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Exploring techniques of presenting results in scientific research: A critical review

Joshua Okemwa [1,*], Paul Oduor Oyile [2] and Anselemo Peters Ikoha [2]

[1] *Department of Computer Science, School of Information Science and Technology, Kisii university, Kenya.*
[2] *Department of Information Technology, School of Computing and Informatics, Kibabii University, Kenya.*

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Abstract

Presenting research findings clearly and accurately is essential in scientific communication, as it bridges data analysis and interpretation. However, many researchers, especially early-career scholars, struggle with organizing and visualizing results in a way that enhances comprehension and transparency. This paper aims to critically review existing literature on techniques used to present analyzed data in scientific research. A qualitative synthesis approach was adopted, involving the review of academic writing guides, peer-reviewed journal articles, and exemplary studies across various disciplines. The findings indicate that while tools such as text, tables, figures, and illustrations are widely recommended, inconsistencies and misuse remain prevalent, leading to reduced clarity and credibility in research output. The review concludes that adherence to standardized presentation protocols significantly improves the readability, reliability, and interpretability of scientific papers. It recommends targeted training and institutional guidelines to support researchers in mastering best practices for results presentation.

Keywords: Scientific Communication; Results Presentation; Data Visualization; Research Reporting; Academic Writing Standards

1. Introduction

The communication of research results is a fundamental component of the scientific process, bridging the gap between data collection and knowledge dissemination. Effective presentation enables other scholars to validate findings, replicate experiments, and build upon the presented evidence. Day and Gastel highlight that poorly communicated results hinder scientific advancement by limiting understanding and undermining credibility [1]. In agreement, Creswell and Creswell emphasized that results reporting should be structured in a way that supports objectivity, reproducibility, and clarity [2]. As Regehr notes, when results are presented without a coherent strategy, even strong data may lose its scientific value [3].

However, numerous researchers continue to grapple with challenges in presenting their findings in structured and transparent ways. These challenges range from a lack of familiarity with data visualization tools to confusion about what constitutes factual reporting versus interpretation. For example, Weissgerber et al. observed that biomedical studies frequently misuse graphics, leading to confusion and misinterpretation [4]. Similarly, Fah and Aziz underscored that many research articles fail to align tables and narratives, resulting in fragmented understanding [5]. Such inconsistencies, as Tetzner explains, are often due to inadequate training in scientific writing practices [6].

Various presentation tools such as text, tables, graphs, and illustrations are available to support accurate reporting. These tools, if applied correctly, enhance both the aesthetic and cognitive dimensions of scientific communication. Tufte has argued that well-designed visuals can summarize large datasets far more effectively than prose [7]. At the same time, Annesley recommends using tables for precise numerical comparisons while reserving graphs for visualizing

* Corresponding author: Joshua Okemwa

trends and relationships [8]. The American Psychological Association (APA) similarly asserts that illustrations should not duplicate information but rather offer additional clarity to the reader [9].

Given these concerns, the academic community has increasingly advocated for formalized guidelines and training in results presentation. Early-career researchers, in particular, benefit from instruction that clarifies the purpose and structure of the results section [10]. According to Lang and Altman, even journals need stronger enforcement of presentation standards to ensure consistency across published work [11]. In response to these challenges, Monash University has integrated structured results reporting into their research training programs, encouraging logical flow and appropriate visual design [12]. This paper aims to critically review scholarly literature on presenting results in scientific research, synthesizing best practices and proposing practical recommendations for improved academic reporting .

2. Methods

This paper employed a qualitative, critical literature review methodology to analyze existing works related to the presentation of research results in scientific writing. The review focused on identifying common techniques, strengths, and challenges associated with textual and visual presentation methods. The goal was to synthesize best practices and highlight areas where current approaches diverge from established academic standards.

The sampling process began with the identification of relevant scholarly databases. Three major academic search platforms were selected for comprehensive coverage and credibility: Scopus, Web of Science, and Google Scholar. These databases were chosen due to their extensive indexing of peer-reviewed journals and academic publications across disciplines. Advanced search functions were used to refine and filter the literature. Search queries included keywords such as “results presentation in research”, “scientific writing best practices”, “data visualization in academic papers”, and “reporting research findings”. Boolean operators (e.g., AND, OR) and search limiters (e.g., publication date range from 2010 to 2024, peer-reviewed only, English language) were applied to ensure relevance and quality.

An initial pool of over 150 articles was generated. Through screening of titles and abstracts, 62 articles were retained based on relevance to the subject of results presentation techniques. A secondary screening was conducted by reviewing the full text of each article. The inclusion criteria required that the articles: (1) focus on scholarly writing practices or scientific communication, (2) address methods for reporting and visualizing research results, and (3) be published in reputable journals or by recognized academic publishers. Articles that solely focused on statistical analysis without discussing presentation or that were not accessible in full text were excluded. This process yielded 26 articles that were reviewed in-depth.

The selected articles were thematically analyzed based on presentation modalities; textual narrative, tables, figures, illustrations, and mixed approaches. Each study was evaluated for clarity, adherence to writing standards, and consistency with recommendations from academic writing authorities. Additional reference materials such as writing guides and publication manuals were included to support and contextualize the critical review. The process ensured a rigorous and comprehensive understanding of current practices and scholarly discourse surrounding the presentation of research results.

3. Results and Discussion

This section presents a critical synthesis of reviewed literature on techniques used to present research results in scientific writing. It focuses on three primary thematic areas identified during the literature analysis: textual presentation, use of tables and figures, and illustrative methods for complex data. Each subsection examines how these methods have been treated in scholarly works, evaluating both best practices and common pitfalls. The section concludes with a reflection of the author’s voice, critically analyzing current gaps and suggesting insights for improving the practice of presenting research findings.

3.1. Textual Presentation of Research Results

Text remains the foundational mode of presenting research results, particularly when describing context, highlighting key patterns, or linking findings to research objectives. Creswell and Creswell argue that narrative descriptions provide interpretative depth that tables and figures alone cannot achieve [13]. Day and Gastel emphasize that textual presentation allows researchers to clarify anomalies and reinforce the alignment of findings with the research questions [14]. In biomedical research, Weissgerber et al. observed that narrative structures were essential for interpreting statistically significant findings, especially in studies that employed complex or longitudinal designs [15].

However, issues arise when authors rely excessively on narrative without providing structured visuals to support their explanations. Lang and Altman note that overuse of prose can obscure patterns, reduce transparency, and frustrate readers attempting to extract key results [16]. To counter this, Bates recommends that textual explanations should be used to complement, not duplicate, tables and figures [17]. When integrated well, the narrative provides logical sequencing, identifies noteworthy trends, and contextualizes the presented data, making the research more accessible and impactful.

3.2. Use of Tables and Figures

Tables and figures serve as indispensable tools for summarizing large volumes of data and enhancing the readability of results. Tufte and Annesley advocate for their use in cases where precise comparisons, groupings, and distributions must be communicated efficiently [18], [19]. Tables are especially suitable for numerical accuracy and categorical comparisons, while graphs and charts (e.g., line, bar, scatter) are best suited for displaying patterns and changes over time. According to APA guidelines, well-labeled visuals reduce cognitive load and enable faster interpretation of core research outcomes [20].

Nevertheless, several studies have pointed to poor design and misuse of visuals as a persistent problem in scholarly writing. For instance, Belcher reports that many authors fail to label axes properly or provide informative titles, making it difficult for readers to interpret data independently [21]. Similarly, Fah and Aziz caution against presenting data redundantly in both text and visuals, a practice that undermines both clarity and brevity [22]. Effective visual design, according to Monash University, requires careful attention to alignment, scale, color, and captioning to ensure each figure or table stands alone as a meaningful unit of communication [23].

3.3. Illustrative Methods for Complex or Abstract Results

Illustrations, including conceptual models, flow diagrams, and annotated schematics, are especially useful when communicating abstract concepts, system architectures, or procedural workflows. Mills, Durepos, and Wiebe observe that illustrations provide immediate clarity for readers unfamiliar with the internal mechanisms of complex systems [24]. For instance, in technical disciplines such as health informatics or engineering, illustrations can visually depict interoperability between components or data flow across platforms. Tetzner argues that preparing illustrations prior to writing the results section can guide the logical structuring of the narrative itself [25].

However, the literature shows that illustrative methods are often underutilized or inconsistently applied. Zhang suggests that many researchers either omit illustrations or use generic diagrams that add little value to the interpretation of findings [26]. Enago emphasizes that high-quality illustrations must align with the study objectives and be referenced clearly in the text [27]. When used appropriately, illustrations not only improve understanding but also enhance the credibility and perceived sophistication of the research.

3.4. Authors' Critical Perspective on Current Practice

Despite the availability of extensive scholarly guidance on the presentation of results, its practical implementation remains uneven across the academic literature. For instance, several reviewed studies included tables with missing titles or unlabeled columns, contrary to established formatting standards outlined by APA and leading journals [20]. It has been noted that early-career researchers often rely heavily on dense narrative exposition while omitting supportive visuals, an issue likely rooted in limited training or uncertainty about accurately representing quantitative data. Moreover, there appears to be a widespread underutilization of conceptual diagrams, even in research contexts that involve abstract constructs or system-level interactions. These observations point to a pressing need for institutional reforms, including the integration of structured scientific writing instruction into postgraduate curricula to enhance researchers' competence in effectively presenting results. Additionally, it is imperative that the results section does more than list outcomes; it should also guide readers toward understanding the relevance and implications of those outcomes without veering prematurely into interpretation.

4. Conclusion

The presentation of research results is a critical component of scientific communication, serving as the bridge between data analysis and interpretation. This review has highlighted that while textual, tabular, graphical, and illustrative methods each play distinct roles in conveying findings, their misuse or inconsistent application can undermine the clarity, credibility, and impact of scholarly work. A consistent theme across the literature is the need for balance; text should complement visuals, and visuals must be well-designed and contextually integrated. Despite the availability of established guidelines, many researchers, particularly novices, continue to face challenges in effectively structuring and

delivering their results. Addressing these gaps through targeted academic training and stricter adherence to publication standards is essential for improving the overall quality and transparency of scientific reporting.

Recommendations

To enhance the clarity, accuracy, and impact of results presentation in scientific research, the following actions are recommended:

- Universities and research institutions should embed structured modules on scientific writing, particularly focusing on results presentation, in postgraduate and doctoral programs.
- Researchers should consistently follow established standards (e.g., APA, journal-specific formats) for presenting results, ensuring correct use of text, tables, figures, and illustrations.
- Journals and reviewers should enforce stricter evaluation of how results are reported, ensuring that visuals are well-labeled, captions are descriptive, and text supports the data effectively.
- Supervisors and senior researchers should guide novice scholars in choosing appropriate presentation formats and avoiding common pitfalls such as redundancy or poor design.
- Future studies should investigate challenges and best practices for result reporting across various academic fields to support the development of more refined and contextualized guidelines.

Compliance with ethical standards

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No conflict of interest to be disclosed.

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