly articulating data sources, methodological processes, and any limitations alongside the visual elements so audiences gain an engaging and context-rich understanding of the information. When using infographic, communicators should carefully balance creative design with the inclusion of critical numerical details to maintain credibility. Given the diversity of audience characteristics, assessment of audience familiarity with the subject matter and preferences for communication styles in advance could allow for adjustments in textual and visual complexity that enhance comprehension without oversimplifying key details.

Future research should explore the impact of long-term exposure to consistently high-quality communication materials on trust in an organization. Because trust is a dynamic and evolving construct, longitudinal studies could provide valuable insights into whether repeated exposure to well-designed visuals eventually leads to increased trust. Further studies of specific audience subgroups, such as variations based on age, cultural background, digital literacy, or familiarity with the subject matter, could also help clarify how these factors control the effectiveness of textual, graphical, and infographic communication modes. Ultimately, replicating this study with real-world organizations could help develop an understanding of whether the observed patterns in a fictional context are also applicable in practical environments.

Limitations

Although this study achieved insights into the impact of communication modes on cognitive processing and trust, several limitations exist. First, the use of a fictional organization, the PorkTrust! Consortium, may not fully capture the nuances of trust formation that occur with true organizations, which could limit the external validity of the findings (Evergreen, 2013; Fischer et al., 2023). Second, reliance on self-reported measures for assessing both cognitive processing and trust introduces the possibility of response biases, which may affect the accuracy of the reported outcomes (Fischer et al., 2023). Third, the visual materials were not designed by a professional, potentially compromising their visual clarity and effectiveness. Several studies confirmed that professionally designed infographics can significantly enhance audience comprehension and engagement (Evergreen, 2013; Fischer et al., 2023), therefore this limitation may have influenced participants' perceptions and, in turn, impacted the study findings.

Conclusions

Though preliminary, the findings of this study highlight the limitations of relying solely on visual communication to foster public trust in evaluation contexts. Although graphical presentations significantly enhanced cognitive processing, they did not lead to increased trust in the fictional scientific consortium. This distinction between comprehension and trust formation suggested that building trust in an organization required more than clear data presentation; it necessitated a commitment to transparency, consistency, and ethical practices. Widespread skepticism toward organizations, the ability to effectively and credibly communicate evaluation findings is more critical than ever. The preliminary findings underscored that successful science communication must appeal not only to intelligence by clarifying complex data but also to the sentiments by demonstrating trustworthy practices and real engagement. By integrating the

principles of utilization-focused evaluation with accurate experimental methods, this research provided a preliminary roadmap for enhancing public perception and trust in scientific and evaluation findings communication.

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APPENDIX A

IRB Approval



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Human Research Protection Program

EXEMPT DETERMINATION

September 6, 2023

Dear [Alexa Lamm](#):

On 9/6/2023, the Human Subjects Office reviewed the following submission:

Title of Study:	Real Pork Trust Consortium
Investigator:	Alexa Lamm
Co-Investigator:	Kevan Lamm
IRB ID:	PROJECT00008098
Funding:	IOWA STATE UNIVERSITY
Grant ID:	FP00029428/AWD-027517-00001
Review Category:	Exempt 2ii

Materials Reviewed: IRB Submission, Training Records, [Informed Consent](#), [Informed Consent FG](#), [Moderator Guide](#), [Survey](#)

We have determined that the proposed research is Exempt. The research activities may begin 9/6/2023. This determination only covers the survey portion of the research activities and you must add the external site authorization letters for in-person focus groups once you receive them. Please see the Post-Approval and Reporting section of the Training & Submission process to learn how to create a project modification.
<https://research.uga.edu/hrpp/post-approval-reporting/>

Since this study was determined to be exempt, please be aware that not all future modifications will require review by the IRB. For more information please see Appendix C of the Exempt Research Policy (<https://research.uga.edu/docs/policies/compliance/hso/HRP-033-ExemptResearch.pdf>). As noted in Section C.2., you can simply notify us of modifications that will not require review via the "Add Public Comment" activity.

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The PI is responsible for ensuring that all activities and materials are compliant with the following policies: [Participant Selection and Recruitment](#), [Research with Vulnerable Populations](#), [Internet Research](#). Also, the consent process must include the elements in Appendix B of the [Exempt Review](#) policy.

A progress report will be requested prior to 9/6/2028. Before or within 30 days of the progress report due date, please submit a progress report or study closure request. Submit a progress report by navigating to the active study and selecting Progress Report. The study may be closed by selecting Create Version and choosing Close Study as the submission purpose.

In conducting this study, you are required to follow the requirements listed in the Investigator Manual (HRP-103).

Sincerely,

Aisha Haggard, Compliance Professional I
Human Subjects Office, University of Georgia

APPENDIX B

Survey Instrument Scales

Trust in Scientists (Reif et al., 2022)

Please indicate your level of agreement or disagreement with each of the following statements about scientists. Scientists can be trusted because they... (Strongly Disagree = 1; Strongly Agree = 5)

- Are experienced experts in their particular topic
- Adhere to strict rules and standards in their work
- Work for the common good
- Inform the public about the relevant results of their research
- Sufficiently involve the public in their research

Trust in Organizations (Reif et al., 2022)

Please indicate your level of agreement or disagreement with each of the following statements about organization (Strongly Disagree = 1; Strongly Agree = 5)

- I trust the information from an organization that aligns with what I already believe to be true
- My trust can be enhanced when an organization acknowledges it has made a mistake or error when sharing information
- I do not trust organizations I believe withhold information
- My trust can be enhanced when an organization shares their information using multiple formats (text, photos, visual images)

Experiment

You will be asked to learn about the PorkTrust! Consortium. Please take your time viewing the material and then answer the related questions to the best of your ability.

Recall

What did you just view?

- An image of scientists from the PorkTrust! Consortium
- A paragraph discussing the PorkTrust! Consortium
- A set of graphs showcasing the work of the PorkTrust! Consortium

What did you just see?

- Pictures of scientists involved in the PorkTrust! Consortium
- A set of graphs and charts explaining the PorkTrust! Consortium
- A field with pigs in front of a red barn

What did you just see?

- A field with pigs in front of a red barn
- Pictures of scientists involved in the PorkTrust! Consortium
- An infographic explaining the impact of the PorkTrust! Consortium

Attitude

Please respond by marking the circle that best represents your feelings between each set of adjectives based on the information provided by the PorkTrust! Consortium. The PorkTrust! Consortium is... (Scale 1 to 5)

- Efficient/Inefficient
- Successful/Unsuccessful
- Sustainable/Not Sustainable
- Effective/Ineffective
- Impactful/Not Impactful

Cognitive Processing

Please respond by marking the circle that best represents your feelings between each set of adjectives. Reviewing the information provided by the PorkTrust! Consortium... (Scale 1 to 5)

- Took very little mental effort/Took a lot of mental effort
- Was easy to understand/Was hard to understand
- Was simple to process/Was difficult to process
- Was pleasant to review/Was tedious to review

Trust in Scientific Consortium

Please indicate your feelings by marking the most applicable circle between each set of adjectives. The information provided by the PorkTrust! Consortium is... (Scale 1 to 5)

- Believable/Unbelievable
- Accurate/Inaccurate
- Trustworthy/Untrustworthy
- Biased/Unbiased
- Complete/Incomplete
- Credible/Not Credible