

Using the Kruskal-Wallis H Test to Compare Citation Differences Among Communication Areas of Specialization in the Title of the Article

Kathy Kuria
Kuriah Consulting, LLC

Ursula Brady
Texas A&M University, Corpus Christi

Reginald L. Bell
Prairie View A & M University

This study examines how including specific communication areas of specialization “in the title of an article” affects its citation count. Using Google Scholar’s “Cite By” data and the Kruskal-Wallis H test, a method used when the data is non-parametric and violates the assumption of normal distributions, we compared citation numbers for 480 articles across 12 National Communication Association (NCA) specializations, ranked by search results. Articles were categorized based on whether the specialization appeared in the title (experimental) or anywhere else in the article (as baseline control). Tier 1 analysis, comparing six groups, resulted in $H(5, 240) = 69.144, p < .001$, with a large effect size of $\eta^2 \approx 0.2741$. The Tier 2 analysis, comparing six different groups, resulted in $H(5, 240) = 59.257, p < .001$, with a large effect size of $\eta^2 \approx 0.2319$. A contribution to knowledge management, our findings indicate that keyword placement in the title of the article is an effective tool which influences scholarly impact. Keywords in the title of the article is a powerful and generally effective tool for maximizing citation counts in the communication field, though its impact can vary depending on the specific area of specialization.

Keywords: artificial intelligence, article titles, bibliometrics, communication specializations, citation analysis, familywise error, homoscedasticity, impact factors, knowledge management, Kruskal-Wallis H Test, reference librarians

IMPORTANCE OF TITLES IN COMMUNICATION RESEARCH

When researching areas of communication specialization, a literature search and review is normally conducted. The National Communication Association (NCA) identifies areas of communication specialization as interest groups. Scholars in each of those disciplines agree on the boundaries for each discipline. Therefore, they list on the NCA website numerous *interest groups* for its members to participate during conferences. Moreover, when delimiting the research question, communication scientists are often confronted with the common practice of searching for key terms “in the title of the article;” this step is taught by reference librarians as a first step; the next step is abstract; then search “anywhere in the article,”

with restrictions on a custom time period, and next within references of selected articles themselves. Some researchers delimit the topic by limiting searches to recent publications not older than 10-years. One blog from *San Francisco Edit* (2024) titled, “Literature Search Strategies in Science: A Step-by-Step Approach,” teaches about field-specific searches:

“Many databases allow you to target your search to specific fields within an article, such as the title, abstract, or author names. This precision can drastically reduce the volume of irrelevant results and direct you to the most pertinent articles. For instance, searching for a term within the title field ensures that the articles returned are focused primarily on that topic” (para).

Literature reviews are essential, yet can be the most time-consuming part of the research process, if time is wasted reading publications not particularly germane to the research question. The research design for a study needs to use simple methods for answering research questions for theory development, most often by testing null hypotheses. Literature reviews are most often the theory basis of the hypotheses being tested. Librarians have a plethora of tips on precise and efficient literature searches, and many of those title search methods are confirmed in the literature (Burns & Islam, 2024; Diao, 2021; Jimene et al, 2020). Librarians have myriad tips on how to get an article published, and perhaps in some cases more importantly, how to get it cited frequently. More directly, the title of the publication is seen to have enormous importance. Yet, there does appear to be some disagreement on the potency of titles as they are related to scientific impact when that impact is measured by citation counts cross-disciplinary and diachronically (Wang, 2024). Some leading impact factors and indexes such as Google Scholar’s h5-index or SCOPUS might be related to citation counts; the use of question marks; and the length of the title for some disciplines (Ball, 2009; Hudson, 2016). The area of specialization has an influence on the research articles being published, including “modification in noun phrases” as well as in the soft disciplines (Nagano, 2009; Nagano, 2015).

Our Study’s Problem and Purpose

The problem investigated in this study for communication areas of specialization, although valid at face value, is how any one of the specialization areas affects citation counts when it is included in the title of the article, as opposed to anywhere in the article (a baseline measure). In other words, does the area of specialization appearing in the title of the article have any meaningful difference on impact when impact is measured by scholarly citations?

Our study’s purpose investigates current studies on the impact of article title properties, especially the inclusion of phrases associated to specialization, on citation counts and academic participation. In order to answer the research question, we test two hypotheses. The brief literature review serves as a guidepost for the various research articles on the influence that including an area of specialization or topic in the title of the article might have on citation counts. The literature review also serves as a guide to the quantitative analyses, findings, discussion of results and implications for future research.

Our Research Question

We wanted to know if including any of the NCA communication areas of specialization topics over the past twenty years, in quotes, when searching for results “in the title of the article” would lead to differences in the Google “Cited By” count. Therefore, the following research question was formulated.

RQ: *When a communication area of specialization appears in the title of the article, will Google’s “Cited By” counts differ among the numerous areas of communication specialization?*

There is no denying the importance of Artificial Intelligence (AI) in aiding researchers with accomplishing mundane and routine tasks that historically took days or weeks to accomplish. Because Google Gemini is a very effective AI large language model tool for knowledgeable users, we asked Gemini

the following question on August 16, 2025: “To determine if the provided list of communication areas of specialization has face validity, we need to assess whether the areas seem relevant and appropriate to measure different aspects of communication based on a superficial assessment.” We now have no doubt that the NCA interest groups are valid avenues for investigation in the field of communication. Table 1 shows in quotes the NCA descriptions of each area of specialization (NCA, 2023). Juxtaposed in the right column are the AI checks for the validity of each area description. Table 1 is a showcase of 16 representative NCA interest groups that are confirmed by Google’s Gemini AI as having face validity because of 1) Clear and Understandable labels, 2) Relevance to Communication, 3) Representation of Diverse Form of Communication, and 4) Alignment with Common Understanding. Face validity is a form of validity that is on the surface a good measure of a thing, concept, or construct that can withstand scrutiny and which leads to the more established measures for validity: Predictive, Concurrent, Content, Construct and Internal validities (Erickson & Wentling, 1988).

TABLE 1
THE FACE VALIDITY OF THE NCA COMMUNICATION AREAS OF SPECIALIZATION
CONFIRMED BY GOOGLE GENERATIVE AI

<p>Source: What is communication? (2023, April 6). National Communication Association. https://www.natcom.org/about-nca/what-communication</p>	<p><u>Google Gemini AI Overview, August 16, 2025</u> “To determine if the provided list of communication areas of specialization has face validity, we need to assess whether the areas seem relevant and appropriate to measure different aspects of communication based on a superficial assessment.”</p>
<p>Applied Communication – “How Communication theory and research can be useful and relevant in addressing practical problems. Example: How can emergency management personnel best communicate severe weather warnings to affected populations?”</p>	<p><i>Applied Communication:</i> A highly relevant and practical area, focusing on using communication theories and research to address real-world problems.</p>
<p>Communication Education – “How communication theory and practice can inform effective instruction and learning in the classroom and other pedagogical contexts. Example: How can teachers establish credibility with students?”</p>	<p><i>Communication Education:</i> Seems highly relevant and appropriate as a specialization focusing on how communication impacts teaching and learning.</p>
<p>Electronic & Digital Media – “How people make use of different forms of media to communicate with audiences. Example: How are news reports produced and disseminated via social media?”</p>	<p><i>Electronic & Digital Media:</i> A very relevant and timely specialization considering the prevalent use of various media for communication today.</p>
<p>Health Communication – “How people communicate in different health care contexts. Example: How should doctors communicate with patients to increase the likelihood of adherence to prescribed medication protocols?”</p>	<p><i>Health Communication:</i> Clearly relevant, focusing on communication within diverse healthcare contexts.</p>
<p>International & Intercultural Communication – “How people communicate across national and international boundaries and different cultural backgrounds. Example: How can diplomats from different countries most effectively negotiate with one another in a manner that is sensitive to the other’s cultural norms?”</p>	<p><i>International & Intercultural Communication:</i> This specialization is evidently relevant for understanding communication across national borders and cultural backgrounds.</p>
<p>Interpersonal Communication – “How pairs of people communicate in personal relationships. Example: Why does father-daughter communication differ from mother-daughter communication?”</p>	<p><i>Interpersonal Communication:</i> A foundational and highly relevant area, focusing on communication between pairs of individuals in personal relationships.</p>

<p>Legal Communication – “How communication organizes and creates meaning in courtrooms and other legal contexts. Example: What should defense attorneys do to effectively persuade juries of their clients’ innocence in closing statements?”</p>	<p><i>Legal Communication:</i> This specialization appears relevant for studying how communication operates within legal settings like courtrooms.</p>
<p>Mass Communication & Media Literacy – “How mass forms of communication, such as print, radio, and television, create meaning for audiences. Example: How does watching Grey’s Anatomy on television affect viewers’ interactions with their health care providers?”</p>	<p><i>Mass Communication & Media Literacy:</i> A very relevant area given the impact of mass media, and media literacy is crucial in navigating it.</p>
<p>Mediation & Dispute Resolution – “How conflict is understood, managed, and resolved via different types of communication interactions. Example: How can the competing claims and arguments of opposing parties in negotiations over labor contracts be resolved?”</p>	<p><i>Mediation & Dispute Resolution:</i> This specialization appears relevant for focusing on communication's role in resolving conflicts and disputes.</p>
<p>Organizational Communication – “How people communicate in different organizational contexts. Example: How can suggestion boxes in employee lounge areas encourage positive feelings about an organization?”</p>	<p><i>Organizational Communication:</i> A highly relevant specialization, examining how people communicate within different organizational contexts</p>
<p>Performance Studies – “How performers, audiences, texts, and contexts interact in popular entertainment and other forms of public performance. Example: How do different types of Latino/a performance art redefine citizenship and political participation in U.S. states that border Mexico?”</p>	<p><i>Performance Studies:</i> This area seems relevant for examining how different forms of public performance involve communication among performers, audiences, and contexts.</p>
<p>Political Communication – “How we can explain the communicative activity of citizens, individual political figures, governmental institutions, the media, political campaigns, advocacy groups, and social movements. Example: Are protestors effective at influencing public policy?”</p>	<p><i>Political Communication:</i> This specialization is clearly relevant for analyzing the role of communication in various political contexts.</p>
<p>Public Address – “How speakers have persuaded audiences and shaped social and political ideas in their specific historical contexts via public oratory. Example: How did Abraham Lincoln’s pre-presidential oratory shape public and social understandings of abolition and antebellum politics?”</p>	<p><i>Public Address:</i> Historically and contextually relevant, focusing on how public speaking has shaped social and political ideas.</p>
<p>Rhetorical Criticism – “How rhetoric is defined, classified, analyzed, interpreted, and evaluated. Example: How can audiences interpret and evaluate the most relevant and important characteristics of the U.S. President’s most recent State of the Union address?”</p>	<p><i>Rhetorical Criticism:</i> A fundamental area within communication studies, concerned with the analysis and evaluation of rhetoric.</p>
<p>Small Group Communication – “How groups of three or more individuals interact around a common purpose and influence one another. Example: How does a 10-member citizens’ advisory group for a local food co-op reach a decision about whether to sell beer and wine?”</p>	<p><i>Small Group Communication:</i> Seems relevant for understanding communication and interaction within groups of three or more individuals.</p>
<p>Visual Communication – “How people communicate using visual data, such as through architecture, photography, film, or visual art. Example: Why has the iconic photograph of World War II soldiers raising a</p>	<p><i>Visual Communication:</i> Relevant for understanding how people communicate through visual means like images and art.</p>

<p>U.S. flag on the island of Iwo Jima been used so frequently by multiple generations?"</p>	
<p>Why Face Validity Matters (AI, August 16, 2025). <i>“Define Face Validity:</i> Face validity refers to how well a test, measure, or list appears to measure what it's supposed to measure, based on a superficial or intuitive assessment. Essentially, does it "look like" it makes sense?"</p>	<p>Does it have face validity (AI, August 16, 2025)? “Yes, the list of communication areas of specialization provided by the NCA appears to have strong face validity.”</p>
<ul style="list-style-type: none"> • “Initial Assessment: Face validity provides a quick and intuitive check of a list's relevance and appropriateness. It helps to weed out clearly unsuitable or irrelevant areas early in the process.” • “Perception and Buy-in: A list with good face validity is more likely to be accepted as credible and useful by individuals reviewing it, including those in the field and the general public.” <p>“Important Note: Face validity is a subjective assessment and is considered the weakest form of validity. It does not guarantee that the list is truly comprehensive or accurate in representing the field of communication specializations. However, it serves as a valuable first step in evaluating a list's overall suitability. A list might appear to cover relevant areas (have face validity), but a deeper analysis might reveal that it misses crucial aspects or includes overlapping categories, necessitating further refinement or validation.”</p>	<p>Why (AI, August 16, 2025)?</p> <ul style="list-style-type: none"> • “Clear and Understandable Labels: Each specialization is named in a way that clearly indicates its focus, making it easy to understand what the area encompasses. For example, "Health Communication" intuitively suggests communication within healthcare.” • “Relevance to Communication: The descriptions and examples provided for each specialization demonstrate their direct connection and relevance to the broader field of communication studies.” • “Representation of Diverse Communication Forms: The list encompasses a wide range of communication forms and contexts, including interpersonal, group, public, organizational, media, and cultural communication, suggesting a comprehensive representation of the field's different facets.” • “Alignment with Common Understandings: The listed areas generally align with how the field of communication is commonly understood and categorized by scholars and practitioners.” <p>“In conclusion, based on the clarity, relevance, and broad coverage of the listed specializations, the NCA's list appears to have strong face validity, meaning it intuitively seems to measure or represent the different areas of focus within communication studies.”</p>

LITERATURE REVIEW

The field of communication covers a wide range of theoretical and sub-specializations that inform both academic scholarship and professional practice. As communication studies evolve, so does our understanding of how visibility, clarity, and structure in academic writing, particularly with article titles, impact a paper's visibility and subsequent citation rates (Jamali & Nikzad, 2011; Fox & Burns, 2015; Chamorro-Padial & Rodríguez-Sánchez, 2023). This literature review supports an empirical study examining citation frequency across the 16 official communication areas described by NCA (NCA, 2023). In particular this literature review pays particular attention to patterns in title construction and how these areas perform in bibliometric impact. This section encompasses public relations and political communication, both of which involve strategic messaging, leadership framing, and audience influence across and civic domains.

Cross-Field Citation Trends

Shorter titles with clear keywords tend to perform better in databases and search engines. An emerging consensus across communication specializations highlights several title construction practices that are

linked to higher citation rates. Research indicates that short, keyword-rich titles enhance database retrieval and increase the visibility of articles in search results (Letchford et al., 2015; Habibzadeh & Yadollahie, 2010). Additionally, titles that explicitly state research results or conclusions tend to attract greater scholarly engagement (Paiva et al., 2012). The strategic use of a colon to divide distinct components in a title has also proven effective for improving discoverability, especially in applied research contexts (Hartley, 2007; Lewison & Hartley, 2005). In contrast, the use of excessive jargon or highly specialized terminology can limit an article's reach across disciplines, thereby constraining its citation potential (Martínez & Mammola, 2021).

The literature reflects that each communication specialization offers unique contributions to scholarship and practice. However, their visibility and influence are increasingly shaped by how researchers title and position their work. As journals become more competitive and interdisciplinary, understanding citation behavior and the rhetorical aspects of academic writing become as important as the content itself. Communication scholars are encouraged, per the literature reviewed here, to employ clear, relevant, and discoverable language in their article titles to optimize their work's academic and practical impact. This review is strictly a synthesis of current trends and findings in the literature and does not offer original analysis or evaluation of primary data.

Interpersonal Communication

Interpersonal communication, one of the foundational NCA-recognized areas, is central to the study of how individuals construct meaning and navigate personal relationships. Classic works by DeVito (2007) and Bennett (1998) emphasize relational development, listening skills, and nonverbal cues. While this area remains central to curricula and theory development, it has historically received moderate citation rates compared to more policy-focused specializations. Jamali & Nikzad (2011) suggest that papers with clearer, concise, and result-oriented titles in this field tend to get more downloads and citations, especially when applied to counseling, health, or education contexts. For example, titles that explicitly include "Relationship Satisfaction" or "Nonverbal Behavior in Conflict" outperformed broader titles, such as "Insights into Communication Dynamics." This section includes both traditional interpersonal communication and related areas such as health communication, reflecting their shared emphasis on relational processes and person-to-person interaction.

Organizational Communication

Organizational communication connects leadership, internal messaging, and institutional growth. Scholars like Cornelissen (2020) and Argenti (2014) have influenced the field with highly cited works on strategic alignment, change management, and corporate identity. This area has demonstrated strong citation potential, particularly when titles clearly relate to managerial relevance or strategic implications. Bell and Martin (2019) point out that practitioner-oriented framing, such as "leadership development" or "employee engagement," increases citations from both scholars and practitioners. Bibliometric studies (e.g., Fox & Burns, 2015; Hartley, 2007) indicate that titles with colons (such as "Communicating Change: Strategies for Resilient Organizations") tend to perform better in cross-disciplinary searches, probably because they more clearly signal both the theoretical and applied aspects. Given their shared emphasis on internal procedures, institutional dynamics, and communicative conflict management, organizational communication is taken into consideration here in addition to dispute resolution.

Intercultural Communication

Although less frequently cited than organizational studies, intercultural communication is gaining attention due to its implications for Diversity, Equity, and Inclusion (DEI), globalization, and conflict resolution (Cooper et al, 2023). Foundational contributions including Ting-Toomey & Chung (2005) and Bennett (1998), provide theoretical grounding. This subfield gains when articles link intercultural constructs to real-world outcomes, such as workplace inclusion or virtual team dynamics. Citation performance improves when papers include concise terminology ("intercultural competence," "cross-cultural leadership") and direct outcomes in titles (e.g., "Improving Intercultural Competence in Virtual

Teams”). As Nagano (2015) and Yitzhaki (1997) point out, humanities-related fields like intercultural studies often use longer, descriptive titles, which can make discovery harder unless they are very clear or relevant to institutions.

Mass Communication and Media Studies

Mass communication and media studies investigate the structure, influence, and ethics of mediated content. This specialization features strong citation patterns, especially when discussing emerging technologies, media framing, or audience analysis. Canonical texts (e.g., Lull, 2000; Watson, 1998) remain fundamental, while newer studies examine algorithmic influence and media ethics. According to Tran et al. (2024) and Subotic & Mukherjee (2013), titles in this area with emotion, wit, or novelty ("Insert Witty Catchphrase Here!") tend to boost initial engagement, especially in digital media and journalism research. However, literature consistently recommends that authors should prioritize clarity over cleverness, especially in databases where keyword indexing matters more than humor or catchiness. This section includes media literacy, digital communication, and visual communication, reflecting their shared emphasis on how media technologies shape communication and public engagement.

Leadership and Strategic Communication

Leadership communication includes multiple research subfields, yielding high citation metrics, especially within business and public administration (George (2003); Dinh et al. (2014); Randel et al. (2018). Judge et al. (2007) found that in management and leadership journals, citation rates are influenced by factors beyond title, notably author reputation and journal ranking. However, concise, high-clarity titles with actionable terms, such as “inclusive leadership,” “authenticity,” or “employee voice,” often lead to greater citation longevity. Additionally, Bell (2013) and Fei and Bell (2013) discuss the "celebrity researcher effect," suggesting that papers written by well-known scholars receive more citations regardless of title structure, though the accessibility of the title still plays an important role in early engagement. Top institutions in the Carnegie R1 classification also have huge influence on the citation counts of published articles (Bell & Chong, 2010).

METHODS

Methods are often the most important part of the research process, just after the research question. How data are collected, analyzed, and as well as selection of the proper statistic for empirical data is paramount. We used appropriate methods to accomplish the purpose of our study. The organizational structure used in the literature review draws upon both the NCA officially recognized numerous areas of specialization and the empirical categorization framework developed for this project. The literature is grouped into five primary thematic areas: Interpersonal, Organizational, Intercultural, Media (Mass/Digital), and Strategic/Leadership Communication, which collectively map to the project’s Tier 1 and Tier 2 ranking by Google Search results. Table 2 illustrates the data truncated for statistical purposes which helps to avoid Type 1 error. Too many independent variables in the Kruskal Wallis test are prone to the Family-Wise Error problem. This categorization was developed based on both citation frequency and thematic congruence, ensuring that the literature review aligns conceptually with the empirical analyses conducted in the subsequent sections of the study. The literature review should adhere to a formulated research question.

Therefore, we used only six groups per null hypotheses, per Tier 1 and Tier 2. We divided the communication specialization areas into Tier 1 and Tier 2 based on the Google Scholar search results, shown in Table 3. Figure 1 and Figure 2 are histograms showing the skewness in the “Cited By” data for Tier 1 and Tier 2, respectively. The two control groups (PerStd-C1 and EduCom-C2) “Cited By” counts were the search result for those groups “anywhere in the article.” The controls served as the baseline for comparisons with the experimental variables which were searched for “in the title of the article.” All data analyzed in this study, the two null hypotheses tested, are shown in Table 3. No IRB permission is required for this type of study at the institution where it was conducted.

TABLE 2
RANK ORDERED LISTING OF 18 NCA COMMUNICATION AREAS OF SPECIALIZATION
(SEARCH RESULTS) AND THE DEPENDENT VARIABLE “CITED BY”

*Rank	The Possible Independent Variables (Search Results = 102,704) Custom Search Period: from 2005 to 2024	The One Dependent Variable “Cited By”
1	Public Relations (16,400)	<p>Cited By counts for 40 articles for each of the 12 independent variables is the measure of comparison.</p> <p>Measurement was the number of citations for 40 articles for each of the 12 independent variables: 40 x 12 = 480 rows of raw citation data “Cited By”.</p> <p>Kruskal-Wallis H test is appropriate when the assumption of normal distribution is violated and there are more than three independent groups.</p>
2	Dispute Resolution (14,100)	
3	Intercultural Communication (12,500)	
4	Media Literacy (11,600)	
5	Health Communication (8,190)	
6	Political Communication (7,250)	
7	Digital Media (6,440)	
8	Interpersonal Communication (5,980)	
9	Visual Communication (5,220)	
10	Organizational Communication (4,430)	
11	Mass Communication (4,090)	
12	Performance Studies (3,100)	
13	Communication Education (1,810)	
14	Rhetorical Criticism (449)	
15	Public Address (448)	
16	Legal Communication (362)	
17	Applied Communication (212)	
18	Small Group Communication (123)	
*Rank order is based on the Google search results for area in the title of the article.		

Table 3 clearly shows that a review of the data reveals skewness and rank ordering, which pulls the mean in either direction, thus violating homoscedasticity and heteroscedasticity, making the data non-parametric. When the assumption of normal distribution is violated, as demonstrated in Table 3, One-Way ANOVA is not the appropriate statistical method. Kruskal Wallis H Test requires at least five observations per independent group (Kruskal & Wallis, 1952); we had 40 observations per 12 independent groups of communication. Drummond and Vowler (2012) wrote:

“The usual solution proposed to the problem imposed by the multiple tests is to impose a more stringent threshold for ‘significance’. The advantage is that we are less likely to have false positive classifications. The disadvantage is equally clear: with a more stringent criterion, we will fail to detect occasions where the null hypothesis is not ‘true’” (para).

Table 3 shows that Intercultural Communication column, for example, has an article cited 6,496 times, and one cited only 41 times. This type of skewness occurs across all categories. Some data are prone to Type 1 errors if there are too many independent variables being compared, this is known as the Family-Wise Error (Nicholson et al, 2022). A solution for this problem is to make the criterion more stringent to reject the null or use the Bonferroni correction for multiple tests (Duggal et al, 2008). The Bonferroni correction reduces the chance of a type one error do to inflated effects. SPSS 28.0 defaults to the Bonferroni setting.

FIGURE 1
TIER 1 HISTOGRAM SHOWING SKEWNESS IN THE “CITED BY” DATA

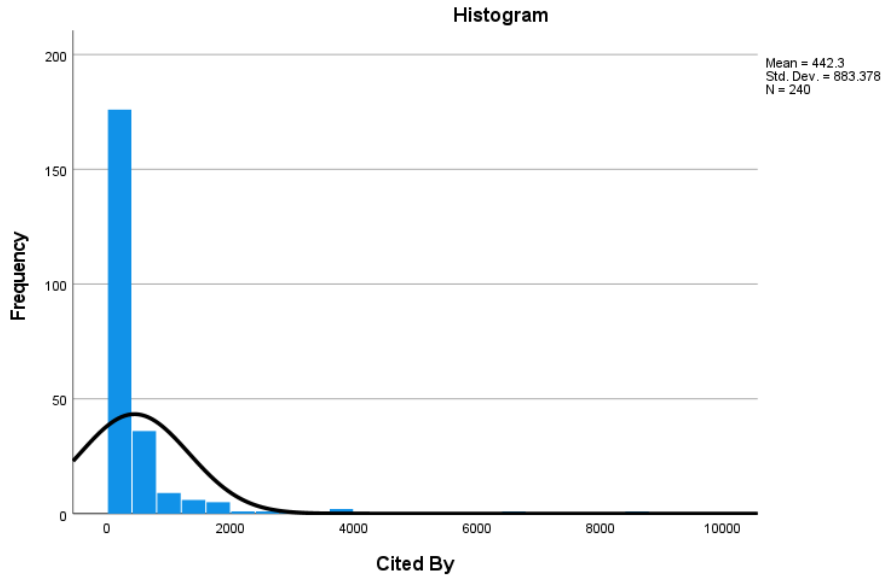
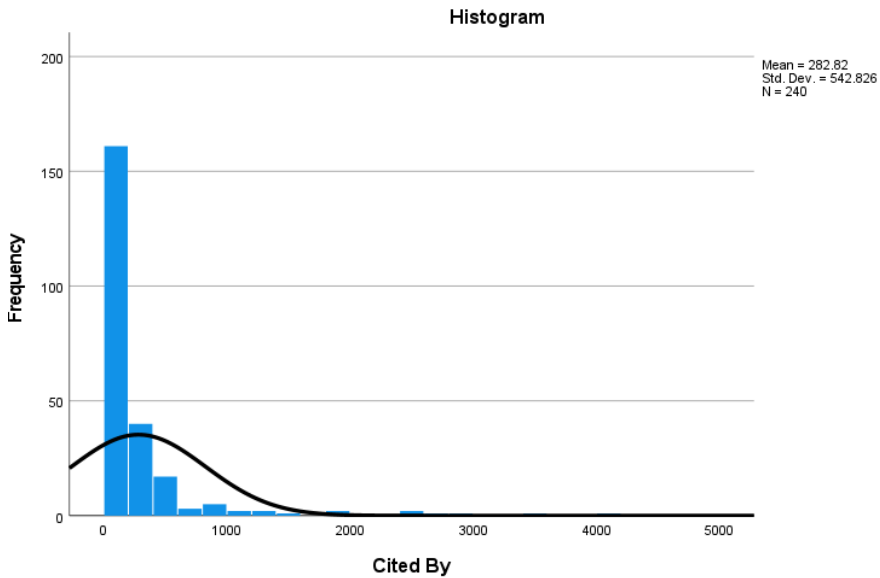


FIGURE 2
TIER 2 HISTOGRAM SHOWING SKEWNESS IN THE “CITED BY” DATA



We had to truncate the data for statistical purposes to avoid Type 1 errors by reducing the list shown in Table 2. We did not include any of the areas of specialization that did not fall into the Tier 1 and Tier 2 as experimental groups based on search result total. Simply put, the bottom eight communication areas of specialization did not serve the purpose of experimental variables. However, Performance Studies and Communication Education served the purpose of control groups during data analyses and hypotheses testing. The five Tier 1 groups had 61.1% $[62,790/102,704 * 100]$ of the total search results for all 18 groups shown in Table 2. The bottom eight groups had 10.3% $[10,594/102,704 * 100]$ of the total search results.

Therefore, Tier 1 had a ratio of 5.93 articles to 1 article when compared to the bottom 8 groups, when the search was for a communication area of specialization in the title of the article. Therefore, truncation of the specialization areas into two Tiers was essential.

Bottom Eight Communication Areas of Specialization:

Mass Communication (4,090)
Performance Studies (3,100)
Communication Education (1,810)
Rhetorical Criticism (449)
Public Address (448)
Legal Communication (362)
Applied Communication (212)
Small Group Communication (123)

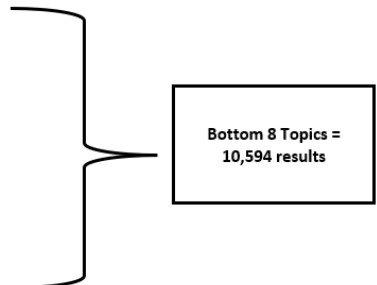


Table 3 shows the groups which comprise Tier 1 and Tier 2. All the data used for analyses is included in Table 3. The raw data copied and pasted from Google Scholar into Excel is available upon request. This study, however, can be easily replicated from the Table 3 data, or new data can easily be copied from Google Scholar by advance search function, custom search 2005-2024, and “in the title of the article” specifications.

TABLE 3
RANK ORDERED “CITED BY” DATA WITH EXPERIMENTAL GROUPS (SEARCH RESULTS IN THE TITLE OF THE ARTICLE) AND CONTROL GROUPS (SEARCH RESULTS ANYWHERE IN THE ARTICLE)

TIER 1 EXPERIMENTAL VARIABLES					Control Group 1	TIER 2 EXPERIMENTAL VARIABLES					Control Group 2
Public Relations (16,400)	Dispute Resolution (14,100)	Intercultural Com. (12,500)	Media Literacy (11,600)	Health Com. (8,190)	*PerfStd-C1 (192,000)	Political Com. (7,250)	Digital Com. (6,440)	Interpersonal Com. (5,980)	Visual Com. (5,220)	Org. Com. (4,430)	*EduCom-C2 (25,300)
Cited By	Cited by	Cited By	Cited By	Cited By	Cited By	Cited By	Cited By	Cited by	Cited By	Cited By	Cited By
3662	584	6496	3259	3170	8734	4116	2912	3444	572	2023	1828
1731	296	2625	2165	1587	3779	2569	2435	2643	516	902	263
1348	227	1849	1976	1533	1041	1165	1298	1917	504	630	185
1062	221	1613	1660	773	635	912	612	1459	295	608	151
833	219	1322	1480	770	384	867	566	1300	279	553	144
787	207	1215	1115	602	305	845	481	1133	270	500	126
760	196	1190	884	555	258	581	330	823	218	355	115
699	166	1170	878	532	221	504	329	517	209	354	97
671	162	1091	712	508	191	487	297	481	200	346	96
661	151	715	682	474	157	474	277	407	196	329	88
581	146	605	681	474	138	474	264	345	194	309	76
550	141	574	638	474	112	446	235	284	168	306	76
549	134	549	465	421	108	444	182	273	152	269	66
420	131	438	415	339	106	305	175	262	113	240	60
420	126	433	407	323	94	299	173	232	111	233	46

417	119	397	393	306	90	276	153	227	108	218	44
389	119	385	374	268	87	244	134	223	104	206	34
365	117	327	355	177	79	219	120	210	102	195	30
340	110	235	351	175	75	211	105	205	97	165	28
329	105	219	294	160	70	196	72	202	93	158	23
285	104	202	242	152	59	194	72	176	76	153	22
269	103	195	237	142	57	178	70	171	63	141	22
259	86	190	227	141	52	175	69	170	59	137	20
248	80	183	221	131	52	165	69	161	43	137	19
244	79	177	209	122	38	162	62	127	42	136	19
237	70	175	186	118	28	130	60	117	42	129	17
226	59	143	181	117	22	127	42	109	36	128	15
224	50	143	170	96	22	124	38	108	35	105	14
220	50	139	167	95	21	110	37	103	35	95	12
219	50	126	163	82	21	109	35	85	33	85	12
204	47	120	162	81	19	105	30	83	30	81	11
199	34	119	148	78	17	103	29	80	22	79	10
198	30	101	126	75	15	100	26	67	21	72	10
196	28	97	115	69	14	75	25	63	19	71	10
191	23	96	114	67	12	63	22	63	17	57	9
177	15	78	94	57	12	63	19	44	16	56	7
172	13	73	84	56	6	62	11	43	14	49	7
162	11	70	79	55	5	57	9	34	14	47	6
133	10	56	78	51	2	54	9	33	14	47	4
100	10	41	42	40	2	45	8	14	11	43	0
Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
20,737	4,629	25,972	22,229	15,446	17,140	17,835	11,892	18,438	5,143	10,747	3,822

*Both the Control variables represent Google Search results for area of specialization searched for “anywhere in the article.”

TEST RESULTS FOR HYPOTHESIS 1

HO₁: There will be no difference in the median Google “Cited By” counts among the five Tier 1 experimental variables and the control group when the five experimental variables are searched for “in the title of the article” and the control group is searched for “anywhere in the article.”

We rejected HO₁: There is a statistically significant difference in the median Google “Cited By” counts among the five Tier 1 experimental variables and the control group when the five experimental variables are searched for “in the title of the article” and the control group is searched for “anywhere in the article.” Pairwise comparisons can identify specific group differences following a significant overall Kruskal-Wallis H test. The Adj. Sig. (adjusted significance) values correct for multiple comparisons using the Bonferroni correction, reducing the risk of a Type I error. Significant differences were identified when the adjusted $p < .05$ was less than $.05$. The analysis was conducted in SPSS 28.0. The Kruskal-Wallis H test indicated a statistically significant difference among the six Tier 1 groups, $H(5, 240) = 69.144, p < .001$. Google Gemini was utilized to compute the Eta Squared and assist in writing a summary that reflects the pairwise comparisons that were computed in SPSS. Gemini AI is a very effective large language model tool in handling the routine nature of these tasks. Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. Statistical difference was determined at $p < .05$, with values adjusted using the Bonferroni correction for multiple tests.

Calculation of Eta Squared

For a Kruskal-Wallis H test, a standard formula for calculating eta squared is:

$$\eta^2 = (H - k + 1) / (n - k)$$

Given values:

$$H = 69.144$$

$$n = 240$$

$$k = 6$$

Calculation:

$$\eta^2 = (69.144 - 6 + 1) / (240 - 6)$$

$$\eta^2 = 64.144 / 234$$

$$\eta^2 \approx 0.2741$$

Result:

The calculated eta squared (η^2) is **0.2741**.

Interpretation of Eta Squared

The eta squared value represents the proportion of variance in the dependent variable explained by the independent variable. The interpretation is often categorized as:

- **Small effect:** 0.01 to < 0.06
- **Moderate effect:** 0.06 to < 0.14
- **Large effect:** ≥ 0.14

There were five experimental groups in Tier 1 comparison, Public Relations (Group 1), Dispute Resolution (Group 2), Intercultural Communication (Group 3), Media Literacy (Group 4), and Health Communication (Group 5). Groups are referred to by their respective numbers in order to save space in the report. The Control group variable serving as the baseline was Performance Studies (Group 6) [PerfStd-C1]. The pairwise comparisons specify where those differences lie. Groups 6 and 2 significantly differ from Groups 1, 3, 4, and 5. However, Groups 1, 3, 4, and 5 do not significantly differ from each other. Groups 1 to 5 were experimental groups and group 6 was the control group. Although all are in the communication field, the areas of specialization differ. This raises the question of how the experimental groups differ from the control group. What does the data tell us about communication areas of specialization? Based on the pairwise comparisons, we can determine how the experimental groups differ from the control group (Group 6) and what this may suggest about the effectiveness of different communication areas of specialization.

With an eta squared of 0.2741, the effect size is considered **large**, indicating that approximately 27.41% of the variance in the dependent variable is accounted for by the group variable. Table 4 shows the Tier 1 pairwise comparisons with five experimental variables and one control variable. The test statistic $H(5, 240) = 69.144$, $k=6$, $p < .001$ confirms an overall statistically significant difference among the six groups. Figure 3 and Figure 4 are visualizations of the data in the form of a box chart and the node comparisons, respectively.

TABLE 4
TIER 1 PAIRWISE COMPARISONS:
FIVE EXPERIMENTAL VARIABLES AND ONE CONTROL VARIABLE

Pairwise Comparisons of Group					
Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
6-2	3.662	15.524	.236	.813	1.000
6-5	52.713	15.524	3.396	<.001	.010
6-3	73.863	15.524	4.758	<.001	.000
6-4	81.725	15.524	5.264	<.001	.000
6-1	95.913	15.524	6.178	<.001	.000
2-5	-49.050	15.524	-3.160	.002	.024
2-3	-70.200	15.524	-4.522	<.001	.000
2-4	-78.062	15.524	-5.029	<.001	.000
2-1	92.250	15.524	5.942	<.001	.000
5-3	21.150	15.524	1.362	.173	1.000
5-4	29.013	15.524	1.869	.062	.925
5-1	43.200	15.524	2.783	.005	.081
3-4	-7.862	15.524	-.506	.613	1.000
3-1	22.050	15.524	1.420	.155	1.000
4-1	14.188	15.524	.914	.361	1.000
Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.					
Asymptotic significances (2-sided tests) are displayed. The significance level is .050.					
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.					

There were significant differences:

- Group 6 and Group 5 (Adj. Sig. = .010).
- Group 6 and Group 3 (Adj. Sig. = .000).
- Group 6 and Group 4 (Adj. Sig. = .000).
- Group 6 and Group 1 (Adj. Sig. = .000).
- Group 2 and Group 5 (Adj. Sig. = .024).
- Group 2 and Group 3 (Adj. Sig. = .000).
- Group 2 and Group 4 (Adj. Sig. = .000).
- Group 2 and Group 1 (Adj. Sig. = .000).

There were non-significant differences:

- The remaining pairwise comparisons did not show a statistically significant difference after the Bonferroni adjustment (all Adj. Sig. > .05).
- This includes the comparisons between:
 - Groups 6 and 2 (Adj. Sig. = 1.000)
 - Groups 5 and 3 (Adj. Sig. = 1.000)
 - Groups 5 and 4 (Adj. Sig. = .925)
 - Groups 5 and 1 (Adj. Sig. = .081)
 - Groups 3 and 4 (Adj. Sig. = 1.000)
 - Groups 3 and 1 (Adj. Sig. = 1.000)
 - Groups 4 and 1 (Adj. Sig. = 1.000)

FIGURE 3
THE BOX CHART FOR TIER 1 ANALYSIS
Independent-Samples Kruskal-Wallis Test

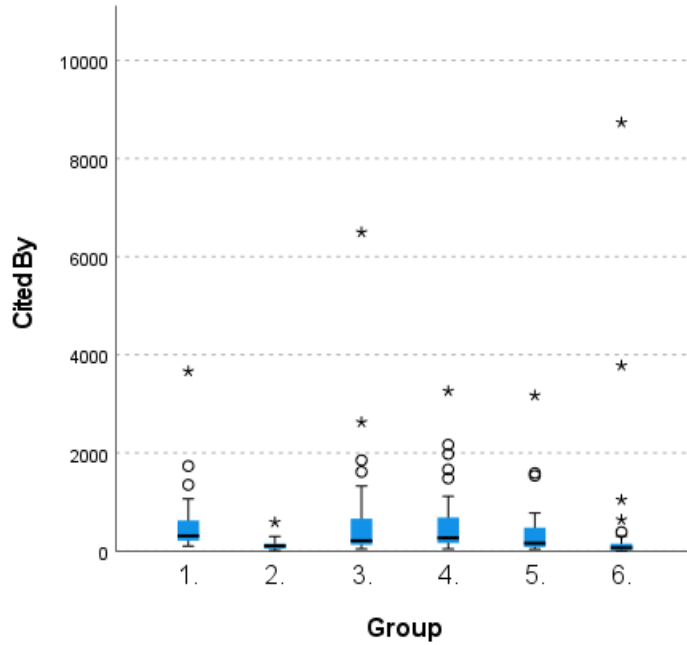
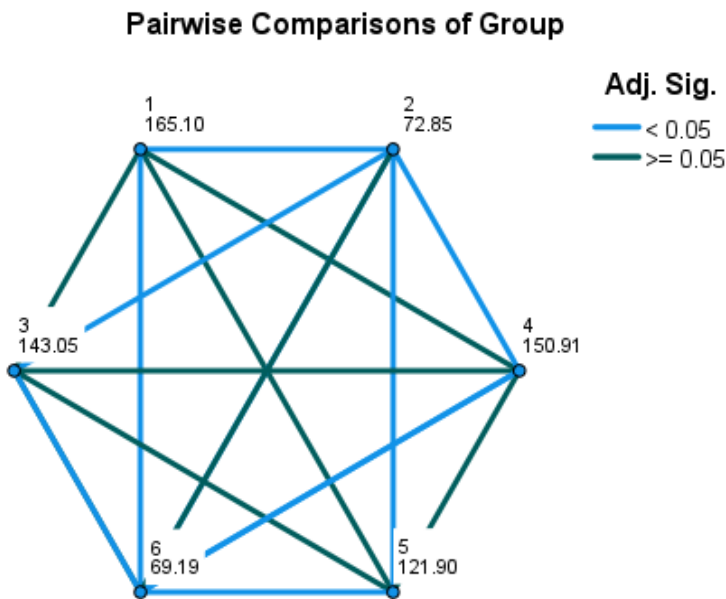


FIGURE 4
THE NODE COMPARISONS FOR TIER 1 COMPARISONS



Each node shows the sample average rank of Group .

The pairwise comparisons, adjusted using the Bonferroni correction to account for multiple tests, show that Group 6 (Performance Studies as

Control) had statistically significant differences from most of the experimental groups. A significant adjusted p-value (Adj. Sig. < .05) indicates a real difference between the two groups. There are inferences about communication areas of specialization. Drawing on the pairwise comparisons, we can make some inferences regarding the different communication areas.

- **Significant differences from control:**
 - **Control (Group 6) vs. Group 5 (Adj. Sig. = .010):** The analysis found a statistically significant difference between the control group and Experimental Group 5.
 - **Control (Group 6) vs. Group 3 (Adj. Sig. = .000):** A highly significant difference was found between the control group and Experimental Group 3. A p-value of .000 is reported by SPSS for values less than .0005 and means the difference is very unlikely to be due to chance.
 - **Control (Group 6) vs. Group 4 (Adj. Sig. = .000):** A highly significant difference was found between the control group and Experimental Group 4.
 - **Control (Group 6) vs. Group 1 (Adj. Sig. = .000):** A highly significant difference was found between the control group and Experimental Group 1.
- **No significant difference from control:**
 - **Control (Group 6) vs. Group 2 (Adj. Sig. = 1.000):** There was no statistically significant difference between the control group and Experimental Group 2.
- **Effective experimental treatments:** The significant differences found between the control group and experimental groups 1, 3, 4, and 5 suggest that the specific communication specializations represented by these groups had a real effect compared to the control condition. Assuming the metric measured is a desirable outcome, these specialized approaches were effective.
- **Ineffective experimental treatment:** The lack of a significant difference between the control group and Experimental Group 2 suggests that the communication specialization represented by Group 2 did not produce a statistically significant change compared to the control condition.
- **Similar effectiveness among some specializations:** The results also showed that there were no statistically significant differences among experimental groups 1, 3, 4, and 5. This implies that while these specializations were all different from the control, they were not significantly different from each other. In other words, in terms of their effectiveness, they may be comparable.

The Kruskal-Wallis H test indicated an overall statistically significant difference among the groups ($H=69.144$) with a large effect size ($\eta^2=0.2741$). The pairwise comparisons identified specific differences. The control (Group 6) was significantly different from experimental Groups 1, 3, 4, and 5. However, the control group was not significantly different from experimental Group 2, suggesting that this particular communication specialization had no distinguishable effect compared to the control condition. Furthermore, no significant differences were observed among the experimental groups that were found to be significantly different from the control.

Summary of Median Test Results: Hypothesis 1

The median test had $N=240$, $df=5$, $\text{Chi-Square}=58.887$, $\text{median}=177$, $\text{Asymp. Sig} < .001$. The chi-square table $\chi^2(5, 240) = 58.887$, $p < .001$ indicates a statistically significant difference between the medians of at least two of the groups. To understand which groups differ, we must examine the frequency Table 5. What does the median test tell us about our communication experimental field 1-5, versus the control group 6? The median test's chi-square table categorizes each participant's score as either above or below the overall study median of 177. The results show a clear pattern of differences in scores between the experimental groups and the control group, as well as among the experimental groups themselves.

TABLE 5
MEDIAN TEST FOR TIER 1 GROUP COMPARISONS

		Frequencies					
		Group					
		Public Relations (Group 1)	Dispute Resolution (Group 2)	Intercultural Communication (Group 3)	Media Literacy (Group 4)	Health Communication (Group 5)	Performance Studies-CL (Group 6)
Cited By	> Median	35	7	24	27	17	9
	≤ Median	5	33	16	13	23	31

Experimental Groups Compared to the Control Group

- **Experimental Groups 1, 3, 4, and 5** show a higher concentration of participants with scores **above the median** compared to the control group (Group 6). This suggests that the communication specializations in these groups had a more positive or higher-performing outcome than the control condition.
- **Experimental Group 2** shows the opposite pattern, with a much higher concentration of participants with scores **at or below the median** compared to the control group. This indicates that the communication specialization represented by Group 2 did not perform as well as the control group.

Interpretation by Communication Specialization

Based on the frequency table, we can draw the following conclusions about the communication areas:

- **Most effective specializations (Groups 1, 3, 4, 5):** The specializations in groups 1, 3, 4, and 5 appear to be more effective than the control group's condition. A significantly higher proportion of participants in these groups scored above the overall study median.
- **Least effective specialization (Group 2):** The specialization in Group 2 appears to be less effective than the control condition. It has the highest proportion of participants with scores at or below the median, suggesting it may have had a negative or no effect.
- **Control group (Group 6):** The control group serves as the baseline, with a higher proportion of participants scoring at or below the median compared to the more effective experimental groups. The small number of participants with scores above the median in the control group helps to highlight the more pronounced effects of the effective specializations.

Overall Tier 1 Conclusion

The median test provides a clear and robust picture of group differences, reinforcing the findings of the Kruskal-Wallis H test. The specializations in **Public Relations (Group 1)**, **Intercultural Communication (Group 3)**, **Media Literacy (Group 4)**, and **Health Communication (Group 5)** appear to have a more positive effect compared to the control **Performance Studies (Group 6)**. In contrast, the specialization in **Dispute Resolution (Group 2)** showed a notably poorer performance, suggesting it was the least effective area tested.

TEST RESULTS FOR HYPOTHESIS 2

***HO₂:** There will be no difference in the median Google “Cited By” counts among the five Tier 2 experimental variables and the control group when the five experimental variables are searched for “in the title of the article” and the control group is searched for “anywhere in the article.”*

We rejected H_{02} : There is a statistically significant difference in the median Google “Cited By” counts among the five Tier 2 experimental variables and the control group when the five experimental variables are searched for “in the title of the article” and the control group is searched for “anywhere in the article.” The $H(5, 240) = 59.257$, $P < .001$. The effect size was large.

Calculation of Eta Squared

For a Kruskal-Wallis H test, a standard formula for calculating eta squared (η^2) is:

$$\eta^2 = (H - k + 1) / (n - k)$$

Given values:

$$H = 59.257$$

$$n = 240$$

$$k = 6$$

Calculation:

$$\eta^2 = (59.257 - 6 + 1) / (240 - 6)$$

$$\eta^2 = 54.257 / 234$$

$$\eta^2 \approx 0.2319$$

Result:

The calculated eta squared (η^2) is **0.2319**.

Interpretation of Eta Squared

An eta squared value of 0.2319 indicates a **large effect size**, as it is greater than the typical threshold of 0.14 for a large effect. This suggests that approximately 23.19% of the variance in the dependent variable is accounted for by the group variable.

Summary of Pairwise Comparisons

The pairwise comparisons, adjusted using the Bonferroni correction, identify specific groups that are significantly different from each other. A significant difference is indicated by an adjusted significance value (Adj. Sig.) less than .05. The overall Kruskal-Wallis test showed a significant difference among the groups ($H = 59.257$). The pairwise comparisons specify these differences. Table 6 shows the Tier 2 pairwise comparisons with five experimental variables and one control variable. Figure 5 and Figure 6 are visualizations of the data in the form of a box chart and the node comparisons, respectively. There were six groups compared in Tier 2: Political Communication (Group 7), Digital Communication (Group 8), Interpersonal Communication (Group 9), Visual Communication (Group 10), Organizational Communication (Group 11), and the control group was **Communication Education** (Group 12) coded [EduCom-C2].

Groups 7, 8, 9, and 11 all performed significantly differently from the control group (Group 12). In contrast, Group 10 did not perform significantly differently from the control group. Furthermore, Group 10 was significantly different from groups 7, 9, and 11, while the other experimental groups (7, 8, 9, and 11) did not have many significant differences among themselves.

TABLE 6
TIER 2 PAIRWISE COMPARISONS:
FIVE EXPERIMENTAL VARIABLES AND ONE CONTROL VARIABLE

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
12-10	39.863	15.524	2.568	.010	.154
12-8	53.188	15.524	3.426	<.001	.009
12-11	86.863	15.524	5.595	<.001	.000
12-9	89.850	15.524	5.788	<.001	.000
12-7	98.563	15.524	6.349	<.001	.000
10-8	13.325	15.524	.858	.391	1.000
10-11	-47.000	15.524	-3.028	.002	.037
10-9	49.988	15.524	3.220	.001	.019
10-7	58.700	15.524	3.781	<.001	.002
8-11	-33.675	15.524	-2.169	.030	.451
8-9	-36.662	15.524	-2.362	.018	.273
8-7	45.375	15.524	2.923	.003	.052
11-9	2.988	15.524	.192	.847	1.000
11-7	11.700	15.524	.754	.451	1.000
9-7	8.713	15.524	.561	.575	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .050.
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

There were significant differences between control and experimental groups:

- Control (Group 12) vs. Group 8: Adj. Sig. = .009
- Control (Group 12) vs. Group 11: Adj. Sig. = .000
- Control (Group 12) vs. Group 9: Adj. Sig. = .000
- Control (Group 12) vs. Group 7: Adj. Sig. = .000

There were no significant differences between control and experimental groups:

- Control (Group 12) vs. Group 10: Adj. Sig. = .154
- The difference between these two groups is not statistically significant after adjustment for multiple comparisons.

There were significant differences among experimental groups:

- Group 10 vs. Group 11: Adj. Sig. = .037
- Group 10 vs. Group 9: Adj. Sig. = .019
- Group 10 vs. Group 7: Adj. Sig. = .002
- These three comparisons indicate that Group 10 is significantly different from groups 11, 9, and 7.

There were non-significant differences:

- All other pairwise comparisons did not show a statistically significant difference after the Bonferroni adjustment. For example, groups 7, 9, and 11 were not found to be significantly different from each other. Also, Group 8 was not found to be significantly different from groups 10, 11, 9, and 7.

FIGURE 5
THE BOX CHART FOR TIER 2 ANALYSIS

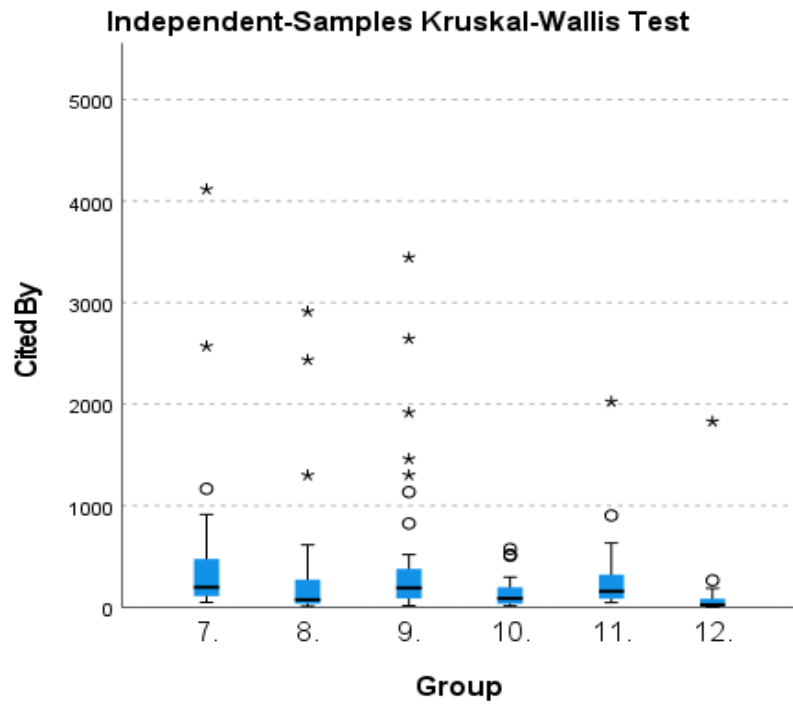
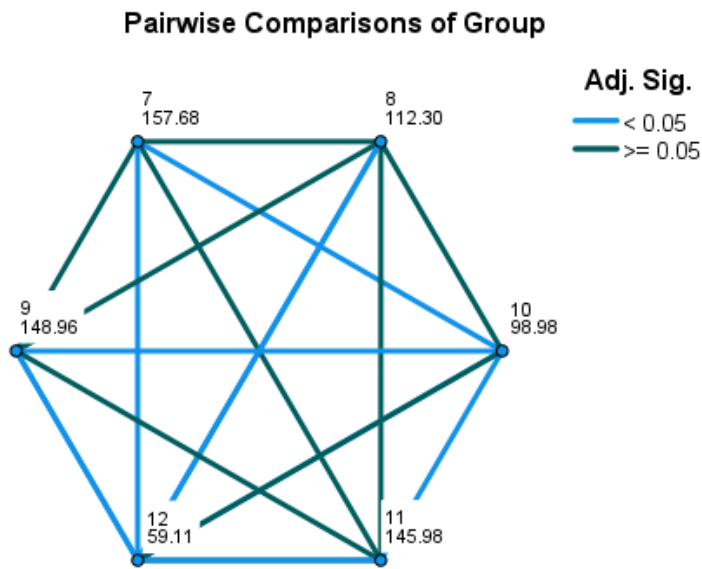


FIGURE 6
NODE COMPARISONS FOR TIER 2 COMPARISONS



Each node shows the sample average rank of Group.

Table 7 shows the Median test results. The median test, with a Chi-Square value of $\chi^2(5, 240) = 35.800$, $p < .001$, demonstrates a statistically significant difference in medians between at least some of the communication specialization groups. The overall median score for the entire dataset is 112. The frequency table further illustrates these differences. Experimental groups vs. control group (Group 12).

**TABLE 7
MEDIAN TEST FOR TIER 2 COMPARISONS**

		Frequencies					
		Group					
		Political Communication (Group 7)	Digital Communication (Group 8)	Interpersonal Communication (Group 9)	Visual Communication (Group 10)	Organizational Communication (Group 11)	Education Communication -CL (Group 12)
Cited By	> Median	35	7	24	27	17	9
	≤ Median	5	33	16	13	23	31

- **Experimental Groups 7, 9, and 11:**
 - **Above Median:** 28 (Group 7), 26 (Group 9), 27 (Group 11)
 - **At or Below Median:** 12 (Group 7), 14 (Group 9), 13 (Group 11)
 - These groups demonstrate a higher proportion of individuals scoring above the median compared to the control group (Group 12). This suggests that these communication specializations had a more favorable or higher-performing outcome compared to the control condition.
- **Experimental Group 8:**
 - **Above Median:** 18
 - **At or Below Median:** 22
 - Group 8 shows a relatively balanced distribution, but with a slightly higher number of individuals scoring at or below the median compared to above the median.
- **Experimental Group 10:**
 - **Above Median:** 14
 - **At or Below Median:** 26
 - Group 10 has a higher proportion of individuals scoring at or below the median. This indicates that this communication specialization may not have performed as well as the control group, or may have even had a less desirable outcome.
- **Control Group (Group 12):**
 - **Above Median:** 7
 - **At or Below Median:** 33
 - The control group has a substantially larger proportion of individuals scoring at or below the median compared to above the median. This serves as a baseline for comparing the performance of the experimental groups.
- **Positive impact:** The communication specializations represented by Groups 7, 9, and 11 appear to be positively impacting the measured outcome, as they show a significantly higher proportion of scores above the median compared to the control group.
- **Potential negative or no impact:** Group 10, in contrast, may have a negative or no discernible impact, as it has a higher concentration of scores at or below the median compared to the control group.
- **Mixed or minimal impact:** Group 8's results are more equivocal, with a nearly even split between scores above and below the median, suggesting a less pronounced effect compared to groups 7, 9, and 11, but potentially better than Group 10.

SUMMARY OF FINDINGS

The median tests for Tier 1 and Tier 2 provide further evidence that several of the communication specializations, **Political Communication** (Group 7), **Interpersonal Communication** (Group 9), and **Organizational Communication** (Group 11), are associated with a greater proportion of higher citations compared to the control group. The Mann-Whitney test, which relies on ranks rather than frequencies, is another nonparametric option to analyze similar data. In contrast, the specialization in **Visual Communication** (Group 10), seems to be associated with lower citations, and the effect of **Digital Communication's** (Group 8) specialization is less clear. These findings highlight the varying impact of different communication specializations on the measured outcome. All the communication experimental groups were the result of a Google Scholar search "in the title of the article" and the two control groups were the result of a Google scholar search "anywhere in the article." The dependent variable of the citation count represents "Cited By" data. Tier 1 and Tier 2 comparisons indicate the importance of including an area of communication in the title of the article, as this treatment was related to increased citation counts.

For Tier 1 data:

- **Experimental groups (1, 3, 4, 5)**, where a communication specialization was in the title, performed significantly better in terms of citation counts compared to the control group (Group 6), where the specialization could appear anywhere.
- The median test showed that a substantially higher proportion of articles in these experimental groups had citation counts above the overall median, while the control group had a much lower proportion.
- **Experimental Group 2**, which had the specialization in its title but did not differ significantly from the control group, may represent a less impactful or niche specialization area that attracts fewer citations regardless of title placement.

For Tier 2 data:

- Similar to Tier 1, **experimental groups (7, 9, 11)**, with the specialization in the title, showed significantly higher citation counts than the control group (Group 12).
- The median test confirmed that these groups had a greater proportion of articles with above-median citation counts.
- **Experimental Group 10**, like Group 2 in Tier 1, did not show a statistically significant difference from the control group in the pairwise comparison and performed poorly in the median test. This further reinforces the idea that not all specializations benefit equally from prominent title placement. Therefore, **Dispute Resolution** and **Visual Communication** were the only experimental groups that did not benefit from appearing in the title of the article.

CONCLUSIONS

In short, the analysis offers compelling evidence that strategic use of keywords in the title is a powerful and generally effective tool for maximizing citation counts in the communication field, though its impact can vary depending on the specific area of specialization.

- **Strong evidence for title optimization:** The data provides robust evidence that including a specific communication area in an article's title is highly effective for increasing citation counts, especially for most specializations. This is likely due to enhanced search engine visibility, as search algorithms prioritize keywords in titles.
- **Variable effectiveness across specializations:** Not all communication subfields benefit equally from having their name in the title. Some specializations, like those in Groups 2 (Dispute Resolution) and 10 (Visual Communication), did not show a significant citation advantage from this practice. This could be due to factors such as:

- **Niche topics:** Less popular or highly specialized topics may have smaller potential citing audiences, regardless of how they are framed.
- **Established fields:** Some mature subfields may already have well-defined citation patterns, where title optimization offers minimal additional benefit.
- **Methodological importance:** This study design, using the control condition of "anywhere in the article," demonstrates the differential impact of title placement versus general keyword presence. It suggests that a search engine's ranking algorithm places a greater weight on title keywords, boosting visibility and, subsequently, citations.

Based on the analysis of Tier 1 and Tier 2 data, the findings strongly suggest that including a specific area of communication in the **title** of an academic article significantly and positively affects its citation count. The study's design, comparing articles where a communication specialization was explicitly in the title versus articles where it appeared anywhere in the text, demonstrates the powerful effect of a well-targeted title on research visibility. The test of the empirical data confirms the broadly taught recommendation made by librarians that searches for subject matter in the title of the article has specific benefits. The data clearly indicates an increased magnitude in citation counts when the area of communication specialization appears in the title of the article, compared to anywhere in the article.

SIX RECOMMENDATIONS

- I. **For researchers, we recommend:**
 - ✓ **Prioritize title keywords:** Researchers in communication fields should be strategic about including their specific area of specialization directly in the article title.
 - ✓ **Identify impactful specializations:** Before publication, researchers should consider the likely visibility of their subfield. If their topic falls into a specialization like those in Groups 2 and 10, other strategies beyond the title (e.g., promotional efforts, targeting high-impact journals) may be more beneficial for increasing citations.
- II. **For publishers and journal editors, we recommend:**
 - ✓ **Educate authors:** Journals should provide clear guidelines and possibly workshops for authors on the importance of title keyword optimization.
 - ✓ **Assess citation practices:** This study's findings indicate that different subfields have different citation patterns. Journals and fields could benefit from more research into why certain areas show higher citation responsiveness to title keywords than others.
- III. **For search engine developers (like Google Scholar), we recommend:**
 - ✓ The study implicitly confirms that title keywords are a critical component of Google Scholar's ranking algorithm. Enhancing transparency on how ranking works could further aid academic authors in improving the discoverability and impact of their work.
- IV. **For weaving subfields, we recommend:**
 - ✓ Authors can strengthen their visibility in databases like Google Scholar by weaving specific communication subfields (e.g., Intercultural Communication, Health Communication) directly into their article titles.
- V. **For going beyond title searches, we recommend:**
 - ✓ When working in areas that tend to draw fewer citations, such as Legal Communication or Small Group Communication, it's worth going beyond title optimization. Authors should consider additional strategies that increase visibility like sharing their work through professional networks, conferences, and social media with relevant hashtags or tags.
- VI. **For journals requiring key terms in titles, we recommend:**
 - ✓ Journals can also play a role by encouraging (or requiring) authors to use field-specific keywords in their titles. They might even offer training sessions or build automated tools that suggest ways to refine titles for better reach and citation potential.

REFERENCES

- Aroon, M.A., Ismail, A.F., Matsuura, T., & Montazer-Rahmati, M.M. (2010). Performance studies of mixed matrix membranes for gas separation: A review. *Separation and Purification Technology*, 75(3), 229–242. <https://doi.org/10.1016/j.seppur.2010.08.023>
- Aufderheide, P. (n.d.). Media literacy: From a report of the National Leadership Conference on Media Literacy. In *Media literacy around the world* (1st ed., p. 8). Routledge.
- Bacow, L.S., & Wheeler, M. (1984). *Environmental dispute resolution*. Springer US. Retrieved from <https://books.google.com/books?id=aC0vIIP5zz0C>
- Ball, R. (2009). Scholarly communication in transition: The use of question marks in the titles of scientific articles in medicine, life sciences and physics 1966–2005. *Scientometrics*, 79(3), 667–679.
- Baram-Tsabari, A., & Osborne, J. (2015). Bridging science education and science communication research. *Journal of Research in Science Teaching*, 52(2), 135–144. <https://doi.org/10.1002/tea.21202>
- Baran, S.J. (2004). *Introduction to mass communication: Media literacy and culture*. McGraw-Hill. Retrieved from <https://books.google.com/books?id=4uC5SBRRcqcC>
- Barry, J.R., Lee, E.A., & Messerschmitt, D.G. (2004). *Digital communication* (3rd ed.). Springer US. Retrieved from <https://books.google.com/books?id=hPx70ozDJlWc>
- Bell, R.L. (2013). Management journals and the celebrity researcher effect on tiers. *Journal of Leadership, Accountability, and Ethics*, 10, 44–62.
- Bell, R.L., & Chong, H.G. (2010). A caste and class among the relative frequency of faculty's publications: A content analysis of refereed business journals. *Journal of Leadership, Accountability and Ethics*, 8(1), 65–89.
- Bell, R.L., & Martin, J.S. (2019). *Managerial communication for organizational development*. Business Expert Press.
- Bennett, W.L., & Iyengar, S. (2008). A new era of minimal effects? The changing foundations of political communication. *Journal of Communication*, 58(4), 707–731. <https://doi.org/10.1111/j.1460-2466.2008.00410.x>
- Burns, C.S., & Islam, M.A. (2024). A citation analysis examining geographical specificity in article titles. *Scientometrics*, 129(7), 4317–4328.
- Carlson, M. (2013). *Performance: A critical introduction*. Routledge. <https://doi.org/10.4324/9781315016153>
- Cheney, G., Christensen, L.T., Zorn, T.E., & Ganesh, S. (2010). *Organizational communication in an age of globalization: Issues, reflections, practices* (2nd ed.). Waveland Press. Retrieved from <https://books.google.com/books?id=TcQSAAAAQBAJ>
- Chou, W.S., Hunt, Y.M., Beckjord, E.B., Moser, R.P., & Hesse, B.W. (2009). Social media use in the United States: Implications for health communication. *Journal of Medical Internet Research*, 11(4), e48. <https://doi.org/10.2196/jmir.1249>
- Cooper, A., Purnsley, B., Washington, F., & Bell, R.L. (2023). Is the leadership for diversity, equity, and inclusion here to stay? *Journal of Organizational Culture Communications and Conflict*, 27(1), 1–9.
- Cortés, P. (2010). *Online dispute resolution for consumers in the European Union* (1st ed.). Routledge. <https://doi.org/10.4324/9780203847756>
- Dahama, O.P. (2019). *Education and communication for development*. Oxford & IBH Publishing Company. Retrieved from <https://books.google.com/books?id=c9v8zvAWGegC>
- DeVito, J. (2019). *The interpersonal communication book* (15th ed.). Pearson. Retrieved from <https://www.pearsonhighered.com/assets/preface/0/1/3/4/0134624440.pdf>
- Diao, J. (2021). A lexical and syntactic study of research article titles in library science and scientometrics. *Scientometrics*, 126(7), 6041–6058.

- Downs, C.W., & Adrian, A.D. (2012). *Assessing organizational communication: Strategic communication audits*. Guilford Publications. Retrieved from <https://books.google.com/books?id=-ZTBhw1gn0YC>
- Drummond, G.B., & Vowler, S.L. (2012). Type I: Families, planning and errors. *The Journal of Physiology*, 590(20), 4971–4974. <https://doi.org/10.1113/jphysiol.2012.244061>
- Duggal, P., Gillanders, E.M., Holmes, T.N., & Bailey-Wilson, J.E. (2008). Establishing an adjusted p-value threshold to control the family-wide type 1 error in genome wide association studies. *BMC Genomics*, 9(1), 516.
- Erickson, R.C., & Wentling, T.L. (1976). *Measuring student growth: Techniques and procedures for occupational education*. Allyn & Bacon.
- Fei, Q., & Bell, R. (2013). Marketing journal ranking, celebrity authors, and the diminishing quality gap. *Mustang Journal of Management & Marketing*, 3, 16–30.
- Grunig, J., & Grunig, L. (n.d.). Models of public relations and communication. In *Excellence in public relations and communications management* (1st ed., p. 41). Routledge.
- Grunig, J.E. (Ed.). (2013). *Excellence in public relations and communication management*. Routledge. <https://doi.org/10.4324/9780203812303>
- Hargie, O. (2021). *Skilled interpersonal communication: Research, theory and practice* (7th ed.). Routledge. <https://doi.org/10.4324/9781003182269>
- Hörnle, J. (2009). *Cross-border internet dispute resolution*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511576102>
- Hudson, J. (2016). An analysis of the titles of papers submitted to the UK REF in 2014: Authors, disciplines, and stylistic details. *Scientometrics*, 109(2), 871–889.
- Jandt, F.E. (2017). *An introduction to intercultural communication: Identities in a global community*. SAGE Publications. Retrieved from <https://books.google.com/books?id=dX5ZDwAAQBAJ>
- Jimenez, S., Avila, Y., Dueñas, G., & Gelbukh, A. (2020). Automatic prediction of citability of scientific articles by stylometry of their titles and abstracts. *Scientometrics*, 125(3), 3187–3232.
- Katherine Miller, & Jason Barbour. (n.d.). *Organizational communication: Approaches and processes*. Cengage.
- Kruskal, W.H., & Wallis, W.A. (1952). Use of ranks in one-criterion variance analysis. *Journal of the American Statistical Association*, 47(260), 583–621. <https://doi.org/10.1080/01621459.1952.10483441>
- Lee, E.A., & Messerschmitt, D.G. (1994). *Digital communication*. Kluwer Academic Publishers. Retrieved from <https://books.google.com/books?id=IHgbmEgLO9YC>
- Martin, J.N., & Nakayama, T.K. (2017). *Intercultural communication in contexts*. McGraw-Hill Education. Retrieved from <https://books.google.com/books?id=SxzzoQEACAAJ>
- McNair, B. (2017). *An introduction to political communication* (6th ed.). Routledge. <https://doi.org/10.4324/9781315750293>
- Moorhead, S.A., Hazlett, D.E., Harrison, L., Carroll, J.K., Irwin, A., & Hoving, C. (2013). A new dimension of health care: Systematic review of the uses, benefits, and limitations of social media for health communication. *Journal of Medical Internet Research*, 15(4), e85. <https://doi.org/10.2196/jmir.1933>
- Nagano, R. (2009). Lexical comparison of journal article titles in soft disciplines. *Porta Lingua*, 2009.
- Nagano, R.L. (2015). Research Article Titles and Disciplinary Conventions: A Corpus Study of Eight Disciplines. *Journal of Academic Writing*, 5(1), Article 1. <https://doi.org/10.18552/joaw.v5i1.168>
- Nicholson, K.J., Sherman, M., Divi, S.N., Bowles, D.R., & Vaccaro, A.R. (2022). The role of family-wise error rate in determining statistical significance. *Clinical spine surgery*, 35(5), 222–223.
- Osorio, D., & Vorobyev, M. (2008). A review of the evolution of animal colour vision and visual communication signals. *Vision Research*, 48(20), 2042–2051. <https://doi.org/10.1016/j.visres.2008.06.018>
- Potter, W.J. (2013). *Media Literacy*. SAGE Publications. Retrieved from <https://books.google.com/books?id=TtMwJ85nK2UC>

- Prof. Dr. Yoesoep Edhie Rachmad, D.B.A. (2024). *Interpersonal Communication Theory*.
<https://doi.org/10.17605/OSF.IO/5XG6U>
- Rachmad, Y.E. (n.d.). *Interpersonal Communication Theory*. <https://doi.org/10.17605/OSF.IO/5XG6U>
 San Francisco Edit. (2024, August 26). Literature search strategies in science: A step-by-step approach.
 Retrieved from <https://www.sfedit.net/literature-search-strategies-in-science-a-step-by-step-approach/#:~:text=This%20precision%20can%20drastically%20reduce%20the%20volume,returned%20are%20focused%20primarily%20on%20that%20topic>.
- Schechner, R., & Schechner, R. (2017). *Performance Studies: An Introduction* (0 ed.). Routledge.
<https://doi.org/10.4324/9780203125168>
- Schiavo, R. (2011). *Health Communication: From Theory to Practice*. Wiley. Retrieved from
<https://books.google.com/books?id=MJKcl26umKYC>
- Schill, D. (2012). The Visual Image and the Political Image: A Review of Visual Communication Research in the Field of Political Communication. *Review of Communication*, 12(2), 118–142.
<https://doi.org/10.1080/15358593.2011.653504>
- Scollon, R., Scollon, S.W., & Jones, R.H. (2011). *Intercultural Communication: A Discourse Approach*. Wiley. Retrieved from <https://books.google.com/books?id=rmgta7ePMi4C>
- Silverman, D.A., & Smith, R.D. (2024). *Strategic Planning for Public Relations* (7th ed.). Routledge.
<https://doi.org/10.4324/9781003348467>
- Singhal, A., & Rogers, E. (2012). *Entertainment-Education: A Communication Strategy for Social Change* (0 ed.). Routledge. <https://doi.org/10.4324/9781410607119>
- Van Aelst, P., Strömbäck, J., Aalberg, T., Esser, F., De Vreese, C., Matthes, J., Hopmann, D., Salgado, S., Hubé, N., Stępińska, A., Papathanassopoulos, S., Berganza, R., Legnante, G., Reinemann, C., Sheafer, T., & Stanyer, J. (2017). Political communication in a high-choice media environment: A challenge for democracy? *Annals of the International Communication Association*, 41(1), 3–27. <https://doi.org/10.1080/23808985.2017.1288551>
- Viterbi, A.J., & Omura, J.K. (2013). *Principles of Digital Communication and Coding*. Dover Publications. Retrieved from <https://books.google.com/books?id=oGbDAgAAQBAJ>
- Wang, J. (2024). Quantifying cohesion in high citation research article titles: a cross-disciplinary and diachronic investigation. *Scientometrics*, 129(9), 5075-5102.
- Worth, S. (2016). *Studying Visual Communication*. University of Pennsylvania Press.