A Linguistic Analysis of Technical and Non-Technical Language in TED talks on Science and Technology

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Abstract

This research paper aims to investigate linguistic features in science and technology-based TED talks. The study combined quantitative and qualitative methods to explore the characteristics of technical and non-technical language use in TED talks. First of all, the researchers identify the distinctions of linguistic features described by Biber's Multidimensional Analysis (MDA) framework, using Involved vs. Informational, Explicit vs. Situation-Dependent, and Overt Expression of Persuasion dimensions. By retaining this framework, this study analyzed the inherent variability and peculiarities of TED talks, revealing their preference for narrative, entertaining, and informative broadcasts. Then, to explain the most important technical and non-technical vocabulary highlighted in the TED talk, identified by AntConc software, recognized words were tagged using Parts of Speech (POS) software and then processed using Longman English Grammar. In addition, the frequency of linguistic features exhibited by speakers when explaining complex technical principles to lay audiences is discussed, such as nouns, verbs, adverbs, and adjectives. The findings show that both technical and non-technical vocabulary are often used in TED lectures and that presenters use a variety of language tactics to express complicated technical concepts to a wide audience. The results show that TED speeches are becoming a distinct language variety. This study aids in the development of public speaking skills and assesses the efficacy of various communication approaches by providing insights into the format and usage of TED speeches. Future studies might examine whether or not other public speeches have similar linguistic characteristics or whether they are specific to TED presentations.

Keywords: TED Talks, Corpus Based-Linguistic analysis, Technical and Non-Technical Language, Scientific and Technological Communication

Introduction

The present research aims to investigate linguistic features in science and technology-based TED talks as scientific communication has been changed by digital media by allowing breakthroughs in scientific genre presentation and contributing to a more diversified audience (Goodman-Deane et al., 2016). Science communication is growing in popularity as a career and study issue. It is characterized as the work of professionals who communicate, including media professionals, public information officers, and scientists themselves, or just as the raising of public knowledge of science (Burns et al., 2003).

TED Talk as a Separate Linguistic Variety

TED talks are a well-known platform for professionals to give their views, ideas, or opinions on a diverse range of fields. They are instructive, amusing, and have a significant global influence. TED originated in 1984 as a conference intended to spread technology, entertainment, and design, but it began streaming videos of conference presentations in 2006 (Sugimoto et al., 2013, p. 1). The videos include a transcription, translation into many languages, a blog, and a comment section, resulting in a genre and modality combination phenomenon (Romanelli et al., 2014). These are usually held in modern studios with trendy backdrops, follow a style that concentrates learners on the presenter, and use minimal, highly successful visual aids (Scotto di Carlo, 2014). Science and technology are prominent topics in TED talks, and speakers commonly integrate technical and non-technical vocabulary to effectively communicate their thoughts. This study will present a corpus-based examination of the linguistic characteristics and aspects of technical and non-technical language in TED talks on science and technology.

Figure 1
Technical and Non-Technical Language
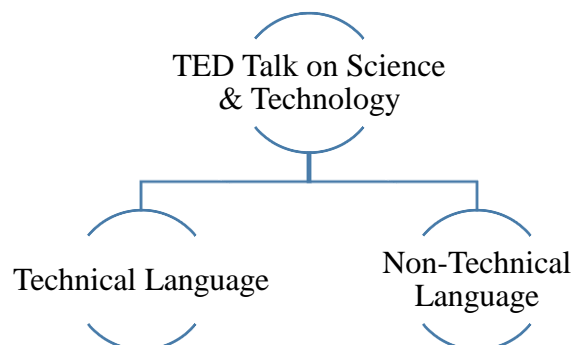
Technical language in TED talks on Science and Technology

Technical language/vocabulary, in general, refers to terms and phrases that are used and recognized primarily in a given profession, trade, or, for simplicity's sake, subject area. Technical vocabulary has been called a variety of things, including "discipline specific vocabulary" (Woodward-Kron, 2008), "domain-specific glossaries" (Perian-Pascual, 2015), "scientific/technical terms" (Huizhong, 1986) and "specialized lexis" (Baker, 1988), 'terminological units' (Cabre, 1999) and "specialized vocabulary" (Robinson, 1980). To communicate specialist knowledge on a particular topic, technical terminology is utilized. It is employed in TED speeches on science and technology to convey difficult scientific and technological subjects. Jargon, acronyms, and specialist terminology are features of technical language. For instance, the speakers at a TED lecture on COVID-19 may utilize scientific terms like "pandemic", "isolation," "vaccines," and "ventilation."

Non-technical language in TED talks on Science and Technology

Non-technical language/Vocabulary, on the other hand, refers to language or information that does not require specialized expertise in a certain subject or career to comprehend. It is not related to or involving science or technology or the lack of specialized or technical expertise. Non-technical language is used to communicate scientific and technological topics to a wide audience in TED lectures on science and technology. Common language, metaphors, and analogies are traits of non-technical language. For instance, speakers giving TED lectures on COVID-19 can refer to "economy," "challenges," and "happenings" rather than using technical terms.

Research Objectives

- To identify how the scientific and technological communication employed in TED talks vary across Biber's MDA framework.
- To explore the most prevalent technical and non-technical words used in TED talks for a general audience.
- To analyze to what degree speakers in TED talks adeptly utilize linguistic elements to explicate intricate technical concepts in a manner that is comprehensible to non-specialists.

Research Questions

1. How does the scientific and technological communication employed in TED talks vary across Biber's MDA framework?
2. What are the most prevalent technical and non-technical words used in TED talks for a general audience?
3. To what degree do speakers in TED talks adeptly utilize linguistic elements to explicate intricate technical concepts in a manner that is comprehensible to non-specialists?

Significance of the Study

The study aims to detect linguistic variation across technical and non-technical features of TED lectures on science and technology. It will add to the body of knowledge on how languages vary within digital media and enhance earlier corpus-based research. The results of the study can be used as a guide for comparison with any special or non-special registers. ESP teachers can focus on language structures and how they operate within a given genre. Researchers studying online speech delivery registers and those attempting to establish the identification of TED talks as a distinct or independent linguistic variety may find the current research to be of great benefit. Additionally, it will be beneficial for academics performing cross-linguistic studies.

Delimitations of the Study

This research focuses on a certain subset of TED presentations about science and technology, which may not be representative of all talks. The study's corpus may be subjective since the collected TED presentations were selected over others based on personal preferences. The study only pays attention to language characteristics without taking into account other elements like nonverbal cues, audience demographics, or speaker charisma. It focuses on one component of TED lectures about science and technology, such as the balance between technical and non-technical language.

Literature Review

The study of TED talks from technical and non-technical usage of language on science and technology has never been done in depth before, particularly by applying Biber's 1988 Multidimensional Analysis framework. The current study is focused extensively after reviewing

previous research works such as, Sosio et al., (2016) examines TED Talks from a sociological standpoint, employing both quantitative and qualitative methodologies. The researcher employed a content analysis of a specific sample of talks, identifying the timing of key terms and a perspective on the speakers' usage of practical examples and humorous jokes. It was concluded that the most important feature of a TED lecture is the horizontal view of the communication channel, encouraging individuals to ask questions and think critically and constructively about subjects without feeling compelled to do so (Sosio et al., 2016).

Lemke's (1990) book "Talking Science: Language, Learning, and Values." This is a book about education in communication, science, and technology. The author of this book explained that "talking science" does not simply mean talking about science; it entails conducting science via the medium of language. He demonstrated how language's semantic resources are employed in discussing science and linked language to bigger social concerns such as attitudes, interests, and values (Lemke, 1990). Likewise, Wingrove and Crosthwaite (2022) conducted a study titled "Multi-Dimensional Exploratory Factor Analysis of TED Talks". The analysis revealed that the conditions surrounding the production of TED lectures resulted in a unique representation of Dimensions 1, 5 and 6. The presence of inspiration and transformation is related to TED's mission statement. Many of the dimensions distinguished subjects in fascinating ways, such as Dimension 3 and Dimension 2, Dimension 6 and Dimension 7 (Wingrove & Crosthwaite, 2022).

Another study "Engaging the Online Audience in the Digital Era: A Multimodal Analysis of Engagement Strategies in Ted Talk Videos" conducted by Xia & Hafner (2021) examined how multimodal semiotic resources are merged in digital media. The analysis revealed that the combination of various semiotic resources, such as speech, gestures, gaze, visuals, distance of the shot, perspective of the shot, and angle of shot, tends to be achieved by online viewers' engagement in a digitally mediated scientific popularization genre like TED. Five strategic multimodal configurations were used to engage viewers, with varying emphasis on visual cues, long shots, gaze, inquiries, and references to individual emotions (Xia & Hafner, 2021).

Baram-Tsabari & Lewenstein (2012) conducted a study titled "An Instrument for Assessing Scientists' Written Skills in Public Communication of Science" in 2012. The study revealed the creation of the first instrument for assessing scientists' writing talents in scientific

public communication. They concluded that scientists may need to "unlearn" their scientific communication abilities to interact with the public in sociocultural settings that appreciate such activities (Baram-Tsabari & Lewenstein, 2012).

Brossard & Shanahan (2006) conducted research titled "Do They Understand What They Read?" to build a scientific literacy measurement instrument based on science media coverage. The researchers identified the 31 terms that are most frequently used in the media by examining how scientific and technical phrases that were randomly chosen from a scientific dictionary were used in the media. The pilot-test scientific literacy results are examined and contrasted with those acquired using the National Science Foundation's scale (Brossard & Shanahan, 2006).

Similarly, Mattiello's (2019) research work, "A corpus-based study of scientific TED Talks explaining cancer-related themes to non-experts," examined the explanation tactics employed by specialists to transmit scientific knowledge to both experts and laypeople. The qualitative analysis looked into the clarifying roles of denominations, definitions, and descriptions in a limited sampling of expert-led scientific TED Talks. The quantitative study focused on the term "cancer" and its synonyms in the same corpus (Mattiello, 2019).

Moreover, Scotto di Carlo's (2014) study "The Role of Proximity in Online Popularizations: The Case of TED Talks" examined the process of recontextualizing scientific lectures into TED talks. It draws on Hyland's idea of "proximity" and five factors when exhibiting proximity in popularizing texts, such as organization, argument structure, believability, posture, and reader involvement. TED's strategy of employing linguistic strategies to promote comprehensibility and engagement of the audience through inclusive pronouns emphasizes proximity of commitment rather than closeness of membership. These strategies demonstrate TED's belief that science should be viewed as a set of ideas to be debated rather than as information to be passively consumed (Scotto di Carlo, 2014).

Then, Pinar & Lopez (2018) conducted a study titled "TED talks: A multimodal tool for students of technical English" in 2018. This article discussed the many modalities at work in several TED Talks. By covering the many verbal and nonverbal modes that contribute to meaning formation, lecturers may show students how TED speakers achieve one crucial goal: to engage

and persuade their audience (Pinar & Lopez, 2018). Sichen Xia conducted a study entitled "Explaining science to the non-specialist online audience: A multimodal genre analysis of TED talk videos" in 2023. The study investigated how scientific knowledge is communicated to a non-specialist internet audience using generic and multimodal resources in TED talk recordings. The findings revealed that while discussing science in TED talk videos, graphics are greatly emphasized (Xia, 2023).

Conclusively, Jin (2021) conducted a study titled "A Multi-Dimensional Analysis of Research Article Discussion Sections in an Engineering Discipline: Corpus Explorations and Scientists' Perceptions". The goal of the study was to comprehend the language traits present in the discussion parts of research publications in chemical engineering. For unskilled scholars, writing in this field might be extremely difficult. The research used 213 discussion sections from 20 specialized journals to create a corpus of around 240,000 words. The study used a Multi-Dimensional (MD) analysis approach created by Biber to look at language usage trends. This method evaluated how various language elements coexisted in the gathered texts. To get their opinions on the MD results, eight specialists in the field were interviewed about the conversation. These conversations centred on the scientists' reading histories and understanding of accepted writing conventions. The study makes recommendations for professionals who teach English for Academic Purposes (EAP), arguing that it is necessary to explicitly teach beginning writers how to use position expressions in academic writing (Jin, 2021).

The current study is being conducted to analyze a specific register variation using a multidimensional analysis tagger to find the technical and non-technical aspects of language in a TED talk on science and technology. MD Analysis is used to explore the technical and non-technical components of language in TED speeches. The existing study gives useful insights into the language usage and communication tactics used in TED speeches. A significant study gap, however, comes from the proposed research subject of "A Linguistic Analysis of Technical and Non-Technical Language in TED Talks on Science and Technology." While multiple studies have investigated various aspects of TED lectures, such as their sociological implications, multimodal tactics, and audience participation, there has been a limited focus on a thorough language study that encompasses both technical and non-technical material.

Research Methodology

Study's Design

In this study, researchers used a mix-method approach to analyze the corpus. For this purpose, firstly, the researchers used the Biber (1988) Multi-Dimensional Analysis as the major theoretical and analytical framework for research question one. Douglas Biber is an American Linguist, who designed this tool for analyzing a large number of corpus-based data to examine and compare spoken and written registers of the English language. There are certain benefits of conducting a corpus-based study such as; it examined the language usage in the real text. Its examination was built on a sizable and ethical collection of natural writings. It makes extensive use of computers for analysis. It depends both on quantitative and qualitative techniques, which enhance the generalizability of the study's findings (Biber, 1998).

As mentioned earlier, this study investigates the technical and non-technical registers used in TED talks, which concurrently examines a large number of linguistic characteristics and features in a large volume of text. In Biber's ground-breaking study from 1988, 67 lexico-grammatical elements were mechanically extracted from the spoken and written corpora. These were then broken down into several interpretable linguistic dimensions in the form of co-occurring linguistic variables using factor analysis:

Figure 2

Biber's 6-Dimensional Framework

Biber's Linguistics Dimenions of MDA Framework	1. Involved vs Informational
	2. Narrative vs Non-Narrative
	3. Explicit vs Situation-Dependent
	4. Overt Expression of Persuasio
	5. Abstract vs Non-Abstract
	6. Online Informational Elaboration

This approach's fundamental presumption is that a factor's collection of linguistic traits indicates a group of related communication functions. The "situational, social, and cognitive functions most widely shared by the language feature" are then understood as dimensions for these co-occurring linguistic aspects (Biber & Conrad, 2001, p. 6) A thorough assessment of the "fundamental structural and functional properties of a certain genre of discourse" is provided by the MD analytical technique (Friginal et al., 2013, p. 286). For the research question two, the researchers used the AntConc software. For research question three, the researchers used the POS tagger software and the Halliday Functional theory.

Corpus of the study

The corpus for the study is provided by the English Department of the Division of Arts and Social Sciences, University of Education for research purposes. The usage of corpus doesn't violate the copyrights because it was available openly for the researchers of the department. The corpus comprises 17 TED talk videos and contains 62788 tokens. The subject matter of the compiled corpus is exclusively based on the COVID-19 pandemic era.

Research Procedures

After finding a rigorous gap by reviewing the previous literature on the problem statement that has been under investigation, the researchers made three research questions. So, the data will be analyzed in the following ways to comprehensively provide the answers to the study's questions. For research question number one, the researchers employed the following three Linguistics Dimensions in Biber's MAT tagger tool, because these are found most appropriate and relevant to the selected corpus;

- o Dimension 1- Involved vs Informational Production
- o Dimension 3 - Explicit vs Situation-Dependent Reference
- o Dimension 4 - Overt Expression of Persuasion

After running the tool on the corpus, the resulting scores of these three dimensions were compared to Biber's 1988 Multidimensional scores of his British English corpus-based study. He presented these scores in his book named "Variation Across Speech and Writing (1991)".

Moreover, further results were analyzed through the differences found in the comparisons and N-Grams provided by the MAT tagger for each dimension.

To find the frequency of the technical and non-technical vocabulary used in the corpus for research question number two the researchers used the AntConc software. AntConc is a useful tool for identifying word sequence frequency trends in a corpus or text. For a study process, it is extremely useful to have established high-frequency terms. This software provided the results in the following ways:

Word Types	**4809**
Word Tokens	**62788**

From these 4809 types of words, the researchers separately made a list of 350 technical and 515 non-technical vocabulary used by the presenters in TED speeches. However, the list of these words is reported in the appendix. After finding the separate list of technical and non-technical vocabulary from the results of AntConc software, the researchers will tag those words through Parts of Speech (POS) software to find the high frequency of linguistics features used in the corpus for scientific communication, which is the third research question of the study. Moreover, for the detailed elaboration and explanation of the linguistic features the researchers also consulted the Longman English Grammar book by Longman Alexander.

Findings and Discussions

The "Involved Persuasion" text type was identified as the nearest text type in the complied TED talks corpus in the results given by the MDA tagger. For numerous reasons, they are classified as "involved persuasion." For instance, TED lectures often use personal stories and emotional appeals to engage and persuade the audience and often include presenters who are deeply invested in and enthusiastic about their subject. Additionally, TED lectures often contain a strong persuasive intent, to motivate and inspire the audience to take action or alter their thinking in some way. The speeches often end with a call to action or a challenge to the audience to make a difference in the world.

Dimension 1: Involved vs. Informational Production—Closet Genre: Personal Letters

According to the MAT tagger's output along dimensions 1 and 4, the text's Closet Genre is Personal Letters. Biber's MDA framework's "Engaged vs Informational" dimension evaluates how much of a text is written in a subjective or in an individual's voice as compared to an increasingly objective, informative style. The author actively participates in the development of writings that score highly on the engaged production dimension, and the texts often include the author's own experiences, viewpoints, and emotions. Writings with strong informational production dimensions tend to be more objective and impersonal, and the author is not as engaged in the writing. Third-person pronouns, technical jargon, and a plainer writing style are frequently used in these writings.

On the positive side, D1 demonstrates the involved functions of language, such as the registers of telephonic calls, face-to-face talks, public dialogues, personal letters, spontaneous speeches, interviews, romantic fiction, and planned speeches. This dimension has linguistic properties such as private verbs, personal pronouns, WH questions and hedges etc. on its positive side. On the other hand, D1 has informational production such as official documents, academic prose, press reportage, biographies, press reviews, science fiction, religion, humour, popular lore, editorials, hobbies, mystery and adventure fiction, general fiction, professional letters, and broadcasts on its negative side. Nouns, prepositions, attributive adjectives, location adverbials, and agentless passives are indicated on the negative side. In this dimension, on the positive side, the MAT tagger indicated conversations, personal letters, and prepared speeches. From these three positive features, it specified *personal letters* as the closet genre. The score for this dimension is 14.74, however, the mean dimensional scores of the 88 MD analyses are 19.5, which shows a difference of 4.76 points. On the negative side, MAT tagger indicated broadcasts, official documents, press reportage, and academic prose. The most frequent linguistic feature found in this corpus is *WH questions*. This is mainly because the platform organized question and answer sessions to enhance the knowledge of the audience on the subject matter of COVID-19. It demonstrates that TED speeches are more engaging than informational.

Dimension 4: Overt Expression of Persuasion; Closet Genre: Personal Letters

The fourth dimension in Biber's MDA model is "overt expression of persuasion." It focuses on the use of words or language that persuade or influence others. Positive characteristics include

infinitives, prediction modals, persuasive verbs, conditional subordination, necessity modals, split auxiliaries, and possibility modals. In the selected data, the MAT tagger suggested personal letters as the closet genre, while broadcasts, official papers, journalistic reports, and scholarly prose were identified as the negative side. The mean dimensional scores of the 88 MD analyses are 1.6, which is different from this dimension's value of 1.68 by 0.08 points. It demonstrates how TED presentations serve as outward indicators of persuasion in one way or another.

Samples of personal letters from the TED Talk corpus

(1) "Audrey Tang: Very happy to be joining you, and good local time to everyone.

David Biello: So, tell us about—sorry to say—digital tools and COVID.
AT: Sure. Yeah, I'm really happy to share with you how Taiwan successfully countered the COVID using the power of digital democracy tools. As we know, democracy improves as more people participate. And digital technology remains one of the best ways to improve participation, as long as the focus is on finding common ground, that is to say, prosocial media instead of antisocial media. And there are three key ideas that I would like to share today about digital democracy that are fast, fair, and fun."

(2) "Whitney Pennington Rodgers: Hello and welcome to everyone joining us from around the globe. Thank you for being part of day two of our special series, TED Connects. This week, we're bringing you interviews from some of the world's greatest minds to offer tools for us to navigate through and thrive in these really uncertain times. I'm Whitney Pennington Rogers, TED's current affairs curator, and I'll be one of your hosts for today's event."

Discussion about Personal Letters as a Closet Genre of TED Talks. D1

The results of this dimension slightly correlate with Scotto di Carlo's research on proximity in the online popularization of TED talks. For example, personal anecdotes, emotional appeals and speaker participation in TED talks may be interpreted as a purposeful attempt to increase proximity and audience involvement, supporting the consistency between the results and the literature. It is mainly because TED talks are characterized by a highly personal and emotional approach to persuasion, which seeks to establish a strong connection with the audience to influence their thoughts or actions. Personal letters are relatively comparable to conversations in that they are involved, situation-dependent, and nonabstract, and they do not have significantly higher or lower scores when compared to other dimensions. In truth, in the example of personal letters, the recipient and author have neither physical nor chronological background in common, yet the

connection between both is generally presumed. Thus, in personal letters as well as in broadcasts and conversations, the speaker or writer assumes familiarity with the production situation.

Personal letters, which can range from intimate to cordial, are written to friends or family members. They are casual, addressed to specific people, deal with very private topics, and heavily rely on the reader and writer having a common background. Although they are written, they exhibit oral situational traits for shared personal knowledge, effort made to keep the connection going, and informational load, as well as intermediate situational traits about the majority of the other distinctions. They only exhibit literacy values about the physical channel and the chance for engagement with the text. Personal letters, although being written, can therefore be categorized as having mostly oral situational-related qualities.

Dimension 4

The finding of overt persuasive expressions in dimension 4 corresponds well with Pinar and Lopez's study of TED talks as a multimodal tool for technical English students. As mentioned in Pinar and Lopez's study, the language characteristics found in Dimension 4, such as persuasive verbs and conditional subordination, match with the greater purpose of engaging and convincing the audience. This is the case because verbs that vehemently convey strong feelings, attitudes, or beliefs are frequently employed to blatantly influence people. For instance, "I am certain that the COVID-19 epidemic requires intervention." Modal verbs like "should," "must," and "need to" are frequently employed to actively convince people to do something. When employed with a first-person agent, prediction and possibility modals indicate intention (e.g., "I will go" and "I might do it"), and they can indicate evaluation of likelihood in other situations (e.g., he will come; it might rain). Additional characteristics, like modals of necessity and suasive verbs, indicate the speaker's efforts to persuade the addressee that specific outcomes are desired or likely (e.g., you should go).

Even though TED speeches and personal letters appear to be distinct modes of communication, they contain characteristics that have categorized them as a closet genre. For instance, TED presentations and personal letters may both be utilized to share personal tales and experiences. Speakers at TED lectures frequently share personal tales or life experiences to highlight a wider point or perspective. Similarly, personal letters allow people to express their own stories, ideas, and feelings with others in a more intimate and personal setting. In both

circumstances, sharing personal experiences may be a powerful way to connect with others and promote empathy. Second, both TED speeches and personal letters may be utilized to motivate and inspire people. TED speeches are often broadcast.

While personal letters may be written to offer support, encouragement, or advice to people, TED lectures frequently focus on disseminating ideas and fostering change. The aim in both situations is to inspire the reader or listener to take action or make a difference in their life. While personal letters may be written to offer support, encouragement, or advice to people, TED lectures frequently focus on disseminating ideas and fostering change. The aim in both situations is to inspire the reader or listener to take action or make a difference in their life. Lastly, TED lectures and private letters may both be utilized to foster a sense of community and belonging. TED presentations frequently bring people with similar interests together.

Personal letters may be a means to connect with others on a more personal level, but TED lectures frequently bring people together who have a common interest or passion. Both TED presentations and private letters may promote a sense of community and a shared sense of purpose or identity by exchanging experiences and ideas. Fourthly, TED lectures and private letters may both serve as discussion starters and sources of inspiration. Although personal letters may be responded to with more letters or chats, TED lectures are frequently followed by discussions or disputes. In both situations, exchanging thoughts and getting comments may be a helpful method for developing fresh viewpoints and insights.

Ultimately, TED speeches and personal letters may both be used to question assumptions and modify viewpoints. Personal letters may be used to question others' preconceptions or provide a different viewpoint on a topic, whereas TED presentations frequently feature speakers who challenge the status quo or offer new and inventive ideas. The purpose of both situations is to inspire people to think critically and perceive things in new ways. We may strengthen our relationships, motivate change, and produce new ideas by noticing and using these commonalities in our communication.

Dimension 3: Explicit vs. Situation-Dependent Reference; Closet Genre: Prepared Speeches

The third component of Biber's MDA structure, "Explicit vs. Situation-Dependent Reference," is titled as such. The way language users relate to things in their environment is a concern in this dimension. WH relative clauses on object locations, pied-pipe constructions, WH relative clauses on subject positions, phrasal coordination, and normalization are some of the linguistic qualities that this dimension has to offer. On the other hand, this dimension has linguistic characteristics like time adverbs, location adverbs, and adverbs.

In this dimension, the MAT tagger resulted prepared speeches, academic prose, and official papers on the positive side. This dimension has identified prepared speeches as the closest genre based on these favourable characteristics. Broadcasts, discussions, private correspondence, general fiction, and news reports were all flagged negatively by the MAT tagger. The mean dimensional scores of the 88 MD analyses are 0.3, which is different from this dimension's value of 0.86 by 0.56 points. Given that TED talks are presented by presenters who have been given advance notice of the event, have had time to prepare and rehearse their message, and are presenting their thoughts in a highly structured and planned style, it is clear that TED presentations may be classified as prepared speeches. The live audience and worldwide reach of TED lectures put added pressure and expectations on the speaker to create a professional and successful presentation.

Sample of Prepared Speech from TED Talk Corpus

(1) "As of the morning of February 27, 2020, there were at least 82,000 confirmed cases worldwide of the coronavirus and 2,810 deaths from it.
[What happens if you get infected with the coronavirus?]
This looks like a very mild disease, like a common cold, in the majority of people. Certain people get infected and have very serious illnesses; among them are health workers. It's a very serious infection in them, as they get a higher dose than normal people, and at the same time, they have no immunity. So, in the general population, it's likely that the dose of virus that you receive when you are infected is much less than the dose that a health worker would receive, with health workers having more serious infections. So, your infection would be less serious, hopefully. So that leaves the elderly and those with comorbidities to really be the ones that we have to make sure are taken care of in hospitals."

(2) "What if you own a hotel, and one of the key principles in your mission statement is a commitment to treat all employees and customers equally, including on the basis of gender and religion? And then a large group books an event at your space, and when you look at the booking, you realize it's a religious group, and one of their key principles is that women should never leave the home and should have no opportunities for professional development outside of it. What do you do? Do you host the event and get criticized by some or refuse and get criticized by others?"

Discussion about Prepared Speeches as a close genre of TED Talks

The organized and planned style noted in Dimension 3, implies a prepared speech genre, which is consistent with Xia's focus on the multimodal features of TED lectures, in which visual aids play an important part. This highlights the wide-ranging nature of TED talks in using equally both linguistics and graphic components for in effect communication with audiences. For numerous reasons, TED lectures are classified as planned speeches. To begin, TED speakers are usually invited to speak ahead of time and given a specified amount of time to prepare their lecture. They may practice their speech and fine-tune their message to ensure that they are communicating their views as effectively as possible. Second, most TED lectures are given in a highly organized fashion, with a distinct introduction, body, and conclusion. Visual aids, such as slides or movies, are frequently used by speakers to complement their points and make their presentations more interesting.

Finally, TED talks are presented in front of a live audience, which adds to the feeling of occasion and necessitates that the speaker be well-prepared and organized in their delivery. The audience is frequently composed of specialists or thought leaders in the same field as the speaker, adding a degree of pressure to the presentation. Third, because TED speeches are frequently videotaped and made available online, they have the potential to reach a worldwide audience. As a result, presenters must ensure that their presentation is well prepared, polished, and presented engagingly and persuasively.

This study focuses on the technical and non-technical terminology of TED speeches. This dimension highlighted the employment of both technical and non-technical terminology. Explicit reference is generally preferred in technical language, such as that used in academic or scientific writing. Technical language strives for precision and clarity, and the reader must understand what is being referred to. A technical document, for example, may refer to "the third bolt from the top" or "the parameter values in Table 2." In certain circumstances, explicit reference is required to guarantee that the information is presented appropriately and unambiguously.

Non-technical language, on the other hand, frequently relies on situation-dependent references. Everyday language is non-technical. Speaking or writing in non-technical language, which is frequently used in ordinary conversation, entails employing generic concepts that don't

need to be specifically identified. As an illustration, a buddy may ask another, "Can you give me the salt?" without referencing the salt container or where the salt was. The situation's context makes the allusion obvious. Yet, it's crucial to remember that the line separating technical language from non-technical language is not always evident, and the reference type used may depend on the particular genre, discourse community, and communicative goal.

For instance, context-dependent references, such as "the machine on the left" rather than "the model number XYZ123 machine," may be more prevalent in some technical disciplines, such as engineering. In conclusion, whereas situation-dependent reference is frequently employed in non-technical language, explicit reference is more frequently used in technical language. The reference type chosen depends on the language's communication goal, context, and audience. The list of technical and non-technical terms from the TED talk corpus, however, is supplied in the following section. The table below provides a summary of the overall D1, D3, and D4 outcomes.

Table 1

Comparison of TED Talks with the British Edition of Dimensional Scores through Multidimensional Analysis (1988)

Sr. No	Biber's Dimensions of Linguistic variation	Ted Talk Master Corpus Score	Biber 1988 British Corpus Score	Difference	Closet Genre	Closet Text Type
D1	Involved vs Informational Production	14.74	19.5	4.76	Personal Letters	
D3	Explicit vs Situation-Dependent Reference	0.86	0.3	0.56	Prepared Speeches	Involved-Persuasion
D4	Overt Expression of Persuasion	1.68	1.6	0.08	Personal Letters	

Figure 3
Overall Comparative Results

Comparsion of TED Talk vs Brit.Ed Corpus on Dimensional Scores using MDA Framework
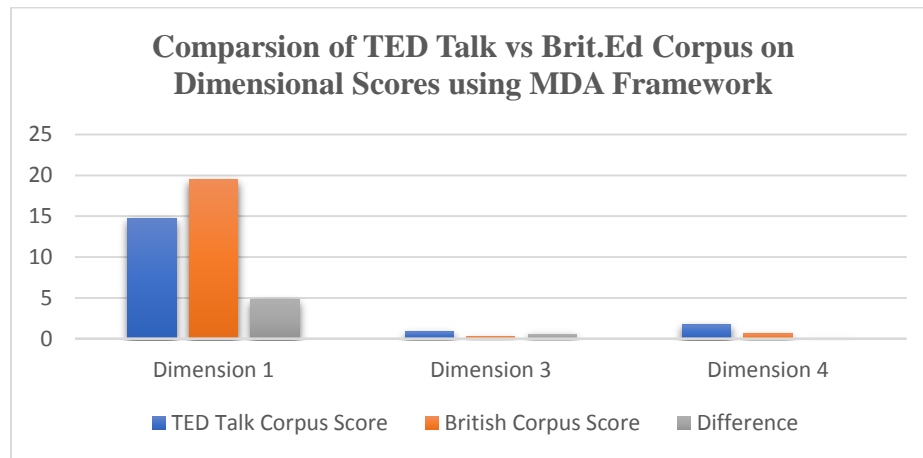
Discussion of Technical and Non-Technical Language in TED Talk

Technical Language in TED talks

TED lectures are renowned for their capacity to entertain and inform audiences on a range of scientific and technology-related issues, making them understandable to both specialists and laypeople. In their speeches on science and technology, TED talks frequently employ technical terms to make complex ideas and concepts understandable to a wide audience. These talks aim to bridge the gap between scientific research and its practical applications, inspiring people to engage with science and technology in their daily lives. TED speakers typically define these technical terms in layman's terms or provide context to help the audience understand their meaning to make them more understandable. They might also use visual aids to clarify difficult concepts, like diagrams or pictures. This approach helps make complex ideas accessible to a wider audience and encourages engagement with the topic.

Additionally, it enables individuals from different backgrounds to understand and appreciate the significance of technical advancements in various fields. TED speakers also frequently employ storytelling and personal anecdotes to make complex subjects more relatable and interesting. TED speakers can better explain the significance and applicability of the subject at hand to their audience by relating these technical ideas to personal experiences. This approach helps to engage the audience and make them feel more connected to the topic. It also allows the speaker to provide a unique perspective that can help the audience better understand and appreciate

the subject matter. Overall, the purpose of TED talks is to inform and inspire their audience; using technical language is just one tactic used to do so. TED speakers can engage a larger audience and advance understanding and interest in science and technology by simplifying complex subjects into understandable terms. This approach helps to break down barriers between experts and the general public, making scientific advancements more accessible to everyone. Additionally, it encourages people to engage with new ideas and think critically about the world around them.

Table 2

Example of Technical Language from TED talk Corpus

Sr. No	Word	Sample from Corpus
1.	**Microbe**	All vaccines have an antigen, that's the part of the **microbe** that your body remembers, that you might make antibodies or cell-mediated immunity against.
2.	**Telemedicine**	And that can be from digital payments to **telemedicine** to changing the face of retail and how we think about retailing, changing the face of entertainment……
3.	**Zoonosis**	And the concept was that she was getting infected with a **zoonosis,** that is, with naturally occurring cowpox, not smallpox.
4.	**Telecoms**	So, we have to innovate at the border and make sure that we have a sufficient number of, for example, quarantine hotels or the so-called "digital fences," where your phone is connected to the nearby **telecoms,** and they make sure that if they go out of the 15- meter or so radius, an SMS is sent to the local household managers or police and so on.
5.	**Tradeoffs**	In China, they've had them in for six weeks, it's tough to maintain that, so we need to think of these **tradeoffs** of all the things we can ask people to do, what's going to have the most impact on actually reducing the burden.
6.	**Electromobility**	So therefore, our green recovery efforts need to be done, as Kristalina [Georgieva] spoke last week, has to be related to a green recovery that creates jobs immediately, and addresses the poverty issues that we have on energy today in southern Chile, and we need to use this for expanding renewable energy and expanding the successful efforts that we've done on **electromobility**.

Non-Technical Language in TED talks

TED presenters use non-technical words in their speeches about science and technology to make complicated ideas and concepts approachable to a large audience. This strategy has promoted innovation in a variety of disciplines and helped democratize knowledge. To further explain complex ideas, TED presenters often clarify them in simple terms or give context. Interactive components such as hands-on experiments or virtual simulations can also engage viewers and motivate them to learn more about science and technology.

This strategy promotes interest in the subject and makes difficult concepts more approachable to a larger audience, making it possible for people from a variety of backgrounds to comprehend and value the significance of technological advancements. Additionally, it facilitates the transition of research into useful applications by bridging the gap between academia and industry. TED presenters use narrative and personal tales to humanize and enliven complicated topics. This strategy helps the audience develop a personal connection with the speaker, which can improve their comprehension and memory of the material.

Additionally, incorporating personal anecdotes or examples from real life can be a useful way to apply this strategy. Ultimately, TED lectures aim to educate and excite their audience, and one strategy employed to do this is the use of technical jargon. By breaking down complicated topics into easily understood words, TED speakers may attract a larger audience and increase interest in and knowledge of science and technology. By lowering barriers between professionals and the general public, this strategy makes scientific breakthroughs more approachable for everybody.

Table 3

Example of Non-Technical Language from TED talk Corpus

| Sr. No	Word	Sample from Corpus
1.	**Wide**	When you say enroll people, you mean enroll people who have their eyes **wide** open.
2.	**Succeed**	So, what you want to do is say, which are the most likely to **succeed**, and then put them through some type of standardized set of criteria to pick a few of them to move forward aggressively for the world.
3.	**Quit**	And if you're a smoker, right now is the best possible time to **quit** smoking.
4.	**Honestly**	I want to lead here by talking a little bit about my credentials to bring this up with you, because, quite **honestly**, you really, really should not listen to any old person with an opinion about COVID-19.
5.	**Concern**	So, the big **concern** when it comes to using digital tools for COVID or using digital tools for democracy is always privacy.
6.	**Truly**	So basically, this is about designing with an aim to enhance other people's privacy, because personal data is never **truly** personal.

The importance of clearness and ease of understanding in delivering technical and non-technical knowledge can be recognized in both academic and TED talk contexts. As the previous study conducted by Jin in 2021, employing Biber's Multidimensional analysis approach. This study highlighted the challenges faced by unskilled writers within the field of chemical engineering and recommended explicit teaching of writing conventions, especially focusing on position expression in academic writing. So this emphasis on teaching is congruent with the findings of the

TED talks explored in this study, which results in using both technical and non-technical language to make complex scientific issues intelligible to both professionals and laypeople. Furthermore, the research highlighted the importance of context and audience comprehension. Through interviews with specialists in Jin's work dives into contextual details of academic writing whereas TED presentations bridge the gap between scientific research and practical applications by adding narrative, stories and visual aids to captivate audiences.

**Discussion of Linguistics Features in TED talks**

To make technical and non-technical language about science and technology more interesting and approachable for their audiences, TED Talk speakers employ a variety of linguistic techniques. To provide their audience with a visceral experience, speakers frequently utilize colourful language. The POS tagger software, for instance, displays the following linguistic properties in the technical terms the researchers chose, as seen in the picture below:

Figure 4
Linguistics Features in Technical Words
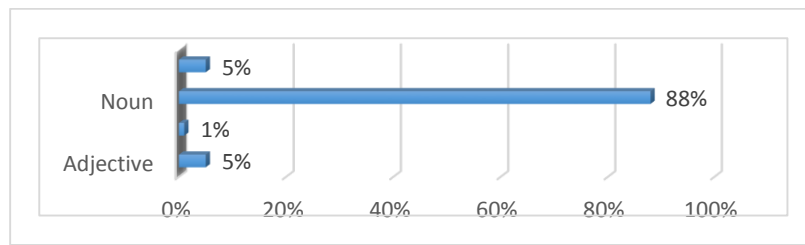
Similar to the image above, the POS tagger software demonstrated the employment of the following linguistic elements in the non-technical terms chosen by the researchers:

Figure 5
Linguistics Features in Non-Technical Words

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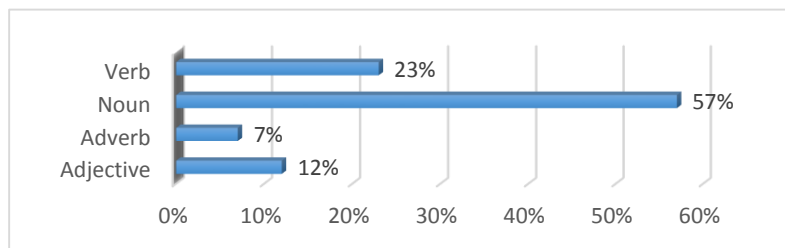
According to the Longman English Grammar book, nouns are of numerous types such as common nouns and proper nouns, compound nouns, concrete and abstract nouns, countable and uncountable nouns, nouns ending with "ing", nouns used as verbs, singular and plural nouns, collective noun (Alexander, 1988).

Here are a few examples of types of nouns found in the technical and technical words that are mentioned in the appendix:

- **Common Nouns:** Heart, Neighborhood, Works, Days, Tourist, Thanks etc.
- **Proper Nouns:** Yellow, Trump, Santiago, Ansin, Schulman, Patagonia, Michael, Audrey, Marcelo, Lagrange, Rodgers, India, Korea etc.
- **Countable Nouns:** Fossils, Tablet, Magnitude, Vaccines, Antibody, Microgram, Meters etc.
- **Uncountable Nouns:** Protein, Substance, Typhoid etc.
- **Abstract Nouns:** Distress, Love, Fear, Trust, Frustration, Desire etc.
- **Collective Nouns:** Politicians, Folks, Families, Guests, Games, Cities etc.
- **Concrete Nouns:** Ladder, House, Tree, Grocery, Bag etc.
- **Nouns with "Ing":** Worrying, Manufacturing, Transmitting, Co-learning, Preexisting, Engineering, Formatting

TED Talk speakers frequently avoid jargon and overly complicated terminology and utilize straightforward sentence patterns, whether the language is technical or not. This facilitates audience comprehension, particularly for those who may lack a background in science or technology. Overall, TED Talk speakers employ several language techniques to make their talks interesting, educational, and approachable to a diverse spectrum of audiences. Presenters at TED Talks may make a stronger connection with their audience and leave a lasting impact by using these components.

Conclusion

As mentioned above, Biber's (1988) Multidimensional analysis is used to highlight the linguistic and functional characteristics of the TED talk corpus based on three textual dimensions. The average Dimension 1 score, for instance, demonstrates that the TED talk corpus is less

informative than the British corpus. This is demonstrated by the finding that British corpora utilize nouns, prepositions, and attributive adjectives sparingly, but TED talk corpora use these language elements extensively to communicate information. This shows that TED speeches may stress entertainment and narrative about information transmission, whereas British corpora may employ language elements more evenly.

In terms of technical language, for example, presenters employ 88% of nouns compared to other linguistic elements. Nomenclature, PPE, protein, sublimation, subset, substance, systematic, tablet, targeted, telecommunications, telehealth, teleworking, termination, thread, telemedicine, threads, timeline, sync, and so on are examples of these nouns. This implies that technical speakers rely largely on specialized vocabulary to deliver their information. It also means that a solid command of technical terminology is required for efficient communication in these domains. Presenters, on the other hand, employ 57% of nouns in non-technical language when compared to other linguistic elements. Vision, Winter, Worried, Wreck, Yellow, Absent, Around, Threatens, Ties, Tourists, Travelers, Trump, Trusting, Truth, Tweets, and so on. This shows that presenters prefer to employ actual and practical language over abstract words.

The Dimension 3 score of the TED talk corpus reveals more textual variety than the British Ed. This is backed by the fact that the TED talk corpus appears to make considerable use of relative constructions; for example, relative constructions, nominalizations, and phrasal coordination are more prevalent in TED talks than in the British corpus. This implies that the linguistic style and structure used in TED speeches differ from those used in British educational resources, which may reflect the two forms of discourse's varied aims and audiences. These characteristics demonstrate knowledge, explicit discourse, and developed discourse, which are common in planned presentations. The British corpus, on the other hand, demonstrates context-dependent speech, and it appears to make enough use of time and place adverbs to assist in the description of current events and circumstances. This shows that people communicate and express information in different registers, which may be noticed in the language they employ. Knowing these distinctions is essential for good cross-register communication.

The Dimension 4 score demonstrates that the bulk of the TED talk corpus contains a high level of argumentative language, but the British Edition corpus contains no argumentation or

persuasive statements. To successfully transmit a message and accomplish the intended goal, it is critical to adapt one's vocabulary and tone depending on the situation and audience. Furthermore, speakers or writers who want to persuade their audience may benefit from studying argumentative discourse patterns to improve their persuasive abilities. This is unexpected because compelling writing for TED speeches is anticipated. TED speeches often express clearly expressed viewpoints with distinctive language elements, such as many modals (should, etc.) and a high concentration of conditionals. The use of persuasive language isn't the only thing that keeps TED speeches interesting. The presenters also employ narrative tactics and visual aids to attract the audience's attention and successfully deliver their points.

The current study demonstrates the use of multi-Dimensional analysis in characterizing the linguistic aspects of TED presentations. It is stated that TED presentations are classified as a sub-register with distinct language characteristics. It may also be claimed that TED speeches are emerging as a distinct language variety, which encourages more research. The outcomes of this study might help to design language training materials and improve public speaking abilities. By giving insights into the structure and use of TED talks, the findings of this study can assist in developing public speaking talents and examine the usefulness of various communication techniques. This work also contributes to the area of discourse analysis by establishing the usefulness of MD analysis in investigating spoken conversation. Furthermore, future research could look into whether these linguistic features are unique to TED talks or if they are found in other types of public speeches. Future research might look at how these language distinctions affect audience engagement and understanding.

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