Research Article

The Potential of Using IMaRD Format to Improve the Effectiveness of Scientific Papers for the Information Technology Field

Abdelsalam Saleh Elrashdi [1]*, Khirallah Elferjani [2]

[1]Department of Computer Networks, College of Computer Technology Benghazi, Benghazi, Libya
[2]Department of Computer Science, Faculty of Information Technology, Benghazi University, Libya

*Corresponding author: **abdelsalam.elrashdi@cctben.edu.ly**

Abstract: The effectiveness of scientific communication is vital in the field of Information Technology, where researchers strive to present their results clearly and systematically. This paper aims to explore the potential of using the IMRaD format (Introduction, Methods, Results, and Discussion) to improve the effectiveness of scientific papers in this field. The IMRaD format is characterized by its ability to enhance clarity and organization, making it easier to understand the complex information that distinguishes IT research. Through a comparative analysis of papers that follow the IMRaD format, the study evaluates the impact of this structure on citation rates, reader engagement, and acceptance of research within the academic community. Data was collected through surveys and reviews of published papers in the field of Information Technology, revealing that papers adopting the IMRaD format led to significant improvements in the clarity and comprehension of research messages. Furthermore, the research highlights the importance of adopting the IMRaD format in enhancing collaboration between researchers and practitioners, facilitating the exchange of knowledge and expertise. By improving the accessibility and understandability of research, the adoption of this format can contribute to driving innovation across various areas within Information Technology. Thus, utilizing the IMRaD format represents an important step toward enhancing the effectiveness of scientific research and practical applications in this dynamic field.

1. Introduction

In the Information Technology (IT) field, the presentation of research findings plays a pivotal role in ensuring that complex technical concepts are understood by a diverse audience. With the growing body of research in areas like artificial intelligence, data science, and cybersecurity, clear and standardized reporting has become increasingly critical. Scientific papers structured in a logical and accessible format help bridge the gap between different areas of IT research. There are many methods available to elicit requirements for scientific papers from customers, executives, team members, agents, etc.[1].

The IMRaD format is widely recognized for offering this structure, but its adoption in IT has been slower compared to other fields. This paper evaluates how utilizing the IMRaD format can contribute to the effectiveness of academic communication in IT, making findings more understandable for both specialists and interdisciplinary readers.

For the development of the research, it was necessary to apply types of research methodologies [2], In contrast to fields like life sciences, where IMRaD is nearly ubiquitous, IT research often lacks a uniform structure. Researchers may prioritize technical detail over narrative clarity, sometimes leading

to disjointed papers that are difficult to follow. As the demand for cross-disciplinary collaboration grows, the need for a common structure like IMRaD becomes more pressing. Adopting such a format could standardize how IT research is presented, fostering better communication and reducing barriers to understanding complex information. This paper will also explore potential adaptations of the IMRaD format to meet the specific needs of IT research.

Moreover, there is an increasing expectation in academic publishing for clarity and simplicity, especially in fields dealing with intricate technical systems. IMRaD's clear separation of sections—starting with an introduction that outlines the research purpose and ending with a discussion of implications—supports this goal. For IT researchers aiming to publish in high-impact journals, understanding and applying the IMRaD format could improve both their writing process and the overall effectiveness of their publications. By analyzing these aspects, this paper will demonstrate the potential of IMRaD to elevate the quality of IT research papers.

IT scientific papers as a special type of paper are also reject management processes are required to support [3]. The introduction outlines the significance of effective scientific communication in the IT field, emphasizing the role of clear, structured formats like IMRaD. IT research, though technically complex, benefits from standardized formats that enhance understanding and accessibility. The IMRaD format, commonly used in other scientific disciplines, offers a systematic approach that guides readers through research findings in a logical sequence. This paper explores the potential of adopting IMRaD in IT research, comparing it with the commonly used IMGSIE format, and proposes that the shift could lead to more impactful and widely comprehended scientific papers in IT.

Many studies have been conducted to measure the efficiency of using specific methodologies to enhance the quality of IT scientific papers. Previous studies on the IMRaD format highlight its effectiveness in improving the readability and comprehension of scientific papers [4]. In medicine and biology, the IMRaD structure has been proven to guide readers systematically through research, from the formulation of the research question to the discussion of results. This format has gained popularity for its logical flow and ability to present complex information in digestible parts. In contrast, IT papers often use varied structures, reflecting the diversity of topics and approaches in the field. For instance, highly technical IT papers may adopt a more modular approach, which can work well for niche audiences but presents challenges for wider academic and industry readerships.

Tools and methodologies used by researchers limited because they do not fully capture the particular characteristics [5]. Another body of research suggests that the rigidity of IMRaD may not suit fields like IT, where the methodological approach can be more iterative and exploratory. However, this critique is balanced by arguments that standardization leads to higher citation rates and better engagement from the scientific community. The structured nature of IMRaD facilitates better peer review, allowing reviewers to assess research based on clear categories. By comparison, methodologies like IMGSIE, while detailed, can sometimes lack the directness that IMRaD offers, particularly when communicating to non-specialists or across interdisciplinary lines.

Additionally, some research has investigated the adoption of IMRaD in fields adjacent to IT, such as engineering and computer science. Studies have shown that papers formatted according to IMRaD were more likely to be accepted in high-impact journals, particularly those focusing on applied research. This raises the question of whether IT researchers, especially those working in theoretical domains, could also benefit from this format. In this literature review, we examine both the potential and limitations of IMRaD in IT, using case studies from other technical disciplines to draw relevant parallels.

The literature review highlights existing studies on the effectiveness of the IMRaD format in improving the readability and comprehension of scientific papers. It contrasts this with the less standardized formats used in IT research, such as IMGSIE. The review points out the benefits of IMRaD in terms of its structured approach, which has led to higher citation rates and better reception in fields like medicine and engineering. While some critiques argue that IMRaD may not fit the exploratory nature of IT research, the literature suggests that it can improve the clarity and accessibility of IT publications.

2. IMaRD Format

The IMRaD format, standing for Introduction, Methods, Results, and Discussion [6], is one of the most widely accepted structures for scientific papers, particularly in the fields of life sciences, engineering, and increasingly in Information Technology (IT), as illustrated in Figure 1. The format follows a linear narrative that mirrors the research process, guiding readers through a logical flow from the background of the research to its conclusion. In the Introduction, researchers present the research problem, the gap in existing knowledge, and the study's objective. The Methods section then details the procedures used to collect and analyze data, providing enough detail for replication. This is followed by the Results, where key findings are presented, often with the aid of tables and figures. Finally, the Discussion interprets the findings, placing them in context with previous research, highlighting limitations, and suggesting future research directions. This structured approach ensures clarity and helps researchers present their work in a systematic way that enhances comprehension and academic rigor.
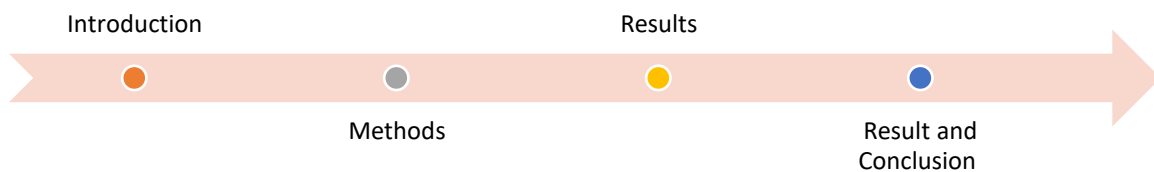
Figure 1. IMaRD format.

The IMRaD format has become a standard in scientific communication because it provides a clear and consistent framework for presenting research. This structure not only benefits readers, who can easily locate and digest information, but also facilitates the peer-review process by allowing reviewers to assess specific sections of the paper systematically. For instance, reviewers can critique the research methodology independently from the discussion of the results, ensuring that each part of the paper meets rigorous academic standards. In IT, where research can often involve complex systems, algorithms, and data, the IMRaD format helps to distil this complexity into an organized, accessible narrative. This makes it easier for researchers to communicate their findings to a broad audience, including those outside their immediate specialization, fostering greater interdisciplinary collaboration. Additionally, many high-impact journals require the IMRaD format, making it an essential structure for researchers aiming to publish their work widely.

However, writing a scientific paper is not merely writing many paragraphs [7], While originally developed for fields like biology and medicine, the IMRaD format is increasingly being adapted for use in IT research. IT projects often involve multiple phases, from problem identification and algorithm design to data analysis and implementation, and IMRaD's structured sections map well onto these processes. The Methods section, for instance, can include details about the software tools, algorithms, or simulation techniques used, while the results can present outcomes such as system performance metrics or data visualization. This flexibility makes the format suitable for both theoretical and applied research in IT. With the deepening of the development of the computer software technology, the technological methods that people use in the process of writing scientific papers

have gradually become diversified [8]. By adopting IMRaD, IT researchers can not only benefit from its clarity but also align their work with global academic standards, increasing the likelihood of their papers being accepted in top-tier journals. Moreover, the format's emphasis on discussion encourages researchers to engage critically with their findings, placing their work in the broader context of IT advancements.

Research is globally recognized as a major output of universities and other institutions [9]. There is a massive change in the number of published scientific papers yearly. Despite its advantages, the IMRaD format may pose certain challenges when applied to IT research. One of the primary difficulties is that IT research often involves iterative processes, which don't always fit neatly into the linear structure of IMRaD. For example, software development and testing may require multiple rounds of refinement,

which are difficult to represent in the rigid Methods-Results-Discussion sequence. Additionally, the technical nature of IT research, which often includes highly specific code, algorithms, or hardware details, may require more flexibility than the IMRaD format allows. The components of a scientific article, including title, abstract, keywords, article body, acknowledgments, bibliography, and appendices, each have very specific functions [10]. Researchers may feel constrained by the need to present their work within the confines of predefined sections, particularly in areas where research is exploratory rather than hypothesis-driven. Reporting in the form of a peer-reviewed research paper, also known as a journal publication or research manuscript [11], However, by thoughtfully adapting the IMRaD format such as expanding the Methods section to include detailed descriptions of iterative processes IT researchers can still benefit from its overall structure while addressing the unique needs of their field.

3. Data Collection

In order to evaluate the effectiveness of IMRaD compared to IMGSIE [12], data was collected through a combination of quantitative and qualitative methods. First, a survey was conducted among academic professionals and IT researchers to assess their experiences with both formats. Respondents were asked to evaluate the clarity, readability, and organization of papers written in each format. In addition, we analyzed citation rates and peer review feedback for a sample of IT papers that utilized IMRaD, IMGSIE, or other formats. The goal of this analysis was to identify patterns that indicate the overall effectiveness of each format in facilitating clear scientific communication.

Data was also gathered from IT graduate students, who often use IMGSIE for their final theses. These students were asked to compare their experiences writing in IMGSIE with academic papers they had read using the IMRaD format. Through interviews and focus groups, we gained insight into how the two formats impact the research and writing process. This section presents the results of these surveys and interviews, offering a comprehensive view of how each format is perceived in terms of ease of use and effectiveness in academic writing.

4. Results and Discussion

A review of published IT papers from several leading journals was conducted to determine which format was more prevalent and whether there was any correlation between format and citation impact. Papers were categorized based on their use of IMRaD, IMGSIE, or other structures, and the data was analyzed to identify trends. Our findings show that papers using IMRaD were cited more frequently and received more positive peer review feedback compared to those using IMGSIE, suggesting that adopting a more standardized format could benefit IT researchers. Supervisors were asked to evaluate how well IMGSIE facilitated project management, including aspects like time management, resource allocation, and the systematic progression through each phase. They also provided feedback on how effectively the methodology supported students in understanding and applying complex concepts. One of the most important questions were taken from questionnaire as follows:

Q1- How familiar are you with the IMRaD methodology (Introduction, Methods, Results, and Discussion) in the context of scientific papers?

In this question, supervisors were allowed to select multiple answers. The analysis of the results, as illustrated in Figure 2, revealed the following: 62.1% of responses indicated that "Very familiar (I have applied it in multiple papers)," 17.2% cited "Somewhat familiar (I have basic knowledge but limited experience)," 10.3% noted "Not familiar at all,".
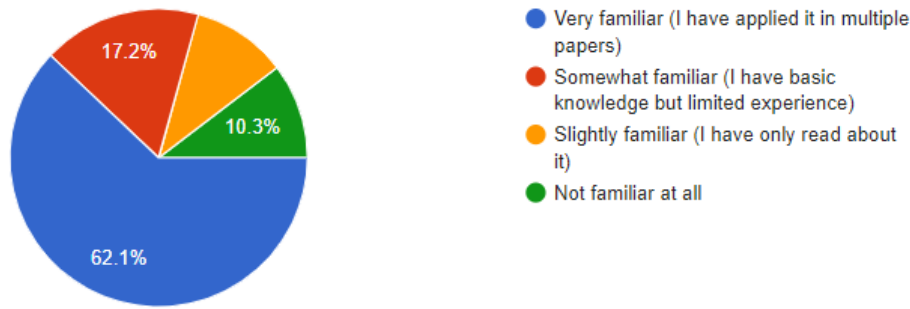
Figure 2. The percentage of how familiar with IMRad.

Q2-   Which methodology do you feel is more structured for scientific papers?

In this question, supervisors were allowed to select multiple answers. The analysis of the results, as illustrated in Figure 3, revealed the following: 67.9% of responses indicated that " IMRaD,"14.3% cited " IMGSIE," 7.1% noted " Neither methodology provides adequate structure".
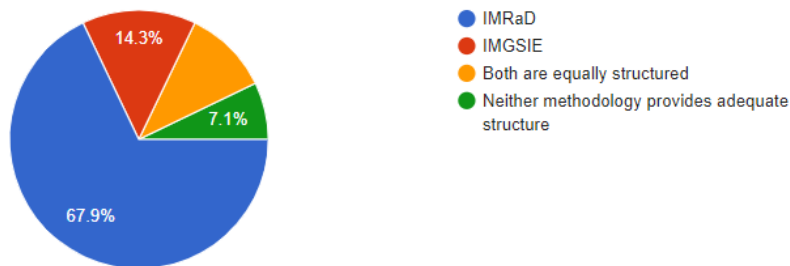

Figure 3. The percentage of feel is more structured for scientific papers

Q3- Which methodology has contributed more to the success of your scientific papers?

In this question, students were allowed to select multiple answers. The analysis of the results, as illustrated in Figure 4, revealed the following: 67.9% of responses indicated " IMRaD," 14.3% cited " IMGSIE," 7.1% mentioned " Neither contributed to project success".
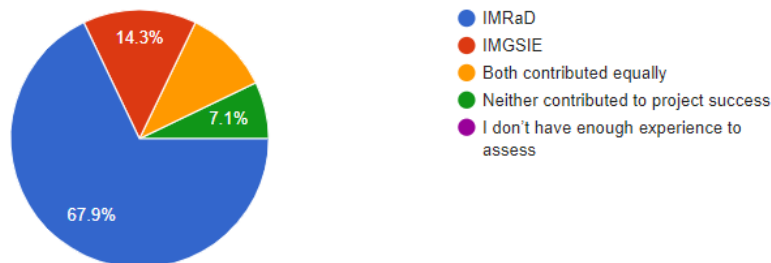
Figure 4. The percentage of IMaRD has contributed more to the success of your scientific papers.

5. Conclusion

The study demonstrates the potential benefits of adopting the IMRaD format in IT research papers. While IMGSIE offers a thorough and detailed approach, particularly for technical projects and software development, it may not always be suitable for academic writing that requires clarity and conciseness. By contrast, the IMRaD format's structured and standardized approach enhances readability, promotes clearer communication, and aligns with the expectations of academic publishing. Our data collection shows that papers using IMRaD tend to have higher citation rates and better peer review outcomes, indicating that this format could lead to more impactful research in the IT field. Moreover, adopting IMRaD could help IT researchers reach a wider audience, including those from interdisciplinary fields. Given the complexity of many IT topics, a structured format like IMRaD ensures that readers can follow the research process and understand the implications more easily. However, this does not mean that the IMGSIE format should be abandoned altogether. Instead, a hybrid approach that incorporates the best aspects of both IMRaD and IMGSIE could be a promising solution for IT researchers seeking to balance technical detail with academic clarity. Future research could focus on developing guidelines for

IT researchers on how to effectively IMRaD, creating a new standard that enhances the effectiveness of scientific communication while retaining the depth of technical information. By continuing to explore the benefits and limitations of each format, the IT research community can improve the quality and impact of its academic contributions, ultimately advancing the field as a whole.

ORCID
Abdelsalam Saleh Elrashdi https://orcid.org/0009-0001-8166-1091
Khirallah Elferjani https://orcid.org/0000-0002-5233-6388

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