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Application of Mann-Whitney U-test in the Analysis of Gender-based Leadership and Collaborative Scholarly Writing Performance

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Abstract
The study investigated the gender-based variations in scholarly writing performance in a collaborative book with a focus on leadership. The study adopted a comparative research design, guided by four research objectives and corresponding hypotheses. The collaborative book writing involved contributions from 73 authors across 30 chapters, of which 16 were led by male authors, and 14 were led by female authors. The 30 chapters were subjected to Grammarly Software to determine the performance of the authors in a collaborative scholarly writing task. The study meticulously analyzed variables such as overall writing performance (text quality), word count metrics (characters, words, sentences), readability patterns (word length, sentence length, overall readability score), and vocabulary richness (unique words, rare words). Descriptive statistics such as mean, standard deviation, ranking and graphs were used to answer the research questions whereas the Mann-Whitney U-test was used to test the hypotheses at a .05 level of significance. The findings established among others that the gender of the lead author had no significant influence on the overall writing performance and vocabulary richness. However, subtle variations were identified in readability patterns, specifically in sentence length. These methodologically robust findings challenge preconceptions about gender-specific writing tendencies and provide a foundation for targeted recommendations to enhance equity in collaborative scholarly writing.

Keywords: Gender Dynamics, Collaborative Writing, Scholarly Communication, Gender-Based Leadership, Book

Introduction

In the realm of contemporary academia, an in-depth exploration of gender dynamics has become essential for comprehending the complex factors that shape collaborative research initiatives. This study takes on the challenge of unravelling the intricate interplay between gender-based leadership roles and the performance of collaborative scholarly writing in the academic domain. Collaborative scholarly writing, a cornerstone of academic output often manifested in co-authored publications, holds a fundamental position in shaping the intellectual landscape across diverse disciplines. While various studies have scrutinized gender-based disparities in academia, this research uniquely aims to uncover the specific influence of gendered leadership on the collective writing performance of research teams. Navigating the collaborative landscape within academia involves a series of intricate processes, where leadership roles play a pivotal function in steering the direction of scholarly endeavours. By honing in on collaborative writing performance encompassing variables such as text quality, word count metrics, readability patterns, and vocabulary richness—this study seeks to discern potential gender-related patterns. The examination extends beyond mere authorship representation, delving into the leadership roles assumed within collaborative writing projects and their potential impact on the overall quality of scholarly output. As gender diversity and equity continue to garner increased attention within academic circles, unravelling the dynamics of leadership in collaborative writing becomes imperative. The findings of this study may contribute not only to the understanding of gender-based influences on scholarly output but also to the formulation of inclusive strategies aimed at fostering an equitable research environment. In exploring the intersection of gender, leadership, and collaborative writing, this research endeavours to shed light on the multifaceted dimensions shaping the contemporary academic landscape. In recent years, discussions surrounding gender equality and diversity within academia have gained momentum, prompting a critical examination of power structures and leadership dynamics. While strides have been made, disparities persist, influencing the collaborative processes that underpin knowledge creation and dissemination. This study, situated at

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the intersection of gender, leadership, and collaborative scholarly writing, seeks to contribute empirical insights into how leadership roles, particularly in collaborative book writing, may intersect with gender and impact the overall quality of scholarly output.

The collaborative nature of contemporary research, often materialized in collaborative book projects involving numerous authors, provides a rich context to investigate gendered leadership patterns. The diverse perspectives and skills that contributors bring to such projects make them an ideal setting to explore potential variations in writing performance attributable to gender-based leadership roles. By scrutinizing writing quality, linguistic attributes, and readability metrics, this research aims to uncover patterns that may exist within the collaborative writing process and evaluate their implications. By delving into the intricate relationship between gender, leadership, and collaborative scholarly writing, this study aspires to contribute valuable insights that extend beyond mere quantitative representation. Understanding how leadership roles, often influenced by gender dynamics, shape collaborative writing outcomes is pivotal for fostering inclusive academic environments. The study aims to illuminate the complexities within the collaborative writing landscape, offering a foundation for future discussions and interventions aimed at promoting gender equity and diversity in academic collaborations.

Historically, gender disparities have persisted across various academic disciplines, shaping the trajectories of researchers, especially women, within collaborative environments. These imbalances often manifest in the allocation of lead authorship positions, influencing not only individual career trajectories but also the overall landscape of collaborative research. Understanding the roots of these disparities is essential for creating more inclusive and equitable academic spaces. Ma et al. (2023) conducted an empirical study utilizing BERT-based textual sentiment analysis to explore gender differences in research performance in academic articles. The findings showed that articles with female first authors exhibit lower impact and a less positive writing style compared to those with male first authors. The study provides insights into gender-related disparities in academic research and discusses the theoretical and managerial implications of the results. Baerlocher et al. (2007) found that the first authors generally have the highest levels of participation, followed by the last authors, then the second authors. Middle authors exhibit lower levels in specific contributions. The findings prompt a proposal for a nuanced author classification system ("primary," "contributing," or "senior or supervisory") to enhance clarity in author accountability and roles, providing insights into evolving authorship conventions in academic publishing. In their study, Powell et al. (2022) aimed to investigate trends in female authorship in orthopaedic surgery over the past 25 years, focusing on first and senior authors. The study identified 5,636 first authors and 4,572 senior authors, with sex determined for 82.59% of authors. Female first authorship significantly increased from 6.70% to 15.37% over the studied period, with differences among journals. While the increase in female senior authorship was not statistically significant, women were more likely to publish as first or senior authors in later years, indicating progress in gender representation. Walker (2020) investigated the representation of female authors and reviewers in entomology journals from 2001 to 2017, finding significant underrepresentation in comparison to male counterparts. The findings indicated that, while there is a slow increase in the proportions of female first authors and reviewers over time, progress is modest, approximately 1% annually for both roles. The study suggests potential contributing factors such as peer review, research funding levels, time availability, and women's self-confidence and collaboration in science.

Rigg et al. (2012) investigated the gender differences in publication productivity in the field of geography, focusing on peer-reviewed articles published in prominent journals such as the Annals of the Association of American Geographers and The Professional Geographer. The findings revealed clear gender disparities in authorship positions, collaboration rates, and citation frequencies across the studied journals. Women were consistently underrepresented, particularly in authorship positions associated with prestige and merit. While collaborative publication increased over the study period, single-authored papers remained dominant for both genders. The study noted that, despite high collaboration rates for women, male authors, particularly in lead or single-author roles, still predominantly shaped the voice of geography within the examined journals. DeFilippis et al. (2021) found a significant improvement in the representation of women as key authors during the early COVID-19 pandemic. However, women were less likely to be the first authors of COVID-19-related original research manuscripts. In a related study by Liu et al. (2022) examining gender inequalities in coronavirus-related research fields before and during the COVID-19 pandemic. Utilizing a difference-in-differences approach, the study analyzed publication data and investigated several aspects, including authorships, leadership, collaboration, and scientific impacts. The findings revealed that, during the pandemic, there was a negative impact on females' leadership in publications as the first author. Although both genders published more papers, the gender gap in the share of authorships increased due to a larger increase in males'

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authorships. The share of publications by mixed-gender collaboration declined, and papers, where females played a key role, were less cited, exacerbating existing citation disadvantages. The study indicated that gender inequalities regarding authorships and collaboration were enhanced in the initial stage of COVID-19, widened with the increasing severity, and returned to pre-pandemic levels by September 2020.

The study by Abramo et al. (2021) investigates gender differences in research performance among professors in the Italian university system, particularly in the hard sciences. Findings reveal a skewed gender distribution, with only 35.8% of women on academic staff, and a decreasing trend in female representation across academic ranks. The study emphasizes the importance of accounting for gender differences in performance evaluations, with potential implications for recruitment, career advancement, and incentive schemes in academia. A related study by Mauleon and Bordons (2006) conducted a comparative analysis of the scientific performance of male and female scientists in the field of Materials Science at the Spanish Council for Scientific Research (CSIC). The findings revealed that, while women were generally less productive than men, no significant differences in productivity were found within each professional category. However, the study identified a different life cycle of productivity for men and women, with the most significant inter-gender differences occurring at the ages of 40-59. Van den Besselaar and Sandstrom (2016) investigated gender differences in research performance and their impact on careers, focusing on changes over 10 years in the early stages of researchers' careers. The study, utilizing various performance indicators, found that while the productivity of male researchers increased more than that of females over the decade, the field-normalized citation impact indicators remained relatively equal. The results indicated that performance differences did contribute to the faster development of male careers, but even after controlling for performance, gender remained a significant determinant, suggesting ongoing bias in the academic hiring process. A study by Zhang et al. (2020) revealed that female scientists exhibited better academic performance and experienced significant improvement through international collaboration when compared to their male counterparts. The study suggests potential advantages for female scientists engaging in international collaboration and discusses policy implications.

Abramo et al. (2013) address the gender gap in academic research collaboration through a novel bibliometric approach. Their study explores collaborative tendencies across various forms, revealing that women researchers in Italy exhibit a greater capacity to collaborate, except in international collaborations where a gap persists compared to male colleagues. The article contributes insights to the broader discourse on women in academia, informing policies and interventions aimed at tackling underlying factors influencing gender dynamics in research collaborations. Nunkoo et al. (2020) revealed evidence of gender homophilic collaboration behaviours, with increasing gender heterogeneous co-authorships driven by female first authors. Solo female researchers were strongly associated with qualitative research, while male-only teams showed the lowest likelihood of using qualitative methods. The study suggests practical strategies for promoting gender-diverse collaborations and encouraging female-led research in the tourism field. Abramo et al. (2019) investigated collaboration patterns among top scientists in the Italian academic system. The findings indicate a significant increase in domestic collaboration, less pronounced among top performers, and a substantial rise in international collaboration, particularly beneficial for those achieving top scientist status. The study contributes valuable insights into the nuanced relationship between collaboration behaviour and academic performance, informing strategies for research optimization within academic contexts.

In a study by Horbach et al. (2022), the focus is on exploring gender differences in funding applications within academia, particularly in the natural and technical sciences. Analyzing 1560 full-text applications subjected to double-blind review at a Danish private funder, the study explores patterns in positive word usage, readability, concreteness, and sentiment. In contrast to previous findings suggesting significant differences in writing styles, this study reveals minimal distinctions between men and women in their writing styles. The conclusion drawn is that writing styles are unlikely to be a significant factor contributing to skewed funding patterns in the natural and technical sciences. The study emphasizes the importance of designing funding programmes that ensure fair opportunities for all applicants, irrespective of gender. Van den Besselaar and Sandström (2017) investigate gender-based productivity differences in academic research, challenging the notion that, on average, female researchers publish less but exhibit equal impact. Analyzing a Swedish dataset of 47,000 researchers, the study finds a consistent positive relationship between productivity and impact for both genders. Interestingly, disciplinary demography plays a role, with a lower share of women associated with higher impact within the same productivity class. The numerical dominance of male researchers in higher productivity classes results in an overall 70% male productivity, showcasing persistent numerical imbalances. Factors such as age, authorship position, and academic rank explain a significant portion of gendered productivity differences. Notably, the underrepresentation of women in the last author's positions negatively impacts

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productivity, creating a self-reinforcing dynamic. The study emphasizes the importance of gender equality policies to break the cycle of gendered productivity differences, providing valuable insights for ongoing efforts in academia. Alqahtani and Abdelhalim (2020) conducted a study investigating gender differences in the usage of interactive metadiscourse markers in EFL academic essays. The study revealed statistically significant differences, with female students outperforming males in using transitions, frame markers, and code glosses. The qualitative analysis delved into the contextual functions of these markers, attributing gender differences to psychological and cultural variations among students. The study not only contributes valuable insights into gender-based variations in metadiscourse markers but also offers implications for researchers, writing teachers, and textbook publishers aiming to enhance metadiscoursal proficiency in EFL writing classrooms.

Shen and Joseph (2021) address the fragmented and incomplete nature of the gender and leadership literature by employing Campbell et al.'s (1993) theory of job performance as a comprehensive framework. The review finds that gender influences leadership outcomes, behaviours, and related determinants. They highlight the intricate relationships between gender and leadership, showcasing direct and indirect effects. The study also emphasizes gender as a moderator, revealing nuances in unequal attributes and effects. The findings underscore the complexity of the gender and leadership dynamic, calling for a comprehensive research agenda to enhance understanding. Wang and Degol's (2017) review delves into the gender gap in STEM fields, analyzing research from psychology, sociology, economics, and education. They identify six explanations for the underrepresentation of women in math-intensive STEM: cognitive ability, relative cognitive strengths, occupational interests, lifestyle values, field-specific ability beliefs, and gender-related stereotypes. The study explores both biological and sociocultural factors influencing gender differences in cognitive and motivational aspects, pinpointing relevant developmental periods. The authors conclude with evidence-based recommendations for fostering STEM diversity and propose future research directions.

Statement of the problem

The concern of this study revolves around the potential gender-based disparities in scholarly writing performance within a collaborative book, particularly focusing on the influence of leadership roles. Given the increasing emphasis on diversity and inclusion in academic settings, understanding whether and how gender impacts writing styles, word count, readability, and vocabulary use is crucial. This study seeks to address the gap in knowledge regarding these disparities, aiming to provide insights that contribute to a more equitable and informed academic landscape.

Aim and objectives of the study.

The study aims to investigate the gender-based variations in scholarly writing performance in a collaborative book with a focus on leadership. Specifically, the objectives of the study are to:

1. Assess the influence of gender-based leadership on the overall scholarly writing performance of contributors in a collaborative book.
2. Examine the influence of gender-based leadership on word count within contributed chapters in terms of characters, words, and sentences.
3. Investigate the readability of chapters led by male and female scholars, considering factors like word length, sentence length, and overall readability score.
4. Examine the vocabulary richness within chapters based on the gender of the lead author, in terms of unique words and rare words usage.

Hypotheses

The following hypotheses were tested at a .05 level of significance.

H_{01}: There is no significant influence of gender-based leadership on the overall scholarly writing performance of contributors in a collaborative book.

H_{02}: Gender-based leadership has no significant impact on word count within contributed chapters in terms of characters, words, and sentences.

H_{03}: There are no significant differences in the readability patterns of chapters led by male and female scholars, considering factors such as word length, sentence length, and overall readability score.

H_{04}: There is no significant variation in vocabulary richness within chapters based on the gender of the lead author, in terms of unique words and rare words usage.

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Methodology

The research employed a comparative research design to investigate collaborative book writing, encompassing contributions from 73 authors distributed across 30 chapters. Among these chapters, 16 were spearheaded by male authors, while 14 were led by female authors. To assess the authors' performance in this collaborative scholarly writing endeavour, Grammarly Software was utilized to scrutinize the 30 chapters. The study meticulously examined various variables, including overall writing performance (text quality), word count metrics (characters, words, sentences), readability patterns (word length, sentence length, overall readability score), and vocabulary richness (unique words, rare words). Hypotheses were tested using the Mann-Whitney U-test at a significance level of .05. The adoption of the Mann-Whitney U-test in this study was driven by the need for a robust statistical analysis method suitable for comparing independent samples. Given the nature of the research design, which involved distinct groups led by male and female authors, the Mann-Whitney U-test was deemed appropriate for evaluating potential differences in the measured variables. This non-parametric test is well-suited for ordinal or continuous data when assumptions for parametric tests are not met or when dealing with small sample sizes. The study sought to systematically evaluate and make significant findings on the collaborative book writing performance of male-led and female-led chapters in a scholarly setting by using this test at a 0.05 level of significance.

Mann Whitney U Test

The Mann Whitney U test, sometimes call the Mann Whitney Wilcoxon Test or the Wilcoxon Rank Sum Test, is used to test whether two samples are likely to drive from the same population (i.e., that the two population have the same shape). Some investigators interpret this test as comparing the medians between the two populations.
Determine the test statistics (U);

$$U_1 = n_1n_2 + \frac{n_1(n_1+1)}{2} - \Sigma R_1$$

$$U_2 = n_1n_2 + \frac{n_2(n_2+1)}{2} - \Sigma R_2$$

Where:

R is the rank of the group,

n_1 and n_2 are the sizes of the groups 1 and 2 respectively.

Check the value of U_1 and U_2.

Find U which is the smallest between U_1 and U_2.

Results

H_{01}: There is no significant influence of gender-based leadership on the overall scholarly writing performance of contributors in a collaborative book.

The Mann-Whitney U test was conducted to examine whether there is a significant difference in the overall scholarly writing performance between contributors led by male and female authors in a collaborative book.

Table 1: Summary of Mann-Whitney U-test on gender-based leadership on the overall scholarly writing performance of contributors in a collaborative book

Gender	N	Mean Rank	Sum of Ranks	U	W	Z	p
Male	16	16.09	257.5	102.5	207.5	-0.395	0.693
Female	14	14.82	207.5				

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The results yielded a U statistic of 102.5 and a Z-score of -0.395 with an associated p-value of 0.693. The Z-score measures how many standard deviations the U statistic is from the expected mean under the null hypothesis. In this case, the negative Z-score (-0.395) suggests that the male-led contributions have, on average, slightly lower ranks than the female-led contributions. The p-value associated with the Mann-Whitney U test is 0.693. Since this p-value is greater than the conventional significance level of 0.05, we fail to reject the null hypothesis. Therefore, based on the Mann-Whitney U test, there is no statistically significant difference in the overall scholarly writing performance between contributors led by male and female authors in the collaborative book.

H_{02}: Gender-based leadership has no significant impact on word count within contributed chapters in terms of characters, words, and sentences.

The Mann-Whitney U test was employed to assess the influence of gender-based leadership on word count within contributed chapters in terms of characters, words, and sentences.

Table 2: Summary of Mann-Whitney U-test on gender-based leadership on word count within contributed chapters in terms of characters, words, and sentences.

Variable	Gender	N	Mean Rank	Sum of Ranks	U	W	Z	P
Characters	Male	16	14.00	224.00	88.00	224.00	-.998	.318
	Female	14	17.21	241.00				
Words	Male	16	13.56	217.00	81.00	217.00	-1.289	.198
	Female	14	17.71	248.00				
Sentences	Male	16	13.00	208.00	72.00	208.00	-1.663	.096
	Female	14	18.36	257.00				

Characters: The U statistic was 88.00 with a corresponding Z-score of -0.998 and a p-value of 0.318. **Words:** The U statistic was 81.00, the Z-score was -1.289, and the p-value was 0.198. **Sentences**: The U statistic was 72.00, the Z-score was -1.663, and the p-value was 0.096. The negative Z-scores indicate that, on average, chapters led by male authors had slightly lower ranks in terms of word count than those led by female authors. However, none of the p-values reached the conventional significance level of 0.05. Consequently, the null hypothesis (H02) was retained for all variables, suggesting that there is no statistically significant difference in word count within contributed chapters based on gender-based leadership. These results imply that the gender of the lead author does not exert a significant impact on the length or structure of written contributions in the collaborative book.

H_{03}: There are no significant differences in the readability patterns of chapters led by male and female scholars, considering factors such as word length, sentence length, and overall readability score.

The Mann-Whitney U test was conducted to determine whether there are significant differences in the readability patterns of chapters led by male and female scholars. The results for each variable (Word Length, Sentence Length, and Readability Score) are summarized below:

Table 3: Summary of Mann-Whitney U-test on differences in the readability patterns of chapters led by male and female scholars, considering factors such as word length, sentence length, and overall readability score

Variable	Gender	N	Mean Rank	Sum of Ranks	U	W	Z	P
Word length	Male	16	17.00	272.00	88.000	193.000	-1.016	.310
	Female	14	13.79	193.00				
Sentence length	Male	16	18.47	295.50	64.500	169.500	-1.975	.048
	Female	14	12.11	169.50				
Readability score	Male	16	12.78	204.50	68.500	204.500	-1.812	.070
	Female	14	18.61	260.50				

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Word Length: The U statistic was 88.00 with a corresponding Z-score of -1.016 and a p-value of 0.310. **Sentence Length:** The U statistic was 64.50 with a corresponding Z-score of -1.975 and a p-value of 0.048**. Readability Score:** The U statistic was 68.50 with a corresponding Z-score of -1.812 and a p-value of 0.070. The p-values associated with each variable are as follows: 0.310 for Word Length, 0.048 for Sentence Length, and 0.070 for Readability Score. The p-value for Sentence Length (0.048) is less than the conventional significance level of 0.05, suggesting a statistically significant difference. However, the p-values for Word Length (0.310) and Readability Score (0.070) are greater than 0.05. Therefore, based on the Mann-Whitney U test, there is a significant difference in Sentence Length between chapters led by male and female scholars. However, there are no significant differences in Word Length and Readability Score. This indicates that, on average, chapters led by male authors may exhibit variations in sentence complexity compared to those led by female authors, while other readability aspects remain comparable.

H_{04}: There is no significant variation in vocabulary richness within chapters based on the gender of the lead author, in terms of unique words and rare words usage.

The Mann-Whitney U test was conducted to assess whether there is significant variation in vocabulary richness within chapters based on the gender of the lead author, specifically in terms of unique words and rare word usage. The results for each variable are summarized below:

Table 4: Summary of Mann-Whitney U-test on variation in vocabulary richness within chapters based on the gender of the lead author, in terms of unique words and rare words usage

Variable	Gender	N	Mean Rank	Sum of Ranks	U	W	Z	P
Unique words	Male	16	16.44	263.00	97.00	202.00	-.626	.531
	Female	14	14.43	202.00				
Rare words	Male	16	14.69	235.00	99.00	235.00	-.545	.586
	Female	14	16.43	230.00				

Unique Words: U statistic: 97.00, Z-score: -0.626, p-value: 0.531**. Rare Words:** U statistic: 99.00, Z-score: -0.545, p-value: 0.586**.** The p-values associated with each variable are 0.531 for Unique Words and 0.586 for Rare Words. Both p-values are greater than the conventional significance level of 0.05, suggesting that there is no statistically significant variation in vocabulary richness within chapters based on the gender of the lead author. Therefore, the null hypothesis (H04) is retained. These findings imply that the gender of the lead author does not exert a significant influence on the diversity of unique or rare words used within chapters in the collaborative book

Discussion

Gender-Based Leadership and Scholarly Writing Performance

The investigation into the relationship between gender-based leadership and scholarly writing performance sought to uncover potential differences in collaborative academic endeavours. The primary question centred on whether the gender of the lead author holds any sway over the overall quality of written contributions in a collaborative book. Contrary to initial expectations, the study's findings provided insights that challenge preconceived notions about the impact of gender on scholarly writing. The core metric for evaluating scholarly writing performance was the text quality scores assigned to chapters led by male and female scholars. The expectation was that gender might influence the overall quality of the written content. However, the analysis yielded no statistically significant difference in text quality scores between the two gender groups. This unexpected result prompts a closer examination of the intricate dynamics at play within the collaborative book. The absence of a significant difference in text quality scores suggests that, within the specific context of this collaborative book, the gender of the lead author may not be a determining factor in shaping the overall scholarly writing performance of contributors. Several factors could contribute to this result, including a collaborative and inclusive writing process that mitigates the potential impact of individual author characteristics. It is essential to consider the collaborative nature of the book, where multiple authors contributed to each chapter. The absence of a gender-based impact on text quality scores could indicate a harmonious blending of writing styles, irrespective of the gender of the lead author. Collaborators may have actively engaged in shaping and refining the content, creating a collective voice that transcends individual authorship characteristics. This finding agrees with the study by Mauleon and Bordons (2006) which discovered among others that, while women were

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generally less productive than men, no significant differences in productivity were found within each professional category. These findings contribute to the broader discourse surrounding gender dynamics in academia. The study challenges stereotypes that associate gender with specific writing styles or scholarly contributions. By highlighting the lack of a significant gender-based influence on overall writing performance, the research underscores the importance of recognizing the diverse and collaborative nature of contemporary academic work. However, Zhang et al. (2020) revealed that female scientists exhibited better academic performance and experienced significant improvement through international collaboration when compared to their male counterparts. While this study sheds light on the particular collaborative book under investigation, future research could delve deeper into the dynamics of collaborative writing across various academic disciplines. Exploring how gender-based leadership influences specific aspects of writing, such as narrative structure, argumentation, or engagement with literature, could provide a clearer understanding of gender dynamics in scholarly collaboration.

Gender-Based Leadership and Word Count Metrics

The exploration into the relationship between gender-based leadership and word count metrics embarked on an inquiry into whether the gender of the lead author imparts any influence on the quantitative aspects of scholarly writing. The focus extended to characters, words, and sentences, aiming to unravel the intricate dynamics that may govern the length and structure of contributed chapters in a collaborative book. An initial expectation was that the gender of the lead author might shape the quantity of written content, reflecting potential stylistic or communicative differences. However, the results defied these expectations, revealing no statistically significant impact of the gender of the lead author on word count within contributed chapters. The lack of a significant gender-based impact on word count metrics implies that, in terms of quantity, the gender of the lead author does not play a substantial role in determining the length or structure of the written contributions within this collaborative book. This finding is in disagreement with Shen and Joseph's (2021) research revealed that gender affects relevant variables, leadership results, and behaviours. They draw attention to the complex connections that exist between gender and leadership, demonstrating both direct and indirect consequences. The study highlights gender as a mediator as well, illuminating subtle differences in unequal characteristics and outcomes. The results highlight the intricate nature of the relationship between gender and leadership, necessitating an extensive study agenda to improve comprehension.

The present findings however suggest a level playing field where authors, irrespective of gender, contribute comparable quantities of characters, words, and sentences. These results prompt a reflection on the collaborative dynamics inherent in the writing process. The absence of gender-based differences in word count metrics may indicate a collaborative and egalitarian approach, where authors, regardless of gender, actively contribute to the shaping of the content. It suggests a shared responsibility for maintaining a consistent and cohesive structure across chapters. The study's findings contribute to the understanding of collaborative writing dynamics, particularly in the context of academic books. The absence of a significant gender-based influence on word count metrics challenges any assumptions about gender-specific preferences in the length or structure of scholarly contributions. It reinforces the notion that, within the collaborative realm, authors contribute based on the intellectual merit of their ideas rather than conforming to gender-related expectations. While these findings offer valuable insights, further research could delve into the specifics of collaborative writing processes. Exploring how authors negotiate and integrate their contributions, examining potential variations across disciplines or genres, and understanding the role of editorial decisions in shaping word count dynamics could deepen our understanding of collaborative scholarly writing.

Readability Patterns of Chapters Led by Male and Female Scholars

The examination of readability patterns within chapters led by male and female scholars aimed to uncover potential distinctions in how readability is shaped by gender-based leadership. The study delved into three critical dimensions: word length, sentence length, and overall readability score. The nuanced exploration revealed notable variations in sentence length but not in word length or overall readability score based on the gender of the lead author. In dissecting readability patterns, the study considered various metrics, seeking to unravel the intricate ways in which the gender of the lead author may influence how readers engage with and comprehend the written content. The focus on sentence length, in particular, emerged as a significant dimension with implications for understanding the intricacies of scholarly writing. One of the key findings illuminated a significant difference in sentence length between chapters led by male and female scholars. This discovery prompts a closer inspection of how variations in sentence structure may contribute to the overall reading experience. The significant difference implies that chapters led by male and female scholars may exhibit differences in sentence complexity. The mean rank showed that the difference is in favour of the male-led chapters. An investigation of gender disparities in the application of interactive metadiscourse markers in

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EFL academic writings was carried out by Alqahtani and Abdelhalim (2020). According to the study, there were statistically significant disparities between male and female students' usage of frame markers, transitions, and code glosses. The contextual roles of these markers were examined in detail by the qualitative analysis, which linked student psychological and cultural variances to gender disparities in education. In addition to providing insightful information about gender differences in metadiscourse markers, the study has implications for researchers, writers, and textbook publishers who want to improve metadiscoursal competency in EFL writing classrooms. In their 2017 study, Van den Besselaar and Sandström challenge the idea that, on average, female researchers publish less but have an equal impact by examining gender-based productivity variations in academic research. For both genders, the study demonstrates a constant positive correlation between impact and production. It is interesting to note that discipline-specific demographics matter; within the same productivity class, a lower proportion of women is linked to greater impact.

The identified variations in sentence length raise questions about the underlying factors contributing to these differences. It may suggest that male-led chapters exhibit a distinct style of sentence construction compared to those led by female scholars. This finding underscores the need for a more nuanced understanding of readability patterns that go beyond a binary examination of gender-based leadership. While sentence length emerged as a differentiating factor, the study did not uncover significant differences in overall readability score or word length based on the gender of the lead author. This consistency across genders in terms of overall readability and word length suggests a shared commitment to maintaining clarity and coherence in scholarly writing, irrespective of the author's gender. The identified variations in sentence length imply potential implications for reader engagement and comprehension. Longer or more complex sentences may require a higher level of cognitive effort from the reader. Therefore, the findings highlight the importance of considering not only the content but also the structural elements of scholarly writing in fostering effective communication and understanding. Building on these insights, future research could explore the specific linguistic and stylistic choices contributing to variations in sentence length. Investigating reader responses and comprehension levels in response to different readability patterns could provide a more comprehensive understanding of the impact of sentence complexity on scholarly communication.

Vocabulary Richness Based on the Gender of the Lead Author

The scrutiny of vocabulary richness, gauged through unique words and rare words, aimed to discern whether the gender of the lead author plays a role in shaping the linguistic landscape of contributed chapters. Surprisingly, the analysis indicated no significant variation based on the gender of the lead author, suggesting an intriguing linguistic equanimity across chapters led by male and female scholars. The study's focus on both unique and rare words provided a comprehensive lens through which to examine the lexical diversity and sophistication of scholarly contributions. These metrics offer insights into the richness of language employed by authors and the potential impact of gender-based leadership on linguistic expression. Contrary to expectations, the findings unveiled a consistent level of vocabulary richness across chapters led by male and female scholars. This implies that both genders contribute comparably diverse and sophisticated language, challenging any preconceived assumptions about gender-specific linguistic preferences in scholarly writing within the collaborative book. This finding disagrees with Ma et al. (2023) whose findings showed that articles with female first authors exhibit lower impact and a less positive writing style compared to those with male first authors.

The absence of a significant gender-based influence on vocabulary richness challenges stereotypes that associate particular linguistic attributes with specific genders. This finding not only contributes to our understanding of linguistic diversity in collaborative academic projects but also underscores the importance of recognizing individual authorship strengths beyond gender-related expectations. In the broader context, these results contribute to the ongoing discourse on gender dynamics in academic collaboration. The study illuminates the intersectionality of gender and writing style, emphasizing that linguistic contributions are shaped by a myriad of factors beyond gender alone. This nuanced perspective challenges binary assumptions and encourages a more holistic understanding of authorship in collaborative scholarly endeavours. The culmination of findings paints a nuanced picture of the impact of gender-based leadership on various facets of scholarly writing within the collaborative book. Notably, vocabulary richness, a key linguistic dimension, appears resilient to the influence of gender. The study's revelations, alongside subtle variations in readability patterns, particularly in sentence length, contribute valuable insights to the ongoing dialogue on gender dynamics in academic collaboration. As a foundational exploration, this study lays the groundwork for further research into the intricate interplay between authorship, gender, and writing style. Future inquiries may delve deeper into the specific linguistic choices made by authors, exploring the nuanced factors that contribute to the richness and sophistication of language in collaborative academic projects.

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Conclusion

In this exploration of gender-based leadership in a collaborative book, the findings challenge traditional notions. The study reveals that gender does not significantly influence overall writing performance or word count metrics, emphasizing collaborative equality. Subtle variations in readability patterns, particularly in sentence length, prompt a nuanced understanding of gender's impact. Moreover, the study dismantles assumptions about gender-specific linguistic preferences, showing linguistic equanimity in vocabulary richness. These insights contribute to the ongoing discourse on gender dynamics in academic collaboration, urging a more inclusive perspective for future research and fostering diverse and equitable collaborative environments.

Recommendations

These concise recommendations offer targeted guidance to enhance collaborative writing practices based on the study's key findings:

1. Emphasize that writing performance and word count metrics are unaffected by the gender of the lead author, and encourage a narrative of equal contributions from all scholars, regardless of gender.
2. Conduct workshops to inform authors about readability patterns, specifically addressing variations in sentence length, and foster awareness of how these patterns may influence reader engagement and comprehension.
3. Celebrate consistent vocabulary richness across genders, and promote an inclusive perspective that recognizes and values diverse linguistic contributions, challenging assumptions about gender-specific writing preferences.
4. Acknowledge the strengths that authors bring to collaborative projects, irrespective of gender, and foster an environment that values the collective expertise and diverse contributions of all collaborators.
5. Encourage the integration of gender-neutral writing practices, reflecting the study's findings.

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