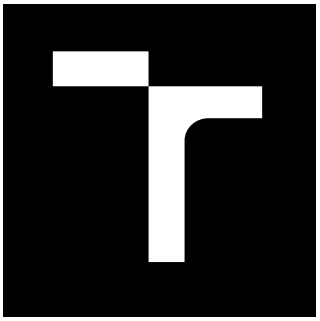

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FACULTY OF ELECTRICAL ENGINEERING AND COMMUNICATION

FAKULTA ELEKTROTECHNIKY
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ÚSTAV JAZYKŮ

FUNCTIONS OF PROFESSIONAL SCIENTIFIC DISCOURSE

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Functions of professional scientific discourse

INSTRUCTION:

Give examples of the functions of professional discourse in science and technology, the speech acts used in this discourse and typical approaches to recipients.

RECOMMENDED LITERATURE:

Krhutová, Milena: Parameters of Professional Discourse, Tribun EU 2009
Knittlová, Dagmar: Překlad a překládání, Univerzita Palackého 2010
Widdowson: Discourse Analysis
Cook, Guy: Discourse, OUP, 1999

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Subject Council chairman

Abstract

The theoretical segment of this thesis delves comprehensively into various facets of discourse analysis, encompassing discourse definitions, analysis methodologies, situated meanings, cohesion, coherence, and distinctions between spoken and written language.

The thesis highlights the intricate nature of language, spotlighting that effective communication surpasses mere grammatical accuracy. It entails an understanding of context, the application of pragmatic strategies, and the adept use of assorted speech acts to achieve precise communicative objectives.

Moreover, the thesis explores the concept of speech acts, their diverse types, and their multifaceted functions within distinct language styles, particularly within science and technology and popular scientific style.

In the following segment of the thesis, the study delves deeper into specific speech acts commonly found in the realm of English in Electrical Engineering. These speech acts are the following: explication, exemplification, evaluation, argumentation, defining, concluding, and critiquing.

As for the practical part of the thesis, it analyzes examples of technical and humanities texts which correspond to different speech acts, which were examined in the theoretical part.

Keywords

Professional discourse, Science and technology, Linguistic features, Speech acts, Pragmatic contexts, Cohesion, Coherence, Meaning, Technical texts, Humanities texts, Science and technology style, Popular scientific style, Analysis

Abstrakt

Teoretická část této práce se komplexně zabývá různými aspekty analýzy diskurzu, zahrnujícími definice diskurzu, metodologie analýzy, situované významy, kohezi, koherenci a rozdíly mezi mluveným a psaným jazykem.

Práce zdůrazňuje složitou povahu jazyka a zdůrazňuje, že efektivní komunikace přesahuje pouhou gramatickou přesnost. Zahrnuje porozumění kontextu, uplatňování pragmatických strategií a obratné používání různých řečových aktů k dosažení přesných komunikačních cílů.

Práce dále zkoumá pojem řečových aktů, jejich rozmanité typy a jejich mnohostranné funkce v rámci různých jazykových stylů, zejména v oblasti vědy a techniky a populárně naučného stylu.

V následujícím segmentu práce se studie hlouběji zabývá konkrétními řečovými akty, které se běžně vyskytují v oblasti angličtiny v elektrotechnice. Jedná se o tyto řečové akty: explikace, exemplifikace, hodnocení, argumentace, definování, vyvození závěru a kritika.

Co se týče praktické části práce, analyzuje příklady technických a humanitních textů, které odpovídají různým řečovým aktům, jež byly zkoumány v teoretické části.

Klíčová slova

Odborný diskurz, Věda a technika, Jazykové rysy, Řečové akty, Pragmatické kontexty, Koheze, Koherence, Význam, Technické texty, Humanitní texty, Vědeckotechnický styl, Populárně naučný styl, Analýza

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Author's Declaration

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Academic year:	*2022/23*
Topic:	*Functions of professional scientific discourse*

I declare that I have written this paper independently, under the guidance of the advisor and using exclusively the technical references and other sources of information cited in the project and listed in the comprehensive bibliography at the end of the project.

As the author, I furthermore declare that, with respect to the creation of this paper, I have not infringed any copyright or violated anyone's personal and/or ownership rights. In this context, I am fully aware of the consequences of breaking Regulation S 11 of the Copyright Act No. 121/2000 Coll. of the Czech Republic, as amended, and of any breach of rights related to intellectual property or introduced within amendments to relevant Acts such as the Intellectual Property Act or the Criminal Code, Act No. 40/2009 Coll., Section 2, Head VI, Part 4.

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author's signature

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Brno, August 15, 2023

Author's signature

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INTRODUCTION

The primary aim of this thesis is to provide a comprehensive overview of professional discourse within the realm of science and technology, achieved through an in-depth analysis of linguistic attributes and roles within both technical and humanities texts. The theoretical segment ventures into the multifaceted landscape of discourse analysis, encompassing diverse aspects like contextual meanings, coherence, cohesion, and distinctions between spoken and written language.

A particular focus lies on speech acts – their taxonomy, varied types, and intricate functions across language styles, particularly in science and technology style as well as popular scientific style communication. The selected specific speech acts are commonly prevalent in the domain of English within Electrical Engineering. These encompass explication, exemplification, evaluation, argumentation, defining, concluding, and critiquing. Through the lens of these speech acts, the strategies employed by writers to captivate readers, impart knowledge, and advocate within technical and humanities texts come to the fore.

In the practical part, the thesis examines instances of technical and humanities texts, exemplifying distinct speech acts identified earlier in the theoretical framework. Through the contrast of theoretical understanding and practical illustration, this work seeks to enable the reader to comprehend the differences between a humanities text in popular scientific style and a technical text in science and technology style.

1. THEORETICAL PART

1.1 Discourse

What is discourse? Guy Cook (1989/1990) describes discourse as language in use or language used to communicate something felt to be coherent which may, or may not correspond to a correct sentence or series of correct sentences. Guy writes that in discourse using language and communicating with others is more important than producing correct sentences. Here are some quotes of his which represent this study area:

"People do not always speak or write in complete sentences, yet they still succeed in communicating." (Guy, 1989:3)

"Language in use, for communication is called discourse" (Guy, 1989:6).

"Discourse may be composed of one or more well-formed grammatical sentences and indeed it often is, but it does not have to be. It can have grammatical 'mistakes' in it, and often does." (Guy, 1989:7)

What discourses mean and involve, according to Gee (1999):

- situated identities;
- ways of performing and recognizing characteristic identities and activities;
- ways of coordinating and getting coordinated by other people, things, tools, technologies, symbol systems, places, and times;
- characteristic ways of acting – interacting – feeling – emoting – valuing – gesturing – posturing – dressing – thinking – believing – knowing – speaking - listening (and, in some Discourses, reading-and-writing, as well) (1999:38).

The term "Discourse" (with a big "D") is intended to encompass significant aspects of what others have called: discourses, communities of practice, cultural communities, discourse communities, distributed knowledge or distributed systems, thought collectives, practices, cultures, activity systems, and others (Gee, 1999).

1.2 Discourse analysis

„In discourse analysis, as in pragmatics, we are concerned with what people using language are doing, and accounting for the linguistic features in the discourse as the means employed in what they are doing“ (Brown and Yule, 1983:26).

Discourse analysis has emerged as a response to traditional linguistic approaches focused on sentence structure, which neglected language use. In contrast, discourse analysis aims to extend the concept of structure from individual sentences to longer texts. This field emphasizes understanding larger units recognized in discourse but not explicitly analyzed. Conversations exhibit inherent structures, identifiable through participant moves that initiate new topics or reintroduce old ones. These moves are signaled by discourse markers like "well" or "anyway," which function beyond sentence level, indicating transitions or topic shifts. Higher-level organizational features, including text segmentation and structuring, are central to discourse analysis. Coulthard and Sinclair view discourse structures hierarchically, where acts are the lowest unit and contribute to transactions, exchanges, and moves. Their work involves isolating and describing functional units within discourse, such as teacher-pupil interactions classified as eliciting, directing, or informing (Mills, 1997).

“Doing discourse analysis certainly involves doing syntax and semantics, but it primarly consists of doing pragmatics.” (Brown and Yule, 1983:26)

Meaning is studied through discourse and it's also classified. Gee (1999) sorts meaning into different categories, present two of them which are: **situated meaning** and **meanings in and out of science**. It defines how speakers and writers give language specific meanings within specific situations. Words are not stable and general, rather have multiple and ever changing meanings created for and adapted to specific contexts of use.

1.3 Situated meanings

For situated meaning Gee presents an interesting example of how the context of the word shoe can be understood differently in situations:

“We humans recognize certain patterns in our experience of the world. These patterns (such as "soft," "thick laces," "perhaps with colored trim," "flexible soles," "made of certain sorts of characteristic materials," "having certain sorts of characteristic looks/designs", etc. = athletic shoes) constitute one of the many situated meanings of a word like "shoe." In the context of a teenager saying something like "I can't play basketball today, I haven't got any shoes," the situated meaning of "shoes" is something like the pattern above for athletic shoes (actually, a much more customized pattern for acceptable teenage basketball shoes). The sentence certainly does not mean that the teenager has no shoes whatsoever in the closet.” (Gee, 1999:42)

So, in addition to situated meanings, each word is also associated with a cultural model. A cultural model is usually a totally or partially unconscious explanatory theory or "storyline" connected to a word - bits and pieces which are distributed across different people in a social group - that helps to explain why the word has the different situated meanings and possibilities for the specific social and cultural groups of people that it does.

1.4 Meanings in and out of science

The meaning of words can vary between scientists and "everyday" people, both within specific discourses and across different ones.

The contextual meanings of words are connected to cultural models linked to distinct social groups and their discourses. These groups often compete for power, status, and the authority to claim knowledge. Gee also touches on the topic of how "everyday" people understand science, which is a significant focus in education, mentioning a study, *Learning in science* by Osborne and Freyberg (1985:8-11), that examines children's understanding of light, illustrating the challenges in comprehending scientific concepts.

Children's understanding of light using pictures, including one showing a person and a candle. Questions were asked about light's behavior and reach. Some children gave scientifically acceptable answers, unrelated to age. Notably, even older children provided incorrect answers. Many children thought candlelight travels only a short distance or stays near the candle. Some believed light's travel depends on day or night. Such views persisted in students with prior light knowledge, indicating teaching's limited impact.

Children's odd light ideas stem from their egocentric view, assuming light travels only where visible. Objects over 0.5 meters from a candle seem unlit in the day, while this varies at night (Gee, 1999).

1.5 Context

To understand the meaning, however, people use the current situation and their knowledge to assess the context of the language and text.

Brown and Yule (1983) delve into the relationship of context in between pragmatics and discourse analysis, highlighting how understanding context is pivotal in both areas. It emphasizes that discourse analysis does not just involve syntax and semantics, but crucially hinges on pragmatics—the study of language in action.

The connection between the discussed principles and Morris's (1938) view of pragmatics as the study of signs in relation to interpreters becomes evident. Both discourse analysis and pragmatics share a focus on deciphering how people use language to communicate intentions and meanings within specific contexts.

Brown and Yule point out about context that “linguistic elements which require contextual information for their interpretation are the deictic forms such as *here*, *now*, *I*, *you*, *this* and *that*. In order to interpret these elements in a piece of discourse, it is necessary to know (at least) who the speaker and hearer are” (1983:27)

Discourse analysts need to consider these contextual elements when examining language. There are contrasts in the approach of discourse analysts with that of formal linguists. The former concentrates more on how speakers use language in specific situations to convey intentions, rather than just examining abstract relationships between sentences. Terms like "reference," "presupposition," "implicature," and "inference" are employed in discourse analysis to describe the intentions and actions of speakers and hearers, as opposed to exploring linguistic relationships in isolation.

Moreover, there is underscore the interplay between pragmatics and discourse analysis highlighting the significance of context in comprehending language and underscores the role of discourse analysts in unraveling the intricacies of language use within real-life situations to uncover intentions and meanings (Brown and Yule, 1983).

1.6 Cohesion

Context is highly affected by cohesion and coherence which are grammatical and lexical connections.

Zapletalová (2009) discusses the concept of cohesion as a crucial element in understanding lexical patterning, highlights key studies by authors related to cohesion, outlining its evolution and its role in the study of discourse features.

The initial studies on cohesion emerged in the 1970s, with Quirk's "A Grammar of Contemporary English" (1985/1991) addressing sentence-context relations. This work later expanded by Quirk by focusing on textual structure and internal coherence through grammatical devices. Gutwinski's study in 1976 considered cohesion within the stratificational model, aiming to analyze literary texts and stylistic features.

Halliday & Hasan's influential work in 1976/1990, "Cohesion in English," categorized semantic relationships formed by grammatical structures and lexical choices. They interpreted cohesion as relations of meaning within the text, outlining cohesive ties like reference, substitution, ellipsis, conjunction, and lexical cohesion. Their framework was applicable to literary and narrative texts.

De Beaugrande & Dressler in 1981 approached cohesion as grammatical dependencies and relations among surface elements. They viewed cohesion as a broad relation involving repetition, showing how existing structures can be reused, modified, or compacted.

Hoey's (1991) perspective emphasized cohesion as an objective property, stressing its organizational quality in creating and interpreting a text. Cohesion, as per Hoey, is how words or grammatical features connect sentences within a text, emphasizing organization over structural unity.

The discussion shifts towards Halliday's (1994) view, where cohesion is seen as a processual relation between entities rather than a strict structure. This concept of cohesion goes beyond structural confines and operates as an additional relation within the text, existing outside structural constraints (Zapletalová, 2009).

Zapletalová sets the foundation for understanding cohesion's significance and evolution, paving the way for delving into its lexical aspects in the subsequent section.

In Brown and Yule’s (1983) book cohesion is studied on Halliday and Hasan’s findings. Their perspective focuses on cohesive relationships within sentences to

determine if they constitute a text. They assert that cohesion, provided by these relationships, distinguishes a text from non-text. Cohesion arises where the interpretation of one element relies on another, creating a cohesive link. For instance:

"Wash and core six cooking apples. Put them into a fireproof dish." (Yule and Brown, 1983:191)

This showcases an anaphoric cohesion, where "them" refers back to "six cooking apples," connecting the sentences into a coherent text.

They introduce a taxonomy of cohesive relationships, which create "ties" holding a text together. One type involves explicit markers like "and," "but," "so," and "then," indicating additive, adversative, causal, or temporal relations. However, the presence of these markers does not guarantee cohesive relations; it is the underlying semantic relationship that holds cohesion.

Moreover, there is particular interest in co-reference, substitution, ellipsis, and lexical relationships. Co-referential forms direct interpretation elsewhere for their meaning. If interpretation lies outside the text, it is exophoric; if within, it is endophoric. Endophoric relations can be anaphoric (looking back in the text for interpretation) or cataphoric (looking forward).

Halliday & Hasan (1976) assert that cohesive relationships between sentences define a text's texture. They outline a taxonomy of relationships, with a focus on explicit markers and co-reference. The presence of cohesive markers contributes to "textness," even though the underlying semantic relation holds the cohesive power (Brown and Yule, 1983).

1.7 Coherence

Moving onto coherence Cook notes that “What matters is not its conformity to rules, but the fact that it communicates and is recognized by its receivers as coherent.” (1989:7)

Brown and Yule (1983) delve into the concept of coherence in discourse interpretation by challenging the notion that meaning is solely derived from the literal words and sentence structure, highlighting the importance of additional context for accurate understanding.

Through examples, they showcase how literal completeness doesn't guarantee complete comprehension. For instance, a novelist can provide a grammatically sound yet incomplete sentence, encouraging readers to read on for full understanding.

Additionally, they also point out that language fragments lacking formal syntactic structures can be interpreted due to our familiarity with standard information formats. Even when no explicit linguistic links exist between adjacent linguistic strings, infer connections are placed based on their proximity.

“We might say that, in addition to our knowledge of sentential structure, we also have a knowledge of other standard formats in which information is conveyed. We also rely on some principle that, although there may be no formal linguistic links connecting contiguous linguistic strings, the fact of their contiguity leads us to interpret them as connected. We readily fill in any connections which are required. ” (Brown and Yule, 1983:224)

The assumption of coherence guides our interpretation of linguistic messages, forming a particular connected interpretation. However, it is the reader's effort to understand the writer's intended meaning that plays a critical role in interpretation. Various factors contribute to this understanding: coherence, analogy, local interpretation, context, discourse structure, and information organization.

Moreover, readers bring socio-cultural knowledge, such as recognizing names and understanding communicative functions, to their interpretation. Specific local knowledge and inference abilities further deepen interpretation, leading readers beyond the text-producer's intended message.

The process of interpreting discourse involves three core aspects: computing the communicative function, using socio-cultural knowledge, and determining inferences to be made. These aspects work together to uncover the intended meaning behind linguistic messages, highlighting the complexity of discourse interpretation (Brown and Yule, 1983).

1.8 Spoken and written language

The goal of learning then becomes written and spoken language, which is the key feature of communication.

Aside from the obvious distinctions between speech and writing, such as the fact that writing uses a medium to record the message transmitted while speaking uses merely air, there are also some less visible contrasts. Although a request for repeat is feasible, it is difficult to envision a discussion in which every line needs to be rephrased. Speech develops through time, during that time, the speaker speaks at a speed that is comfortable for him, even though it may not be pleasant for the listener.

Moreover, speaking may be impulsive, resulting in errors, repetition, and occasionally less cohesive phrases, where even grunts, stutters, or pauses may be significant. The speaker can modify the register since he or she typically knows the listener or audience members, or at the very least is aware that he or she is being listened to. Since interlocutors often interact face-to-face (except over the phone), they make use of extralinguistic cues such as grimaces, gesticulation, and expressions like "here," "now," and "this."

Another aspect of oral conversation is the use of nonsensical words, slang, and contracted forms (we're, you've). Rhythm, intonation, speed of utterance, and, more importantly, the difficulty to hide mistakes committed while speaking are additional crucial characteristics of speech (Crystal 1995).

Writing, in contrast, grows in space because it requires a way to transport the information. Since the author of the publication frequently is not sure who will be reading their text, he is unable to cater to the particular needs and level of expertise of the reader. Because the writer may regularly think on the subject of his work for what seems like an infinite amount of time, the work becomes more cohesive and complicated in its syntax. Additionally, since the reader is unlikely to respond to the content right away or need explanation, a well-organized message, paragraph division, and style are essential for improving understanding.

Furthermore, because there is no context, words like "now" or "here" are left out given that they might be misunderstood as writings that can be read in a variety of settings. The structure of tables, formulae, or charts that can only be represented in written form is another characteristic of writing that is never present in oral conversation (Crystal, 1995).

The most significant elements affecting whether formal or informal language should be used is the relationship between the message's sender and receiver, the number of addresses, and circumstances, like a public or private occasion. It is logical to suppose

that the modern student, who may easily travel and apply his or her language abilities outside of the classroom, would meet mostly informal speech, which may be the most challenging to understand thanks to its flexibility and unpredictability. As a result, it is reasonable to teach all language types using genuine oral and written resources (Cook, 1989).

Brown and Yule (1983) discuss the differences between spoken and written language in terms of their manner of production and the demands they place on language producers. From a production standpoint, spoken language offers paralinguistic cues such as voice quality, facial expression, and gestures, allowing the speaker to enhance their message beyond just the words spoken. In contrast, writers lack these paralinguistic tools.

“The speaker has available to him the full range of 'voice quality' effects (as well as facial expression, postural and gestural systems). Armed with these he can always override the effect of the words he speaks. Thus the speaker who says 'I'd really like to', leaning forward, smiling, with a 'warm, breathy' voice quality, is much more likely to be interpreted as meaning what he says, than another speaker uttering the same words, leaning away, brow puckered, with a 'sneering, nasal' voice quality.” (Brown and Yule, 1983:4)

There is also focus on spoken language without much consideration for paralinguistic features, as it assumes cooperative adults who use these features to reinforce meaning. The speaker not only manages different communicative systems from the writer but also handles complex multitasking during speech production. The speaker must assess whether their spoken words align with their intentions, plan upcoming utterances, and monitor their own performance while gauging the reception by the listener. Unlike writers, speakers lack a permanent record of earlier speech and often lack notes for guidance.

On the other hand, writers have distinct advantages. They can review their writing, take their time to choose words, consult references, reorder text, and revise their work privately. Unlike speakers who must actively address misunderstandings, writers can edit and revise without public scrutiny. While speakers can modify their speech in real-time based on their listener's reactions, writers must imagine reader responses without immediate feedback. It also has to be considered that according to Goffman (1981) the author can either accept the position of the writer or relate with the role of the researcher,

whose voice does not necessarily have to be the same as the writer's.

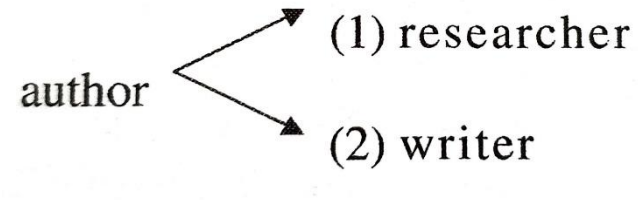

Figure 1: Goffman's (1981) concept of the 'author' (Zapletalová, 2009:35)

Brown and Yule point out that individuals sometimes choose spoken interactions or written communication based on the circumstances. While spoken communication allows immediate feedback, it also exposes emotions and requires quick responses. The author emphasizes that both spoken and written communication have their advantages and challenges, each serving specific purposes based on the context and the goals of communication.

Cook (1989) highlights the distinctions between spoken and written discourse. Spoken language occurs in real-time, lacking the ability to backtrack or edit like writing. However, there are planned speeches and custom-structured discussions, blurring the line between writing and speech. Spoken language that is scripted or based on notes is another intermediate category. The author emphasizes that the divide between spoken and written communication is not rigid, as recording technology can partially mitigate time limitations.

Furthermore, the conventional speech-writing division overlooks a more crucial division within spoken language – 'one-way' speech (e.g., lectures) and 'two-way' speech (e.g., conversations). 'One-way' speech, characterized by less reciprocity, is akin to writing in some aspects.

1	Planned	Unplanned
2	Socially Structured	Less Socially Structured
3	Aided by Writing	Unaided by Writing
4	Less Reciprocal (One-way)	More Reciprocal (Two-way)

Table 1: Cook's categorized spoken discourse along a continuum (1989:116)

Despite these categorizations, casual conversation stands out. It is unplanned, unpredictable, lacks writing aids, and involves frequent turn-taking. Due to its unique attributes, conversation requires distinct treatment in educational settings.

Zapletalová (2009) explores the relationship between **passive voice** and **hedging** in academic writing. While the focus is on the functions of the passive, there is also emphasis on the presence of hedges within passive constructions and their contribution to the interpersonal semantic system in texts, also there is examination on how hedging impacts logical arguments.

“Hedges are lexico-grammatical devices employed intentionally in order to make the propositional content more fuzzy and 'cloudy'.” (Zapletalová, 2009:63)

Despite the requirement for factual and objective academic arguments, hedges play a role in academic writing's social nature. Academic writing involves both presenting facts and seeking the community's approval of knowledge claims, which can lead to a certain blurring of factuality. Hedges are careful linguistic choices that structure social interactions and rhetorical purposes in research articles.

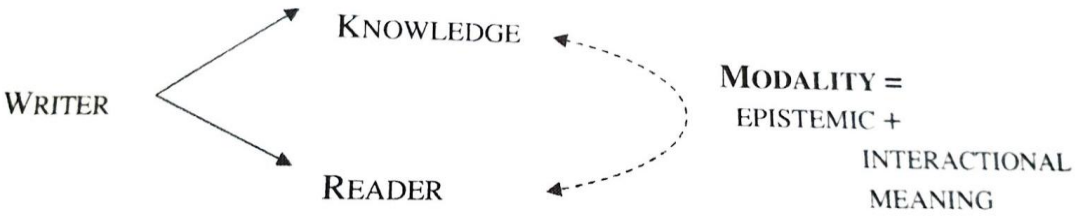

Figure 2: Zapletalová’s idea for the use of hedges to achieve modality, ‘the writer and modality’ relationship (2009:63)

From an audience-friendly perspective, hedges serve to soften the stark facts of science, allowing readers to interpret them while guiding them through the text. Hedges negotiate interpersonal meanings and contribute to the persuasiveness of discourse. They activate degrees of potentiality, such as probability, certainty, or credibility, influencing the effectiveness of the argument. Epistemic modality becomes key in understanding hedges, as they modify an action that is performed with an aim to express the complex relationship between the writer's knowledge and the transfer of that knowledge to the reader. Zapletalová (2009) also investigates how hedges, combined with the passive voice, influence the persuasiveness and social interactions within academic writing, contributing to the nuanced communication of knowledge claims.

1.8.1 Specific types of written language researched

In the following part of this thesis the focus will shift towards the analyzation of humanities and technical texts, specifically in popular scientific style and science and technology style.

Humanities texts are written works that explore and discuss various aspects of human culture, history, philosophy, arts, literature, and social sciences. These texts often delve into the complexities of human experiences, values, beliefs, and interactions. Humanities texts encompass a wide range of genres, including essays, novels, poems, plays, historical accounts, philosophical treatises, critical analyses, and more.

Technical texts are written documents that convey specialized information about a particular field or subject, often in a clear and concise manner. These texts are commonly used in technical and scientific disciplines to communicate complex concepts, procedures, instructions, and data to a specific audience with a background in the relevant field. Technical texts aim to provide accurate and detailed information, often using specialized terminology and conventions.

1.9 Speech acts

Cook (1989) writes about speech acts and sorts speech acts into families. He states speech acts can be defined by their felicity conditions and that speech acts form families - while sharing some conditions and differing in others. Cook mentions four speech acts:

Speech Act	**Meaning**
directives	ordering, advising, appealing, praying, warning
expressives	thanking, apologizing, welcoming, congratulating
commissives	promising, threatening
declarations	swearing, sentencing, arresting, opening, naming

Table 2: Categorization of Cook's speech acts (1989:35)

These speech acts are also performative speech acts which are also grouped into two kinds. Brown and Yule (1983) write that performative speech acts can be categorized into explicit and implicit.

Moreover Coulthard (1985) studies Searls and Austins speech act theories and writes about speech acts in the following way:

Speech act's name	Speakers aim to achieve	Examples
representatives	belief	swear, suggest, hypothesize
directives	want	order, request, invite, dare, challenge
commissives	intention	
expressives	feel	thank, apologize, deplore
declarations	change	

Table 3: Searl's and Austin's speech act theory (1985:24)

As stated above Searl and Austin are dealing with spoken language rather than written. My focus is on speech acts which deal with written language. Krhutová in her book Parameters of Professional Discourse writes about speech acts which address written language.

Austin distinguishes three categories of performatives, which are metalinguistic, ritual and collaborative performative.

Krhutová (2009) writes about speech acts concerning English in Electrical Engineering and examines them the following way.

Speech acts are characterized as illocutionary acts. The pragmatic meaning that is accomplished within a speech act functioning as an illocutionary act. While the term is inherently linked to spoken language, its applicability extends to written language. This is due to their shared focus on generating communicative language and producing specific forms of discourse.

A speech act or literacy event involves carrying out an action, with the intention of activities like describing, informing, explaining, concluding, arguing, evaluating, and naming, particularly common within professional and scientific discourse. "Thus, speech acts perform **functions of discourse** set up to their purposes, and in the case of written language to their conventional genres." (Krhutová 2009:123)

This is also stated by Cook (1989) when he is talking about Austin's speech act theory and sorts layers of intention and interpretation into 3 parts:

literal - locution

act performative - illocution

aim - perlocution

As indicated in the second layer, the action carried out is the illocution, which aligns with the concept of the speech act, itself matching the performed action, which also corresponds to the illocutionary act and its force. (1989)

In academic contexts, particularly within the realm of Electrical Engineering, a common speech act is a lecture. Correspondingly, single-turn genres or literacy events encompass distinct text types with particular aims. These genres fulfill various functions, such as explication, exemplification, evaluation, argumentation, definition, and concluding.

In the process of discourse production, speech acts and dichotomies are closely intertwined. These two aspects interact closely, as functions signify the structural aspects of information, while the dichotomies of approaches are elaborated upon in the subsequent section (Krhutová, 2009).

1.10 Speech acts:

Krhutová identified the six most important speech acts which are present in English in Electrical Engineering and also provided explanation to them by giving multiple specific examples for each and commenting on them. I have studied and tried to understand these speech acts so that I could collect information, discuss their characteristics and search for examples on them to analyze.

1.10.1 Explication

On explication Krhutová provides examples in both science and technology style and popular scientific style for the easier understanding of explication in each style.

In essence, explication is a way of explaining something in a detailed and thorough manner. When we engage in the act of explication, we aim to break down a complex concept or idea so that it becomes clearer and more understandable to our audience.

To convey a complex topic to somebody a decision has to be made to share a brief overview or to provide an explication. In the instance of choosing the later one it becomes necessary to go into the finer details, provide step-by-step explanations, examples, and even clarifications for any potential confusion points. The goal is to ensure that the person receiving the explication gains a deep and comprehensive understanding of the topic.

Explication is often used in educational settings, technical fields, and any situation where clear and precise communication is essential. It's like taking the time to lay out all the pieces of a puzzle and carefully assembling them so that the bigger picture becomes crystal clear. Just like in a puzzle, the process of explication involves arranging and explaining each component until the full picture emerges for your audience to grasp.

1.10.2 Exemplification

Exemplification, as a speech act, involves the use of examples to enhance understanding and illustrate concepts.

Krhutová gives two examples on the two different styles of exemplification, and compares them. In a scientific text, the example is straightforward and focused on the problem being addressed. It's meant to provide a concrete context that supports the content being discussed. On the other hand, in a popular scientific style, exemplification, instead of presenting a real-world scenario, it uses an "irreal" situation, like a hypothetical scenario. „The wave can never be watched by human eyes, however, the image can help the less instructed readers to understand the process.“ (Krhutová, 2009:137) This is done to help less knowledgeable readers grasp the concept even if they can't directly observe it.

In both cases, the goal of exemplification is to make the content more accessible, relatable, and understandable. It's about using tangible examples to bridge the gap between abstract concepts and the reader's ability to envision and comprehend them.

1.10.3 Evaluation

Evaluation, as a speech act, involves the act of assessing, critiquing, or expressing opinions about ideas, research findings, or concepts. It's a way for authors to convey their judgment, express their viewpoint and perspective on a subject, using expression which convey certain amount of certainty or uncertainty, often by comparing their work with the conclusions of other experts or by anticipating future developments.

Krhutová provides an example on how authors, through expressions reflect the function of evaluation. „They articulate his uncertainity and certainity, expressing causative relationships and expressions of measure and modality form the opinion of the producer on the problem described. All these linguistic expressions serve the author to

demonstrate his individuality, his unique approach to the problem solved.“ (Krhutová, 2009:139)

Its also pointed out that evaluation and argumentation functions are not typical for popular scientific style texts, but rather used in science and technology style. (Krhutová, 2009)

1.10.4 Argumentation

Argumentation, as a speech act, involves constructing a coherent series of reasons and evidence to support one's ideas or theories. It's a process of presenting a case, justifying methods, and drawing conclusions based on logical and rational foundations. Argumentation is validated by citing others, particularly the top researchers in the relevant scientific field. (Krhutová, 2009)

Krhutová provides examples for argumentation function and states that “there are various ways how to support one´s own approach and theories. The words, which articulate the authors´ own approach and justify their own methods of progression and conclusions, have been exploited in the above given texts.” (pg. 141)

1.10.5 Defining

The definition of defining in the Cambridge Dictionary is to describe the meaning of something, or to explain something more clearly so that it can be understood.

On defining Krhutová points out that the scientific definition depends on the reader's prior professional knowledge, which enables him to grasp the rule, as well as the chart displaying the link between two items, as opposed to the popular scientific definition, which expressly describes a phenomena. Despite being somewhat implicit, it nonetheless helps recipients' understanding by providing examples.

1.10.6 Concluding

The purpose of concluding is to briefly summarize the idea that has been stated and discussed beforehand, to provide clarity and to restate the main points of the proposition. Krhutová (2009) reveals that absence of the future research intentions is the the main difference between science and technology and popular scientific style. The author reiterates the findings of his research, adds that additional effective solutions to the issue

may exist, and acknowledges certain limitations. He makes plans for further research in the area of interest.

Another distinction is the impersonal tone that characterises scientific writing, particularly in technical sciences, which suggests the objectivity and dependability of the findings presented.

1.10.7 Critiquing

Critiquing as a speech act was not covered by Krhutová, but I could find information regarding the definition of critique in the Cambridge Dictionary, which is to examine and give an opinion or judgment about a piece or work, or the writings or ideas of someone.

A study by Nguyen's (2005, 2013) on the model of criticism strategies investigates how the speech act of criticizing is realized, defined as "an illocutionary act whose illocutionary point is to give negative evaluation of the hearer's actions, choice, words and products for which he or she may be held responsible" (Nguyen 2005:7). It aims to express dissatisfaction or encourage improvement in future actions. It also gives an example as on how university teachers criticize students within the academic context, where discourse reflects educational values. Selecting the right criticism tactics is a very difficult task for educators, "teachers often have to weigh their choice of comment to accomplish a range of informational, pedagogic and interpersonal goals simultaneously" (Hyland and Hyland 2001:187).

2. PRACTICAL PART

2.1 Comparison and analysis between technical and humanities text on different speech acts through examples

The following texts I illustrate the differences in the linguistic features and functions of discourse between technical and humanities texts.

Technical texts are in the **science and technology style** while humanities texts are in **popular scientific style**. In general, technical texts are characterized by a more specialized and precise vocabulary, formal grammar, and a focus on conveying objective information.

On the other hand, humanities texts often employ a more conversational and accessible style, with a greater emphasis on subjective experiences and emotions.

2.1.1 Example for Exemplification:

Technical text (Science and technology style):

"The output wavefrom shown in Fig. 30-3 lead us to a potential problem with the Op-amp integrator. As seen from this waveform the mean value of the output is 0 V. However, in actual practice this may not been properly compensated for the input offset voltage, the output may not centre it self around 0 V. This problem can be rectified by adding a parallel resistor in the feedback path as shown in Fig 30-4. But the addition of this resistor has a disadvantage." (Sedha, 2014:796)

Analysis:

The technical text is definite and not illustrative. It is more focused on the issue itself, to solve the problem. The use of "may" suggest politeness principal.

Humanities text (Popular scientific style):

"Had the purple car been circling your car clockwise when it struck the glancing blow, its angular impulse would have been in the opposite direction and you'd be spinning the other way. "(Bloomfield, 2013:76)

Analysis:

Outlines a hypothetical circumstance, that could have occurred but didn’t, in order to help and explain the procedure to the reader.

2.1.2 Example for Explication:

Technical text (Science and technology style):

“We know that holes and electrons are mobile charges, and therefore are known as mobile charge carriers. On the other hand, positive and negative ions are immobile charges and therefore do not take part in the conduction. The sample, as a whole, is electrically neutral and so are the P- and N- regions, considered separately. Thus in the P-region, the total positive charge on the holes is equal to the total negative charges on free electrons and immobile ions. Similarly, in the N-region, the total negative charge on free electrons is equal to the total positive charge on holes and immobile ions."(Sedha, 2014:55)

Analysis:

This example of explication is aimed at students in degree of electronics or in other electrotechnical field, expecting a higher degree of professional knowledge. The technical text describes what a PN junction diode is. It is precise in describing the P and N region of the diode. Formality - uses formal language to state a facts. I can notice a brief use of passive voice in the example "therefore are known as".

Humanities text (Popular scientific style):

“A PN junction diode is a semiconductor device that allows the flow of electric current in one direction and blocks the flow in the opposite direction. It is created by joining two types of semiconductors – P-type and N-type – together. The interface between the P-type and N-type regions is known as the PN junction."(Trumpal, n.d.)

Analysis:

This is an example of explication. It aims to reveal function to a non-specialist audience and widens knowledge. Here I can also see the use of passive voice in the example "It is created by joining" and "is known as".

2.1.3 Example for Evaluation:

Technical text (Science and technology style):

“By analyzing the circuit, it can be seen that, the section containing diode D1, and 3 V source acts as a biased positive clipper that clips the output at 3 V for any input above this value.”(Sedha, 2014:103)

Analysis:

The linguistic expression "as can be seen" here is an example of evaluation. Other examples for evaluation could contain expression like “As expected”, “This reflects”, “Although” and “Despite these observations”. The author expresses certainty or uncertainty based on the achieved results. "It can be seen" is not just an example for evaluation, but also an example of passive voice. In the original text the author uses various graphs and formulas to illustrate their point.

Humanities text (Popular scientific style):

Evaluation is not common in popular scientific texts.

2.1.4 Example for Argumentation:

Technical text (Science and technology style):

"In either case, the change in VL for the ideal regulator would be OV. However during this discussion, we have assumed that the value of input voltage to the voltage regulator (VS) does not decrease below the value required to maintain the operation of the voltage regulator."(Sedha, 2014:817)

"We know that the capacitive reactance (X) is inversely proportional to the frequency. Thus, at low frequencies, the reactance of the capacitor C is quite large. Therefore, it will allow only a small part of the signal to pass from one stage to the next stage. In addition to this, the emitter bypass capacitor (C) cannot shunt the emitter resistor effectively, because of its large reactance at low frequencies. As a result of these two factors, the voltage gain rolls off at low frequencies."(Sedha, 2014:453)

Analysis:

These two examples use the expressions "In either case", "However", "In addition", "Therefore" which are expressions used in argumentation. Unlike usually the technical text uses personal approach, in the examples of "we assume that" and "we know that".

Humanities text (Popular scientific style):

"If the sensor is too far from the lens, then the light begins to come apart again before reaching the sensor. In either case, the image on the sensor is blurry. The candle's real image is only in focus at one distance from the lens." (Bloomfield 2013:,466)

Analysis:

The expression "In either case" again is a regular example of argumentation.

2.1.5 Example for Concluding:

Technical text (Science and technology style):

"The above developments show that the transmission line analogy can be successfully applied to the solution of noise problems in junction diodes and transistors. It is interesting to note that at low frequencies the new theory shows resemblance with older phenomenological equivalent circuits. Besides, the theory also gives the hf noise behavior of the devices, a result that could not be obtained by the old method. The earlier experimental results on noise in junction diodes find hereby an adequate theoretical explanation. The theory is a one-dimensional theory and the recombination is assumed to be volume recombination. Actually most recombination occurs at the surface and the problem is multi-dimensional. Deviations between theory and experiment might thus be expected in some cases. A research program is under way at the University of Minnesota to check this theory with experiment." (Ziel, 1995:1646)

Analysis:

The example presents the results and state that in the future an investigation, research will take place on that specific theory. Uses impersonal approach. The examples "The above developments show", "the new theory shows" and "earlier results find" are all examples of the author revealing the end results of their research.

2.1.6 Example for Defining:

Technical text (Science and technology style):

"One of the terminals, labelled ’-’ is known as inverting input terminal. The word "inverting" implies that if a signal is applied to the ’-’ terminal of the op-amp, it appears with the opposite polarity at the output, i.e., a sinusoidal signal will experience a phase shift of 180°." (Sedha, 2014:767)

Analysis:

The scientific definition depends on the reader’s prior professional knowledge. The wording is more objective and formal. Popular examples of defining are the use of "this implies that" or "this makes it clear that". Additionally "is know as" is an example of passive voice.

Humanities text (Popular scientific style):

"For example, a filament carries less and less current as it approaches operating temperature, a behavior that helps it avoid overheating. However, if the increase in mobile charges dominates, as it does in semiconductors, an object’s resistance decreases with temperature. This explains why semiconductor-based computer chips carry more and more current as they get hotter and will self-destruct at excessive temperatures." (Bloomfield, 2013:350)

Analysis:

The focus here is on "This explains that" as it is a common sign of definition and it is informal.”

Humanities text (Popular scientific style):

"In this chapter you have learned that: 1. A depletion layer is formed at a junction whenever a P- and N-regions of a semiconductor are joined together. 2. Due to charge separation in the depletion layer, a potential barrier is developed across the junction, Its value is equal to 0.7 V for silicon and 0.3 V for germanium." (Sedha, 2014:66)

Analysis:

It presents a simple, logical summary. The use of the expression "In this chapter you have learned" it can be seen that it is concluding.

2.1.7 Example for Critiquing:

Technical text (Science and technology style):

"For some time now, the convergence of the telecommunications and computer industries into a single ’information and entertainment’ industry has been predicted. The acquisitions that appeared to be bringing such a convergence about have not, however, proved particularly successful." (Duysters, 2010)

Analysis:

The expressions "have not [...] proved particularly successful" is used as critiquing in the technical language. I can also see vagueness and the use of politeness principals in the form of softening the language.

Humanities text (Popular scientific style):

"Some theories are eventually proven true, others false, and many remain uncertain. The theories of relativity and quantum physics have long since been proven true, although there is always the possibility that they may be only parts of a more complete theory." (Bloomfield, 2013:505)

Analysis:

Critiquing can be found in the expression "proven" as it stated in this popular scientific text and also politeness principle can be found in the text "although there is [...] that they may."

2.2 Other types of examples

For comparison between technical and popular scientific texts with speech acts.
In the following group of examples I made an attempt to rewrite examples of technical texts to humanities texts to fit the popular scientific style. I used different linguistic approaches to cover the same idea for each text.

2.2.1 Example-1

Technical text (Science and technology style):

"The part of the enzyme where the substrate binds is called the active site (since that’s where the catalytic “action” happens)." (Khan Academy)

Analysis:

The technical text uses precise vocabulary to describe the active site of an enzyme. Definition of a specific term in a scientific field. There is certainty and definiteness in use. Focuses on the specific function of the active site.

Humanities text (Popular scientific style):

"The part of the enzyme that attaches to the substrate and helps it change into something else is called the active site."

Analysis:

The popular scientific text uses more conversational language to convey the same idea. Informal and less certain than the technical text. It provides a more general description of the purpose of the active site.

2.2.2 Example-2

Technical text (Science and technology style):

"A computer network is a group of interconnected nodes or computing devices that exchange data and resources with each other." (Yasar, n.d.)

Analysis:

Definition of a technical term in the field of computer science. Uses technical terminology and formal language to define computer networks. Emphasizes the technical details of how computer networks function.

Humanities text (Popular scientific style):

"A computer network is a bunch of computers that are hooked up together so they can talk to each other and share specific things."

Analysis:

Uses more colloquial language to describe computer networks and focuses on the social aspect of computer networking with more subjectivity.

2.2.3 Example-3

Technical text (Science and technology style):

"Operating system is a set of programs that control the way a computer system works, especially how its memory is used and how different programs work together." (Cambridge Dictionary)

Analysis:

Technical vocabulary is used to describe the operating system of a computer. This text is formal and definite.

Humanities text (Popular scientific style):

"The operating system of a computer is a bunch of computer programs that help manage the computer and make it work with other programs."

Analysis:

The text uses more accessible language to describe the operating system of a computer while focusing on its practical application. It is informal and vague.

2.2.4 Example-4

Technical text (Science and technology style):

"An algorithm, especially in mathematics, is a step-by-step procedure that can be used to solve computations or other mathematical problems."(Kench, 2022)

Analysis:

Defines an algorithm using precise technical vocabulary and emphasizes the systematic and logical nature of algorithms.

Humanities text (Popular scientific style):

"An algorithm is like a recipe for solving a problem or getting something done, with instructions you have to follow."

Analysis:

The text uses metaphorical language to explain a technical term using simpler language. Uses the metaphor of a recipe to make the concept more accessible.

CONCLUSION

To conclude, this thesis investigates the parameters of professional discourse in the field of science and technology by analyzing the linguistic features and functions of technical and humanities texts.

The theoretical segment of this thesis delves comprehensively into various facets of discourse analysis, encompassing discourse definitions, analysis methodologies, situated meanings, cohesion, coherence, and distinctions between spoken and written language. This part further explores the concept of speech acts, their diverse types, and their multifaceted functions within distinct language styles, particularly within science and technology and popular scientific style.

The thesis points out the dynamic nature of language and communication, highlighting that complete understanding in language is necessary and consideration not solely of structural language elements, but also of contextual, pragmatic, and socio-cultural factors that influence language usage. The examination presents the contrasts between spoken and written language, illustrating their respective strengths, limitations, and unique conventions, all while recognizing their essential roles in conveying information.

In the following part of the thesis, the study delves deeper into specific speech acts commonly found in English in Electrical Engineering. These speech acts—ranging from explication, exemplification, evaluation, argumentation, defining, concluding, and critiquing—assume pivotal roles in elucidating intricate information, expressing viewpoints, and specific knowledge.

As for the practical part of the thesis, it analyzes examples of technical and humanities texts which correspond to different speech acts, which were examined in the theoretical part.

ROZŠÍŘENÝ ABSTRAKT

Tématem této práce je přehled a příklady parametrů odborného diskurzu v oblasti vědy a techniky na základě analýzy jazykových rysů a funkcí technických a humanitních textů.

Teoretická část této práce se zabývá různými aspekty analýzy diskurzu, zahrnujícími definice diskurzu, metodologii analýzy, situované významy, kohezi, koherenci a rozdíly mezi mluveným a psaným jazykem. Dále zkoumá koncept řečových aktů, jejich rozmanité typy a jejich mnohostranné funkce v rámci různých jazykových stylů, zejména v rámci stylu vědy a techniky a populárně naučného stylu.

Zkoumání diskurzu, analýzy diskurzu, situovaných významů, významů ve vědě a mimo ni, kontextu, koheze, koherence a rozdílů mezi mluveným a psaným jazykem umožňuje komplexní pochopení složitosti a nuancí používání jazyka a komunikace.

Diskurz klade důraz na efektivní komunikaci před striktním dodržováním gramatické správnosti, zdůrazňuje flexibilitu a zaměření na smysluplnou interakci. Existují poznatky o diskurzu, které dále odhalují jeho mnohostrannou povahu, zahrnující situované identity, koordinované akce a charakteristické způsoby interakce.

Analýza diskurzu pokrývá jeho vlastnosti od struktury věty k širšímu kontextu užívání jazyka. Rozšiřuje pojetí struktury na delší texty a klade důraz na větší jednotky rozpoznané v diskurzu. Klíčovou roli v diskurzu hrají koheze a koherence, přičemž koheze vytváří jazyková spojení a koherence zajišťuje celkovou smysluplnost.

Kontext je vodítkem pro interpretaci a porozumění a slouží jako most mezi pragmatikou a analýzou diskurzu. Vzájemné působení pragmatiky a diskurzní analýzy zdůrazňuje význam kontextu pro porozumění jazyku.

Rozdíly mezi mluveným a psaným jazykem, o nichž hovoří různí autoři, odhalují jedinečné vlastnosti každého způsobu komunikace. Mluvený jazyk nabízí interakci v reálném čase a paralingvistické signály, zatímco psaný jazyk sází na stálost, organizovanost a absenci kontextově vázaných prvků.

Práce poukazuje na dynamickou povahu jazyka a komunikace a zdůrazňuje, že v jazyce je nutné úplné porozumění a zohlednění nejen strukturních prvků jazyka, ale také kontextových, pragmatických a sociokulturních faktorů, které formují užívání jazyka. Zkoumání zdůrazňuje kontrasty mezi mluveným a psaným jazykem, ilustruje jejich silné

stránky, omezení a konvence, přičemž uznává jejich zásadní roli při předávání informací a určování významu.

Studium řečových aktů v mluveném i psaném jazyce osvětluje, jak se jazyk používá k provádění různých činností a vyjadřování záměrů. Různé typy řečových aktů, jako jsou direktivy, expresiva, komisiva a deklarace, slouží specifickým komunikačním účelům. Analýza řečových aktů a jejich ilokučních funkcí přispívá k hlubšímu pochopení úlohy jazyka při dosahování různých komunikačních cílů.

Souhrnně řečeno, zkoumání těchto rozmanitých aspektů jazyka a komunikace poukazuje na složitou souhru mezi strukturou, kontextem, záměrem a významem v mluveném i psaném diskurzu.

V následující části práce se studie hlouběji zabývá konkrétními řečovými akty, které se běžně vyskytují v oblasti angličtiny v elektrotechnice. Tyto řečové akty - explikace, exemplifikace, hodnocení, argumentace, definování, závěru a kritiky - zaujímají klíčovou roli při objasňování složitých informací, vyjadřování názorů a postojů uživatele diskurzu. Analýza těchto řečových aktů odhaluje strategie, které autoři používají k zapojení čtenářů, šíření znalostí a obhajobě v rámci technických a humanitních textů.

Explikace zahrnuje podrobné a důkladné vysvětlení složitých pojmů. Cílem tohoto procesu je rozložit složité myšlenky na jednodušší složky, aby se zlepšilo porozumění.

Exemplifikace využívá příklady k ilustraci a lepšímu pochopení pojmů. Zahrnuje zpřístupnění abstraktních myšlenek prostřednictvím konkrétních příkladů.

Hodnocení je akt hodnocení, kritiky nebo vyjádření názoru na myšlenky, výsledky výzkumu nebo koncepty. Zahrnuje vyjadřování soudů a názorů, často porovnávání práce s prací jiných odborníků nebo předvídání budoucího vývoje výzkumu.

Argumentace zahrnuje sestavení logické řady důvodů a důkazů na podporu vlastních myšlenek nebo teorií. Je to proces prezentace případu, zdůvodňování metod a vyvozování závěrů na základě racionálních důvodů.

Definování se týká popisu významu něčeho nebo jeho jasnějšího vysvětlení. V kontextu vědeckých textů se definice mohou lišit v závislosti na předchozích odborných znalostech čtenáře a mohou obsahovat diagramy nebo příklady.

Závěr má za cíl shrnout hlavní body návrhu a zajistit přehlednost. Ve vědeckém psaní závěry často opakují výsledky výzkumu, uznávají omezení a nastiňují plány dalšího výzkumu.

Kritika zahrnuje zkoumání a vyjadřování názorů nebo úsudků o něčí práci, činnosti nebo myšlenkách. Jejím cílem je poskytnout negativní hodnocení, povzbudit ke zlepšení nebo vyjádřit nespokojenost. Pedagogové, zejména vysokoškolští učitelé, mohou používat různé strategie kritiky k dosažení informačních, pedagogických a interpersonálních cílů.

Práce uvádí přehled různých řečových aktů a jejich funkcí a ilustruje, jak jsou využívány k předávání různých typů informací a k dosažení specifických komunikačních cílů.

Práce poukazuje na složitou povahu jazyka a zdůrazňuje, že efektivní komunikace přesahuje pouhou gramatickou přesnost. Zahrnuje porozumění kontextu, uplatňování pragmatických strategií a obratné používání různých řečových aktů k dosažení přesných komunikačních cílů. Zkoumání těchto principů je základem pro zkoumání pragmatických důsledků těchto koncepcí v praktických aplikacích.

Praktická část práce se zabývá analýzou příkladů technických a humanitních textů, které odpovídají různým řečovým aktům, které byly zkoumány v teoretické části.

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