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Mastering the art of technical writing in it: Making complex things easy to understand in Atate campus

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Abstract

This research, conducted at the Atate Campus of Nueva Ecija University of Science and Technology, delves into the realm of technical writing within the Information Technology (IT) sector, focusing on the pedagogical strategies that facilitate the comprehension of complex technical topics by IT students. It seeks to uncover the challenges IT students face when engaging with technical documentation and the effective methods to surmount these obstacles. Through a qualitative and quantitative analysis involving a survey distributed to 100 IT students across various academic years, the study identifies significant challenges such as conceptual complexity, jargon prevalence, and the need for audience-tailored documentation. The research highlights best practices like the use of plain language, visuals, real-world examples, and the critical role of user testing in enhancing document clarity and understandability. Furthermore, it examines preferences in writing styles and document structures, offering insights into effective technical communication tailored to diverse audience needs. This study proposes a set of recommendations aimed at improving technical writing curriculum and pedagogy, encouraging future research, and fostering a deeper understanding of technical subjects among IT students through enhanced technical writing skills.

Keywords: Technical Writing; Information Technology; Technical Communication; Pedagogical Strategies; Complex Technical Concepts; Documentation Clarity; User Testing; Writing Styles; Document Structures; IT Education

1. Introduction

The research entitled "Mastering the Art of Technical Writing in IT: Making Complex Things Easy to Understand in Atate Campus" aims to explore challenges and best practices in making complex things understandable in technical IT writing. It aims to investigate the impact of audience analysis, writing style, visuals, document structure, and testing methods on clarity and understandability. The results will lead to guidelines for technical writers to enhance clarity. The field of IT relies heavily on technical writing to simplify complex ideas. As technology advances rapidly, skilled technical writers are in high demand to bridge the gap between intricate concepts and understandable explanations. To ensure user-friendly documentation for IT products and services, technical writers use strategies like plain language, breaking down complex concepts, visuals, clear explanations, and addressing reader questions. Moreover, technical writers ensure accuracy, completeness, and up-to-date documentation, essential for IT product and service safety.

The ability to effectively convey technical information to non-technical audiences is highly valued in the ever-evolving IT industry. Core principles of effective technical writing include prioritizing simplicity and directness, avoiding jargon and technical terms that may alienate non-technical readers, adopting an audience-centric approach, ensuring well-organized technical documents, incorporating visual aids, avoiding assumptions about the reader's technical knowledge, using active voice and present tense, and providing real-world examples to illustrate technical concepts. However, technical writing in IT faces challenges such as conceptual complexity, navigating a diverse audience, and

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addressing the prevalence of jargon. Despite these challenges, technical writing in IT offers numerous opportunities for both aspiring and experienced professionals. High demand for technical writers due to the increasing complexity of software and hardware systems has resulted in a high demand for these professionals (William & Plotkin, 2018; Huth, 2016; Davenport, 2013; Piotrowski, 2018; Wierenga, 2020; Strunk Jr., & White, 2017, and Gunning, 2011).

Technical writing in IT plays a critical role in bridging the gap between complex technical concepts and a diverse audience seeking clear, concise, and accessible explanations. By adhering to these fundamental principles and practices, technical writers can effectively communicate technical information, enhance user understanding, and contribute significantly to the success of IT projects. (Strunk Jr., & White, 2017). Technical writers can pursue diverse career paths within the IT industry, including authoring user manuals, developing training materials, and composing white papers. They play a crucial role in ensuring that complex technical information is effectively communicated, contributing to successful product adoption and user satisfaction.

Mayer and Moreno's Cognitive Theory of Multimedia Learning (1999) suggests that combining text, graphics, and interaction enhances learning. Applied to technical writing in IT, it recommends using a mix of text, visuals, and interactive elements for clarity and engagement. Mark Adler (1970), a key figure in the Plain Language Movement, advises avoiding jargon and complexity, favoring simple language, short sentences, and an active voice. The goal is to make information accessible to everyone. This study aims to guide technical writers in creating understandable and engaging documents by integrating principles of technical writing. These principles include audience awareness, clarity, organization, accuracy, completeness, objectivity, and ethics. In the academic ecosystem of Atate Campus, a diverse group of IT students is navigating the complexities of technical writing. These students, each with a unique set of experiences and perspectives, may choose to share their names and gender, although this information is not central to their quest. What binds them together is their environment — the vibrant, tech-rich corridors of Atate Campus — and their common objective: to grasp the intricacies of IT through the prism of technical communication. As part of their academic voyage, these students delve into the process of creating high-quality technical documentation. It's not just about putting words on a page; it's about how these words can make complex IT concepts accessible and understandable. The students learn to distill complicated information into clear, concise, and useful documentation, a skill as crucial to their future careers as the programming languages and hardware they master. The ultimate goal of their endeavors is to evaluate the tangible impacts of mastering technical writing. They seek to understand whether becoming proficient communicators can indeed enhance their comprehension of IT subjects. The hypothesis is that by refining their ability to convey technical information effectively, they will not only understand IT concepts better but will also be more adept at applying them in practical scenarios.

Oliver Strunk's *The Elements of Style* emphasizes concise writing, active voice, and clear communication, advising against overwriting and the use of complex language. Sharon J. Gerson and Steven M. Gerson's *Technical Writing and Communication* provides a comprehensive look at technical writing, covering everything from ethics to collaboration and the importance of adapting to technological advancements. Joshua Schimel's *Writing Science* advocates for storytelling in science writing, teaching how to craft engaging and comprehensible research narratives, and addressing the structuring of documents for clarity and impact. Together, these works underscore the importance of clear, engaging, and effective writing across disciplines. Joseph M. Williams' *Style: Ten Lessons in Clarity and Grace* offers guidance on refining prose to avoid wordiness and complexity, proving invaluable even to those already adept in concise writing. Singh's 2020 research highlights how quality technical documentation can significantly enhance user satisfaction and effectiveness in IT firms, emphasizing the need for clear instructions and the simplification of complex concepts. Steven Pinker's *The Sense of Style* delves into cognitive processes in writing, suggesting that effective writing involves strategically arranging words to mirror the complexity of thought in a linear, reader-friendly manner. These works collectively shed light on the critical role of clarity and efficiency in writing across various contexts.

The literature on technical writing emphasizes the critical importance of clear and accessible communication in the IT industry. Williams and Kishore (2013) underline the necessity of aligning documentation with the audience's knowledge level, advocating for simplicity, clarity, and the use of storytelling and visual aids to convey complex IT concepts effectively. Maria G. Ramirez's 2017 study further identifies best practices in technical writing, such as employing plain language, active voice, and logical content organization, alongside thorough editing and proofreading to simplify technical information. Jenny Hyry-Beihammer (2011) and Elif Altitis (2016) both highlight the benefits of using plain language and strategies to enhance the readability of IT documentation, including shorter sentences and the inclusion of real-world examples and visuals. The Philippine Technical Writers Association (2018) and Dennis R. Cruz (2019) contribute to the field by fostering professional development and providing guidelines tailored to Filipino audiences, reflecting the global and local contexts of technical writing practices. Collectively, these works contribute to a comprehensive understanding of effective technical writing strategies that enhance user experience, comprehension, and accessibility in technical documentation.

Technical Writing for Filipinos: A Guide to Effective Communication in the IT Industry by Dennis R. Cruz (2019) covers the fundamentals of technical writing, including audience analysis, documentation styles, and common IT terminology. It also includes specific examples relevant to the Philippine context. Engr. Ferdinand M. Cruz (2016) provides a comprehensive guide on writing technical documentation for a Filipino audience, emphasizing language accessibility, cultural sensitivity, visual elements, interactive formats, localized examples, and collaboration. He suggests using an approachable style, including secondhand Filipino verbalizations, and considering educational shadings. Prof. Ramon H. Tuazon (2005) provides technical writing tips for Filipinos to improve their mechanics skills, emphasizing clearness, localized terminology, structured writing, audience consideration, revision and proofreading, collaboration and peer review, continuous learning, and visual elements. He encourages honest speech, short sentences, localized Filipino terms, and structured writing to make the content more relatable.

The Philippines' technology sector is witnessing a growing demand for proficient technical writers capable of demystifying complex technical concepts. Studies, such as those by Galacio and Abesamis (2018), and Talens and Martinez (2016), underline the critical need for enhancing technical writing skills among IT professionals and improving the usability of documentation like user manuals to boost user experience. The emphasis is on clear, concise, and accessible communication to mitigate frustration and confusion among users. Additionally, strong communication skills are highlighted as indispensable for IT professionals, especially in outsourcing contexts, requiring adeptness in both verbal and written forms to cater to diverse audiences and cultural nuances.

Ray E. May's *The Elements of Technical Writing* (2016) and C. Lontoc's article (2014) contribute valuable insights into effective technical documentation practices, stressing the importance of clarity, concise writing, and user involvement in the documentation process. These resources advocate for adopting straightforward language and organized content to enhance readability and user comprehension.

The Technical Writers Association in the Philippines and educational institutions play a crucial role in overcoming communication barriers in the IT sector by providing specialized training programs tailored to meet industry demands (Alfonsi et al., 2020). These programs are essential as they equip technical writers with the necessary skills to effectively communicate complex technical information. In contrast, engineers not only need technical expertise but also soft skills such as problem-solving and good judgment to effectively contribute to society (Munir, 2021). Given the dynamic nature of the IT sector, higher education institutions must stay updated on technological advancements to ensure that graduates possess the required technical and non-cognitive skills for future employability (Hirudayaraj et al., 2021).

Various studies emphasize the significance of soft skills in the engineering field, indicating that individuals with strong communication abilities are highly valued within organizations (Campos et al., 2020). Employers look for a diverse range of social, personal, and self-management skills in entry-level engineers to ensure their success in the workplace (Hirudayaraj et al., 2021). Moreover, the importance of soft skills for engineers is fundamental to their career progression, both locally and globally (Munir, 2021).

In the context of technical writing, the challenges posed by the technical complexity of content can be significant, requiring educators to adapt their teaching methods to meet industry standards (Terblanche & Waghid, 2021). The integration of competency-based training into traditional programs is essential for producing skillful and employable graduates in the technical and vocational education sector (Ochieng & Ngware, 2021). Moreover, the development of academic writing skills is crucial for professionals in the IT field, emphasizing the need for structured training programs that focus on creativity and effective communication (Chavda, 2023; Sarraf, 2023).

The role of leadership in educational institutions is vital for fostering a culture that promotes the development of essential skills among students and faculty (Bhakuni, 2022). Additionally, the integration of active learning strategies can enhance students' thinking and writing abilities, contributing to their overall skill development (Srivatanakul & Annansingh, 2021). Furthermore, the incorporation of educational games and ICT-driven tools can improve motivation and enhance writing skills among students (Ersoy & DEDE, 2022; Patiño et al., 2020).

At Nueva Ecija University of Science and Technology's Atate Campus, a study titled "Mastering the Art of Technical Writing in IT: Making Complex Things Easy to Understand" investigates the impact of technical writing skills on IT students' understanding of complex topics. This research aims to identify challenges these students face and effective strategies to improve technical documentation comprehension. Through a blend of qualitative and quantitative methods, including surveys and focus groups, the study targets a diverse group of 100 IT students across various years. It seeks to offer insights for students and educators on simplifying technical content and enhancing learning outcomes, while providing a framework for future research in technical communication. Conducted from October to December

2023, this inquiry not only explores educational benefits but also aims to refine technical writing practices among IT students, contributing to their ability to effectively communicate and apply IT knowledge.

2. Methodology

The research employs a qualitative, descriptive design, using a survey questionnaire as the primary data collection instrument. This approach does not involve experimental manipulation but instead seeks to describe the current state of affairs at the university. The focus is on understanding the students' ability to translate complex IT subjects into comprehensible content through technical writing. The exploration is set at the Atate Campus in Barangay Atate, Palayan City, Nueva Ecija, where one hundred IT students from the institution, selected through random sampling across the first to third years of study, serve as research participants to ensure a representative sample. The survey questionnaire designed for this study features a mix of five multiple-choice items and a six-statement checklist, allowing respondents to share their proficiency and preferences in technical writing within IT, based on their personal knowledge and insights.

A detailed data gathering procedure is planned for the first semester, spanning from October 16 to December 15, 2023-2024. The research process includes several stages: proposal preparation, data gathering and interpretation, formulation of conclusions and recommendations, preparation for the oral defense, presentation of the research work, finalization of outputs, and ultimately, submission of the final research output. Each phase is assigned specific weeks in the schedule, reflecting a structured and organized research approach.

For data analysis and treatment, the researchers will use simple descriptive statistics to summarize the survey results and create charts to visually represent key findings. The analysis will explore relationships between various factors, such as job roles or academic year, and the students' technical writing skills. The research team is committed to upholding ethical standards, ensuring participant data confidentiality, and seeking consent for participation. Rigorous data verification will be conducted to guarantee the validity and reliability of the findings. Through these methods, the study aims to provide insightful results that will enhance technical writing education in IT.

3. Results and discussion

3.1. Challenges in Understanding Complex Technical Concepts

The challenges individuals face when dealing with complex technical concepts are multifaceted, as indicated by the data. The survey results reveal that 46% of respondents struggle with complex sentence structures, while a similar percentage finds a lack of examples to be a significant obstacle (Nureen et al., 2022). Moreover, issues related to jargon and technical terms, along with a dearth of visuals, affect 43% of respondents each, emphasizing the necessity for clear language and visual aids in technical materials (Nureen et al., 2022). Additionally, poor organization poses a notable challenge, impacting 35% of individuals (Nureen et al., 2022).

These findings underscore the importance of simplifying technical content, providing practical examples, avoiding excessive jargon, incorporating visual representations, and ensuring well-structured information to enhance comprehension. The absence of responses in the "Other" category suggests that the identified challenges comprehensively cover the difficulties encountered by individuals grappling with complex technical concepts (Nureen et al., 2022).

In addressing these challenges, it is crucial to consider the significance of accessible language and the role of visual aids in facilitating understanding. By simplifying language, providing relevant examples, and incorporating visuals, technical materials can become more comprehensible and engaging for a wider audience. Moreover, ensuring well-organized content can further alleviate the difficulties faced by individuals when navigating complex technical information.

3.2. Effective Practices for Understanding Complex Concepts

Respondents overwhelmingly favor step-by-step instructions (66%) and examples (62%) as the most effective methods for understanding complex technical concepts. This preference emphasizes the value of structured, incremental information and real-world applications in learning. Visual aids also play a crucial role for more than half of the participants, reinforcing the idea that visuals are critical for comprehension. Definitions and plain language, while less cited, are still significant for a substantial portion of the audience. The lack of "Other" responses suggests a broad agreement on these practices' effectiveness.

3.3. Considerations for Audience Needs in Technical Documentation

Technical expertise emerges as the paramount consideration for addressing audience needs in technical documentation, acknowledged by 65% of respondents. This underscores the importance of gauging and aligning content with the technical level of the audience. Job role, level of education, and cultural background also emerge as critical factors, indicating that understanding the audience's professional context, educational background, and cultural nuances are key to creating relevant and accessible technical documents. Age, though less considered, remains a factor, pointing to the diverse demographics that may interact with technical documentation.

3.4. Preferred Writing Styles in Technical Documentation

A formal writing style is preferred by a majority (67%) of respondents for reading technical documents, highlighting a general expectation for technical information to be conveyed in a structured, professional manner. The informal style's preference by a third of the participants indicates a niche appreciation for a conversational tone, potentially signaling a desire for more approachable content in certain contexts. The minimal support for a semi-formal style suggests it may not distinctly meet readers' needs or preferences as effectively as the formal or informal styles. The absence of "Other" responses reaffirms the clear preference trends among these defined categories.

3.5. Preferences in Document Structure for Technical Reading

Respondents demonstrate a slight preference for the problem-solution document structure, with 46% finding it most helpful. This indicates a strong inclination towards documents that clearly identify issues and then methodically outline solutions, suggesting that readers value a narrative that directly addresses and resolves their specific challenges or questions. The chronological structure closely follows, preferred by 44% of participants, highlighting a significant number of individuals who appreciate the clarity that comes from a time-sequenced presentation of information. Topical structure, while still valuable to 37% of respondents, ranks slightly lower, suggesting that while categorization by topic is useful, it may not be as universally preferred as the other two structures. The absence of responses in the "Other" category suggests these options effectively cover the majority of preferences for document structures in technical documentation.

3.6. Division on the Use of Jargon and Technical Terms

The responses regarding the use of jargon and technical terms in technical writing reveal a notable division among participants. With 82 agreeing that jargon should be minimized and 81 disagreeing, there's a clear split in opinion. This dichotomy underscores a nuanced debate within the technical communication community about the balance between accessibility and precision in technical writing. On one hand, the preference for minimizing jargon suggests a desire for more inclusive and understandable content. On the other, the substantial number of respondents who see value in jargon indicates a recognition of its role in conveying precise technical concepts to knowledgeable audiences.

3.7. Consensus on the Use of Visuals and Examples

A significant majority of respondents advocate for the use of visuals (93%) and examples (92%) in technical writing. This strong consensus highlights the recognized value of these elements in enhancing comprehension of complex concepts. The near-unanimous agreement on incorporating visuals and examples suggests a widespread belief that these tools are essential for clarifying and illustrating technical information, making it more accessible and engaging for readers.

3.8. Overwhelming Support for Step-by-Step Instructions

The survey also reveals overwhelming support (96%) for the inclusion of step-by-step instructions in technical documentation. This preference underscores the importance of clear, actionable guidance in explaining complex procedures, with nearly all respondents acknowledging the effectiveness of a sequential, detailed approach in enhancing understanding and facilitating practical application. The minimal disagreement (4%) further emphasizes the broad consensus on this instructional strategy.

3.9. Rethinking the Definition of Key Terms

The response to whether technical writers should define key terms yields an unexpected outcome, with a significant majority (90%) disagreeing with the practice. This suggests a prevailing belief among respondents that defining key terms may not always be necessary or that assumptions about the audience's prior knowledge play a role in this perspective. It might also indicate a preference for a more streamlined approach to technical documentation, where definitions are included only when absolutely essential to understanding. This perspective could be influenced by the

specific audience or field of study, assuming that readers already have a foundational knowledge of the subject matter, thus reducing the need for definitions.

3.10. The Value of User Testing in Technical Writing

The overwhelming agreement (96%) on the importance of user testing underscores a strong consensus on its value for ensuring document clarity and understandability. This suggests that respondents recognize user testing as a critical step in the technical writing process, essential for validating the effectiveness of the documentation and its ability to communicate complex information clearly. The minimal dissent (4%) highlights a nearly universal acknowledgment of user testing as a best practice in the development of technical documents, reflecting a proactive approach to addressing the needs and challenges of the target audience.

3.11. Distribution of Respondents by Course

The distribution of respondents across different courses reveals a balanced representation from BSIT-1 and BSIT-2 (each contributing 40% to the total) and a smaller participation from BSIT-3 (20%). This distribution might reflect the varying levels of engagement or availability among the students in these courses, or possibly the structure of the curriculum that makes the survey more relevant to certain year levels. The equal participation from BSIT-1 and BSIT-2 suggests a broad interest and relevance of the survey topics across these groups, while the lower representation from BSIT-3 could indicate factors such as fewer students in advanced levels or different focuses at this stage of their education.

4. Conclusion

The conclusions drawn from this study illuminate the journey IT students navigate as they strive to master technical writing, highlighting both the stumbling blocks and the strategies that pave the way to clear and effective technical documentation. The study pinpoints specific challenges, such as grappling with the intricacies of technical concepts, selecting the most fitting writing styles, and crafting well-structured documents. It also identifies a suite of best practices that serve as beacons for clarity in technical communication, including the adoption of plain language, the strategic use of visuals, and the integration of real-world examples. These practices resonate deeply with foundational principles of communication such as audience awareness, clarity, thorough organization, meticulous accuracy, comprehensive completeness, steadfast objectivity, and unwavering ethics. This research underlines the pivotal role that proficient technical writing skills play in demystifying complex IT topics for students, facilitating a deeper understanding and engagement with the subject matter. The study's theoretical underpinning, which weaves together cognitive learning theories and the ethos of plain language, has emerged as an invaluable compass for guiding aspiring technical writers on their path to proficiency. Furthermore, the insights gleaned from an extensive review of relevant literature underscore the crucial need for tailored training programs. These programs, alongside the concerted efforts of educational institutions and IT organizations, are instrumental in surmounting the hurdles students face in their quest to excel in technical writing. In essence, the research posits that the mastery of technical writing is not merely an academic achievement but a critical tool that empowers IT students to navigate and elucidate the complexities of their field. This calls for a collaborative effort among stakeholders to foster environments that nurture the development of these essential skills, ensuring that the next generation of IT professionals is well-equipped to communicate complex information with clarity and precision.

Recommendation

In the study titled "Mastering the Art of Technical Writing in IT: Making Complex Things Easy to Understand at Atate Campus," a series of recommendations have been laid out aimed at enriching the educational landscape for students, educators, and researchers alike in the field of technical writing within IT. For students, the study emphasizes the creation of interactive materials that not only simplify the learning of complex technical concepts but also cater to various learning styles. This includes resources that offer step-by-step instructions, vivid examples, and engaging visuals. The importance of skill-building workshops is highlighted, providing a platform for students to immerse themselves in technical writing best practices through hands-on exercises. Additionally, the value of peer collaboration is noted, allowing students to exchange knowledge and experience different writing styles and techniques, further preparing them for real-world challenges. A significant aspect of the recommendations for students also involves the understanding of diverse audience factors, ensuring that future technical communicators are adept at engaging with global audiences. Educators are encouraged to weave technical writing modules into the curriculum, stressing the role of clear communication in the IT industry. The study suggests that practical assignments should reflect real-life technical writing scenarios, offering students hands-on experience. It also proposes the integration of user testing concepts into the educational process, teaching students the importance of refining documents based on feedback to ensure clarity

and user-friendliness. Guest lectures from industry professionals are recommended to provide students with insights into the practical aspects of technical writing. Furthermore, educators are urged to foster a research culture among students, focusing on emerging trends and tools in technical communication to keep the curriculum at the cutting edge. Future researchers are invited to explore the potential of emerging technologies, such as augmented reality and interactive documentation platforms, to innovate technical writing practices. The study calls for longitudinal research to monitor the evolution of preferences and practices in technical writing, offering insights into the changing landscape of the field. Additionally, understanding the impact of cultural backgrounds on the interpretation of technical documents is seen as crucial for developing globally adaptive writing strategies. Collaborative efforts between researchers and industry professionals are deemed essential for addressing real-world technical communication challenges, leading to practical solutions and innovations. The development of frameworks to evaluate different writing styles, document structures, and the effectiveness of visuals is also highlighted as a way to contribute to the establishment of industry standards and best practices.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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