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## THE CO-OPERATIVE PRINCIPLE IN TECHNICAL TEXTS

KOOPERATIVNÍ PRINCIP V TECHNICKÝCH TEXTECH - ANALÝZA UŽITÍ

### BACHELOR'S THESIS

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## **ABSTRACT**

The thesis analyses the usage of the Cooperative principle in technical texts as well as concepts related to it. The Cooperative principle specified by Grice is one of the most prominent theories in pragmatics, and its usage can be observed or neglected almost in every communication. With that in mind, the author of the thesis analyzes technical texts and describes various pragmatic aspects related to this principle. Furthermore, the thesis describes the Politeness principle, which is related to the Cooperative principle, demonstrates its appliance and describes various politeness strategies used in technical texts. The pragmatic aspects of the technical texts are explained in this thesis as well, and their usage is shown in the text. Lastly, the series of technical texts are compared with texts non-technical and the difference in usage of the Cooperative and Politeness principle is observed and described.

## **KEY WORDS**

Cooperative principle, Politeness principle, maxims, maxim non-observance, maxim flouting, technical texts, technical writing

## **ABSTRAKT**

Tato práce analyzuje užití kooperativního principu a konceptů s ním souvisejících v odborných textech. Kooperativní princip, poprvé specifikován Gricem, je jednou z nejvýznamnějších teorií v pragmatice a jeho užití nebo opomíjení lze pozorovat téměř v každé komunikaci. S ohledem na to, autor práce analyzuje odborné technické texty a popisuje různé pragmatické jevy s tímto principem související. Práce dále popisuje zdvořilostní princip, související s principem kooperativním, demonstruje jeho užití a ukazuje různé zdvořilostní strategie používané v odborných technických textech. Součástí je také vysvětlení pragmatických aspektů odborných technických textů a jejich ukázaní přímo v textu. Na závěr jsou odborné odborné technické texty porovnány s texty netechnickými a je vysvětlen rozdíl v užití kooperativního a zdvořilostního principu.

## **KLÍČOVÁ SLOVA**

kooperativní princip, zdvořilostní princip, maximy, nedodržování maximů, opovrhování maximy, technické texty, technické psaní

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# INTRODUCTION

The Cooperative principle as part of pragmatics is one of the significant factors of communication that ensures that the message stays comprehensible to the receiver. With the Cooperative principle applied to the spoken word, it can be assured that the conversation stays clear and that information is conveyed correctly. This thesis, however, focuses mainly on the written part of communication, specifically technical texts.

As a student of English in electrical engineering and informatics, it is my speciality to look closely into technical documentation and examine all sorts of linguistic and pragmatic events. This work is therefore compiled to provide insight into such pragmatic events, describe their theory and show their usage in the extracts from various writings related to technology.

The first chapter focuses on the Cooperative principle defined by Grice and describes its four maxims: Quantity, Quality, Relation, and Manner. Each of these maxims is important in technical writing to produce a text that makes sense and is coherent to the reader. As a part of an analysis of the Cooperative principle, it is also essential to explain the maxim non-observance and why it occurs. The second chapter explains the Politeness principle as a corresponding theory to the Cooperative principle and shows its application in the provided extracts. Even though the Politeness principle would be considered more of an aspect of non-technical texts, in the present case, it is shown where it is applied in texts related to technology. The third chapter analyzes elements of pragmatics that are used in technical texts. The primary focus in this chapter is put on the description of which approaches the author chooses toward the reader when compiling the text, as it plays a significant role in connection to the Cooperative principle.

The last chapter of the bachelor thesis compares various texts from technology with the texts related to non-technical sciences and analyzes the differences between the usage of the Cooperative principle and the Politeness principle. Furthermore, the cases of adherence or negligence of principles are explained, and an additional explanation on

why the authors decided to do so is provided.

As for the resources, this work is compiled from various literary and internet sources, with the primary being Parameters of Professional Discourse by Krhutová, Meaning and interaction by Thomas, and many other works which further describe and extend the Gricean Cooperative principle.

# **1 COOPERATIVE PRINCIPLE**

The Cooperative principle was, for the first time, defined by H.P. Grice as a part of the theory of implicature. In his essay *Logic of conversation* (1975) and the book *Studies in the Way of Words* (1989), Grice describes the Cooperative principle and classifies its usage into four maxims of conversation. With this theory, Grice attempts to describe how “a hearer gets from what is said to what is meant, from the level of expressed meaning to the level of implied meaning” (Thomas, 1995:52). It correlates with what the producer implies and what the receiver infers from the message. The Cooperative principle is, however, not meant to be a set of rules which are to be adhered to. It is rather an observation of consistencies that occur in communication. This is based on the supposition that when communicating, participants rely on the specific customs which outline their communication. In verbal conversation, the speakers may, however, disregard this principle as a way not to convey a message explicitly or to hide its meaning.

In the case of the written technical texts, it can be assumed that the author’s primary goal is to transmit information to the reader in the most comprehensible manner. Contrary to the verbal message, the reader cannot perceive other aspects which are parts of such communication, such as intonation, facial expressions, and gestures. The same applies to the producer of the message. Therefore, it is in the writer’s best interest to follow this principle, assuming that the receiver is aware of the conversational rules that are part of regular communication. This chapter describes the usage of the maxims of the Cooperative principle and their non-observance.

## **1.1 Maxims of the Cooperative principle**

The four maxims of the Cooperative principle are the backbone of Grice’s theory. Each of these maxims describes different aspects of communication. Even though their description is written in an advisory tone, Grice is aware that their non-observance may occur purposefully. The reason for this is described later on. Considering the written texts, it can be assumed that the author’s aim is to observe Cooperative principle

maxims in order to convey information correctly. The maxims of the Cooperative principle are described as follows.

### **1.1.1 Quantity**

Maxim of Quantity instructs that the produced message must not be longer than needed but shall not be shorter than required. As Krhutová states in her book *Parameters of Professional Discourse* (2010), this maxim corresponds perfectly to written documentation in Electrical engineering and other scientific texts. These texts are made to convey specific technical information, which is addressed to a particular scientific community, and therefore the producer of the text can presuppose that the recipients will already have prior knowledge of the topic. This means that the writer does not need to explain addressed technical terminology and discourse and can write his documentation as if the reader already understood it. However, in several cases where a very detailed explanation is needed, and even repetition is required, this maxim might be violated for the sake of a thorough understanding of the given topic.

### **1.1.2 Quality**

Maxim of Quality omits the usage of any information that is believed to be false or not correctly understood and researched. This maxim is a matter of course in any technical documentation. It is essential for technical texts to be truthful since real-world applications may depend on them.

### **1.1.3 Relation**

Maxim of Relation states that the writer should keep his/her message relevant to the topic and avoid any superfluous content. In the conversation, this maxim might be a little less prominent since the change of topic can occur dynamically. However, in technical written texts, keeping the relevance of a discussed subject is relatively straightforward.

### **1.1.4 Manner**

Maxim of Manner is concerned with how the message is communicated rather than the

content of the message (Grice, 1989). The producer ought to keep his/her content without unnecessary wordiness and keep his/her information in a meaningful order. Any obscurity when providing an explanation should be avoided, so as not to confuse the recipient and avoid the ambiguity that could cause a different interpretation of the message. As stated in the Quantity maxim, this should be obvious in technical written texts and shall not be violated under any means.

## **1.2 Maxim non-observance**

Grice further explains in his work the concept of maxim non-observance and why it occurs. A failure to observe a maxim is classified into five categories: flouting, violating, infringing, opting out, and suspending a maxim. Each of these failures to observe maxim happens for a different reason and may also happen in a different manner. As the bachelor thesis aims to analyze the Cooperative principle and its attributes in technical texts, the non-observance of Gricean maxims is an integral part of it. However, considering that the primary concern of this thesis is a technical text, some cases of non-observance are described to a lesser extent as they occur mainly in spoken conversations.

### **1.2.1 Flouting**

Flouting of Gricean maxim is described as a case where “the speaker blatantly fails to observe a maxim in which he has no intention of deceiving or misleading” (ukessays.com, 2021). As further explained in Grice’s work, such non-observance creates a conversational implicature. In the book *Meaning and interaction* (1995), Thomas explains different cases of flouting a maxim and why it happens. As described, one of the reasons for flouting a maxim comes from a clash between different maxims (Thomas, 1995). The clash of maxims may also be the main reason for maxim non-observance in technical texts, as it can be assumed that authors of technical writings, which are in its nature often purely informative, need not incorporate any other aspects which would hinder the explicitness of their text. Clash of maxims may occur in the cases where the described topic goes more into depth, and the provided explanation needs to be more detailed and more prolonged. As seen in the presented extract:

*To demonstrate how a Boolean arithmetic statement could be articulated, I can write the proof that a dog is an animal in the form: Result = (Does Dog have 4 Legs) AND (Does Dog have Fur). If both statements within the parentheses are true, then the "Result" will be true. This method of writing out assertions and the logic behind them is quite a bit simpler and much easier to understand, but we can do better. Instead of writing out the true or false statement as a condition, it can be expressed in terms of a simple "variable" (like "X"). So, if we assign "A" as the result of testing if dogs have four legs and "B" as the result of testing if dogs have fur, we can write out the Boolean arithmetic equation above as: Result = A AND B.*

Predko, p.7

The description presented by the author at the beginning of this book may seem, for a person knowledgeable in the given topic, a little redundant; however, by not providing a description, the reader would not understand its meaning later in the book. This case can be therefore classified as a clash between Quantity and Manner since the Quantity maxim is partially flouted in order to observe the maxim of Manner, as without it, the information later in the book would seem ambiguous.

Another instance of a clash of maxims may occur in the conclusion of the scientific research. By using politeness principles, the written text becomes longer. However, by presenting his/her conclusions in accordance with the Politeness principle, the author ensures himself for the case that his/her research is later altered or even disproved. An example of its usage is presented below:

*The best option we found was to blend newly placed tiles with those already on the canvas. However, there are many possibilities here and more exploration of placement strategies and the consequent artistic effects is needed.*

...

*This work has suggested further avenues of exploration. A non-redundant representation, more suited to this specific problem, is needed. More work is needed on strategies for placing tiles on the canvas and blending with any tiles already placed. It would also be very interesting to see whether having a variable tile size would lead to qualitatively different animations.*

Wijesinghe and collective, p.1306

In this case, can be examined clash of Quantity and Quality maxims. Partial failure to observe the Quantity maxim by prolonging the text with seemingly redundant phrases comes from the intention to observe the Quality maxim. Authors, therefore, do not make any definite conclusions so as not to breach the maxim of Quality in case the provided information turns out to be different. This also corresponds to the Politeness principle that is further described in the second chapter.

From the analysis of these two extracts, it can be concluded that in order to comply with the Cooperative principle, authors may also have to compromise between two maxims so as not to flout any of them to the full extent. Further analysis of more texts related to technology is provided in the following chapters of the bachelor thesis.

Grice also defines the phenomenon called the exploitation of maxim, where the recipient of the message is encouraged to look for the implication. However, as stated at the beginning of this subchapter, the technical texts do not purposefully flout maxims. The concept of exploitation can be therefore left out.

## **1.2.2 Violation**

Violation of maxim as defined by Grice is a case of non-observance where the producer is “liable to mislead” (1975: 49), and it is often done in a very discreet manner. Such maxim violation is often marked by lying blatantly or purposefully providing less

information than required in order to mislead the recipient (Grice, 1989). In real-life communication or various articles provided on the internet, such occurrence would not be surprising. However, the violation would be highly unexpected in the texts whose primary focus is to inform and teach about technology. The occurrence of such violation would not be possible for the audience, who is not knowledgeable on the subject, to distinguish. It is, therefore, in the researcher's best interest to provide truthful information unless he/she has different manipulative intentions.

### **1.2.3 Other maxim non-observances**

Since it is assumed that the authors of the professional technical texts have sufficient knowledge of language and access to the various correction tools, maxim infringing is not something to be concerned with. In a similar way, it could be assumed that authors of technical texts have no reason to opt out or suspend the maxim, and therefore such cases of maxim non-observance can be deemed improbable and insignificant for our research.

## **2 POLITENESS PRINCIPLE**

### **2.1 Leech's Politeness principle**

In his book *Principles of pragmatics* (1983), Leech explained the Politeness principle with its six maxims. These maxims were created to "extend and elaborate the Gricean Co-operative Principle and followed the ideas of Lakoff's rules of rapport" (Krhutová, 2010:116). The primary object of this principle is the minimization of coarseness and maximization of politeness. Its maxims are described as follows:

Tact: "Minimize the expression of beliefs which imply cost to other; maximize the expression of beliefs which imply benefit to other."

Generosity: "Minimize the expression of beliefs that express or imply benefit to self; maximize the expression of beliefs that express or imply cost to self."



Approbation: “Minimize the expression of beliefs which express dispraise of other; maximize the expression of beliefs which express approval of other.”

Modesty: “Minimize the expression of praise of self; maximize the expression of dispraise of self.”

Agreement: “Minimize the expression of disagreement between self and other; maximize the expression of the agreement between self and other.”

Sympathy: “Minimize antipathy between self and other; maximize sympathy between self and other.”

(Leech, 1983)

Let us show the application of the Politeness principle in the technical text below:

*The shading algorithm presented here is **exploratory**, and we expect many **improvements are possible**. The most interesting open-ended question in automatic technical illustrations is how illustration rules may change or evolve when illustrating a scene instead of single objects, as well as the practical issues involved in viewing and interacting with 3D technical illustrations. **It may also be possible** to automate other application-specific illustration forms, such as medical illustration. The model we have presented is tailored to imitate colored technical drawings. Once the global parameters of the model are set, the technique is automatic and **can be used** in place of traditional illumination models. The model **can be** approximated by interactive graphics techniques and **should be** useful in any application where communicating shape and function is paramount.*

Gooch and collective, p.4

As seen in the highlighted expressions above, the authors use the Politeness principle in the conclusion of their research. By using the expression *we expect that many improvements are possible*, authors write following modesty and agreement maxim by stating that their model is only a particular way of implementing the algorithm. They are therefore open to more interpretations in the future. The expression *can be* is in

accordance with the generosity and modesty maxim since authors indicate that their model can be used in different cases however do not argue with the option that there might be other current solutions for this problem. Usage of the Politeness principle generally indicates that authors may be open to more discussion and are not hostile towards different interpretations. However, it can be observed that the Politeness principle is applied chiefly in the conclusion part of the technical papers. The reason is that the main content of the text needs to be explicit and straightforward; therefore, there is little space for the usage of hedging and polite expressions.

Non-observance of the Politeness principle:

*The Internet of Things **will be the main driving force** for the development of 5G. The industry believes that 5G is designed for the Internet of Everything. By 2021, **there will be** 28 billion mobile devices connected, of which 16 billion **will be** IoT devices. In the next decade, the service targets in the Internet of Things **will be** extended to users in various industries, and the number of M2M terminals will increase dramatically, and applications **will be** ubiquitous. From the perspective of requirements, the Internet of Things first satisfies the need for identification and information reading of objects, followed by the transmission and sharing of such information through the network, followed by system management and information data brought by the growth of networked objects.*

Al-Absi and collective, p.63

In the second presented extract taken from the different work, little to no observance of the Politeness maxim can be noticed. Authors in this text are making confident predictions based on their research without regard to different possible interpretations. Even though their forecast may be proved to be correct, authors leave very little place for potential discussion and by so completely disregard the prospect of a different view. The highlighted expressions *will be* indicate the non-observance of the politeness maxims since the authors simply state what happens in the future without the usage of hedging or politeness methods.

From the two presented extracts, it can be concluded that by either choosing to observe or disregard the Politeness principle, the final form of the produced text will be either considered more or less polite. In terms of pragmatics, politeness does not present the author's traits; it is rather a strategy of conceiving a message to the reader in a most non-argumentative manner (van Olmen, 2017). Note that in order for the Politeness principle to come into the appliance, it has to be in the form of a continuous process, something that happens more than once, rather than a single occurrence (Leech, 1983). Since the Politeness principle is something that corresponds to the Gricean Cooperative principle, its appliance is further shown in the continuation of the Bachler thesis.

## **2.2 Brown and Levinson's politeness theory**

In their face-management theory, Brown and Levinson presented the concept of "face" and "face-threatening act." They described the face as a "public self-image that every member of a society wants to claim for himself" (Brown & Levinson, 1987:66). This model further classifies face into a positive and negative face. If Brown and Levinson's ideas were to be put in a simplified explanation, a positive face is a desire to be liked, included, and to have a feeling of self-worth. A negative face describes a desire to act freely as one chooses without being impeded upon. The goal of politeness can be therefore described as a way to avoid damage to the producer's own face and also to the face of the recipient. A face-threatening act is an act that could cause such harm (Brown & Levinson, 1987).

Salom and Monreal describe scientific communication as a concept where the researcher "presents a claim and contradicts former theories or beliefs" (2014), and therefore every such communication is prone to perform a face-threatening act. In order to reduce the effect of such acts, various politeness strategies need to be applied. In their research article Salom and Monreal classify politeness strategies into positive and negative, and show their application in the extracts from various technical articles. Below are presented two borrowed extracts from their article where the expressions correlating to politeness strategy are highlighted:

**Positive:**

*It is also interesting to study the weights that carry the decomposition of the reduction in information divergence. In particular, we might ask if the monotonicity is the true property defining the structure of these weights. That is, is any monotone weight function realizable by some distribution?*

**Negative:**

*The phantom harvesting experiment showed that the new method has the capacity to generate stronger and longer negative pressure by the actuator, suggesting that the manipulator may have the potential to harvest graft from a wider area.*

(Salom and Moneral, 2014)

After the analysis of extracts presented in Salom and Monreal's article, it can be concluded that positive strategies can be outlined by the usage of solidarity, by appealing to shared background knowledge and involvement of reader by the usage of inclusive *we* form. Other devices of the positive strategy include reformulation of additional examples, rhetorical questions, and conversation-like devices (Sučková, 2021). On the other hand, negative politeness strategies can be characterized by a reduction of the writer's commitment via the usage of modal verbs, hedging, impersonalization, and figures (Sučková, 2021). Usage of *we* can also be noticed, however contrary to positive strategy, *we* in negative form is exclusive, which means that, by using this pronoun, authors present their views as solely their own, rather than forcefully including the reader in their perspective.

## **3 PRAGMATIC ASPECTS OF TECHNICAL TEXTS**

Before further analyzing the Cooperative principle in technical writings, other pragmatic aspects of the technical texts need to be analyzed. It is essential to understand what is worked with to analyze it correctly. This chapter describes coherence, schemata of knowledge, terminology, and the author's approach to the recipients.

### **3.1 Coherence**

Coherence is the aspect of communication that ensures that the communicated message is understandable and logical in a pragmatic sense. Coherence of written text can be achieved with the help of cohesive elements which make cohesive connections (Bahaziq, 2016). These cohesive elements create a logical connection that gives the text aspect of readability. The usage of cohesive elements, however, does not guarantee itself a coherent text. The reason is that elements may be logically interconnected; however, their meaning may be completely different. In such a case, the resulting text may lack any pragmatic sense. Therefore, it is vital to ensure that it is not relied simply on cohesive elements but also on other tools to make produced text coherent. Suraishkumar, in his article *Improving Coherence in Technical Writing* (2004), explains which tools are to be used in order to improve coherent writing. Tools named by Suraishkumar are repetition, synonymy, antonymy, pronoun, parallelism, enumeration, and transition. Each of these tools may be used to make produced writing readable but also more attractive to the reader.

### **3.2 Mental schemata of specific knowledge**

Mental schemata can be described as a link between the language and familiar elements of the world (Widdowson, 1996). The mental schemata in professional writings regarding technology are the primary concern in this subchapter. These schemata are

usually shared within a particular professional group that communicates in a specific scientific field. If schemata are in fixed and static patterns, they can be labeled as frames (Yule, 1996). Advanced communication in such a field, therefore, relies on the fact that persons in the communication understand the terminology and can correctly connect the pragmatic meaning of its elements; it is supposed that recipients can decode the specific message by using frames relevant to a particular subject. Without them, it would be harder for the recipient to understand the message quickly.

The significant benefit of frames in professional communication is that they have very few cultural restrictions, which means that anybody who has knowledge of a particular scientific field has likely access to the same mental schemata. However, compared to the usage of schemata in ordinary language, it can be noticed that they can be more reliant on the social aspects of the given region. Speakers of the given language can therefore understand the utterances by simply living in a particular place, which is different from the language of technology since it requires a thorough understanding of the theoretical aspects of a given field (Krhutová, 2010).

Mental schemata also play a role in professional texts written in other languages. As can be seen in many scientific texts written in Czech, there are many words borrowed from the English language. An example of their usage can be seen in the presented extract:

*Základní, přednastavený **font** pro celou stránku. Musí se deklarovat bezprostředně za **tagem** <body>. Nepárový tag. Má stejné atributy jako <font>, ale u velikosti nelze použít relativní stupeň. Používání tohoto **tagu** se nedoporučuje, protože se jeho vlastnosti nevztahují na tabulky a občas ani na nadpisy. Podpora v moderních prohlížečích je vágní a nejistá. Prostě je zastaralý.*

Janovský, jakpsatweb.cz

The recipients can create mental schemata of such text, including terms in English, even without the need to thoroughly understand the English language itself. This means that the pragmatic meaning of the word is not simply written down, but is

suggested through its context in the text. It can also be noticed that by declension of a noun *tag*, is created a Czech form of this word *tagem* or *tagu*. It can therefore be stated that speakers of other languages may transform English phrases into forms that are more common to them. Such practice likely allows for the recipients to create mental schemata more easily.

### **3.3 Terminology**

A terminology is a pragmatic unit used in professional texts with the goal of explaining various concepts. It creates a shortened version of the meaning of the function, which described concept fulfills. Usage of terminology allows for topics to be explained precisely with briefer explanations as the producer does not need to explain the process every time but instead uses abbreviations which describe it. Apart from scientific texts, technical terminology has also found its way to the broader public. The reason is that with technology-related products reaching the consumer market, one also needs documentation that explains their usage. This documentation is usually in the form of manuals where users need to understand these terms to understand all the aspects of the given device.

Terminology as such is an inseparable part of technical writing, and sometimes the majority of the text is composed of technical terms. Krhutová, in her book *Parameters of professional discourse* (2010), classifies technical terms into three categories: “General scientific terms, General technical terms, and Branch-specific electrotechnical terms.” Mentioned book also states that the branch-specific terms can usually be understood only by highly instructed readers since comprehension of these terms requires more specific knowledge and understanding of the conception.

### **3.4 Approaches to recipients**

When writing a text of any kind, the producer needs to determine in what manner he/she is going to present his/her ideas. It can also be said that he/she determines which “approach” is to be chosen. Krhutová, in her work, classifies approaches to recipients into different opposite categories, as follows:

impersonality/personality,

objectivity/ subjectivity

uncertainty/certainty,

formality/informality

In the next sub-chapter, the approaches are demonstrated in the relevant texts.

### **3.4.1 Impersonality/Personality**

The impersonality approach is commonly used in professional technical articles and writings. The reason is that producer intends to present the described topic as objectively as possible. It is therefore needed to exclude all the personal aspects which could potentially harm the credibility of the presented finding or ideas. It can be argued that the impersonality of the writing does not explicitly mean that the presented text is objective; however, it can be considered a tool that shows the given text in a factual light. On the opposite side stands personality, which is likely to be used in popular scientific writings. Since the producer aims to inform the public about various scientific topics, they are bound to use different approaches, such as adding entertaining aspects to the text. Apart from popular scientific articles, the personal approach can also be observed in learning technical materials. Such materials often comply with politeness principles.

Krhutová also observes that literature concerned with humanities often contains a personal approach. The reason for that, as explained in *Parameters of professional discourse* (2010), is that scientists in the humanities often condone research alone while engineers in the technical fields usually work in groups.

Below are presented various extracts where each represents a different approach to the recipient:



### **Impersonality:**

*What **can be seen** as ‘operator-internal’ application is dedicated to the security of the operator’s network itself. **This is related** to the use of QKD by the operator to protect its own infrastructure (i.e., protection of the control plane or management plane between operator’s assets). **The wording ‘external’ refers** to the use-cases dealing with the protection of the data of the customers: in that case, the **operator can offer** protection of the customer data or offer the key as a service (KaaS).*

Martin and collective, p.16

### **Personality:**

*We usually roundoff this dB value to +3 dB. If **we** were to do this on our scientific calculator, **we** enter 2 and press the log button. The value 0.3010—appears on the display. **We** then multiply ( $\times$ ) this value by 10, arriving at the +3.010 dB value. This relationship should be memorized. The amplifying network has a 3-dB gain because the output power was double the input power (i.e., the output is twice as great as the input). For the immediately following discussion, **we are going to show** that under many situations a scientific calculator is not needed and one can carry out these calculations in his or her head. **We learned** the 3-dB rule. **We learned** the +10, +20, +30 dB; -10, -20, -30 (etc.) rules.*

Freeman, p.617

As seen in the first presented text, the highlighted expressions indicate the usage of passive voice or third person, which is characteristic of impersonal writing. However, in the second extract can be noticed the usage of personal expressions *we*. The second text is taken from the learning material, where the author’s intention is likely to bring the students closer to the topic by giving personal aspects to the text.

### **3.4.2 Objectivity/Subjectivity**

Objectivity is one of the crucial attributes of scientific writing, especially in technical fields. It is related to impersonality since no personal inputs are expected in objective writing. Usage of objectivity is linked with passive voice since the described matter is put forefront and the author himself is in the background (Shujaat, 2010). Active voice is rarely used in objective writing. Usage of jargon is also something that is not expected in objective writing, even though the jargon may be technical and related to the described field. It is optional for the author to assume that the reader is not aware of the jargon as it may be something that is not familiar to all specialists in a given field.

Similarly, as stated in the previous chapter on impersonality, the objectively written text does not explicitly mean that the content of the given text is objective as well. Even though it is generally assumed that the purpose of the scientific texts is to convey truthful information, some texts may conceal personal subjects under the impression of objective writing. However, this is not the truth for the technical fields where most findings can be empirically verified. Researchers who conduct their studies individually tend to use more of a subjective approach to their writing. As noted in the previous sub-chapter, individual research is often done by scientists in the humanities fields. Their research, therefore, may contain subjective elements since their theories cannot always be verified.

### **3.4.3 Certainty/Uncertainty**

Certainty is another aspect that is common for texts in technical writing. When the author describes specific phenomena or models, his/her description must be precise. It is therefore essential for technical texts to be specific and without any redundancies. This applies to the main body of the technical texts. When concluding, however, authors may choose a more uncertain approach, especially if their research may collide with another scientist's findings. This corresponds with the Politeness principle, which is described in the second chapter. Again, in some humanistic sciences, the researcher may be aware that his/her findings are only theoretical without the possibility of verification, and he/she, therefore, expresses them in a tone of uncertainty.

### 3.4.4 Formality/Informality

As in general texts, the formality depends on the author's intention when compiling a technical text. In his work, *The Five Clocks* (1967), Joos distinguishes five settings of formality: Frozen, Formal, Consultative, Casual, and Intimate. Each of these formality levels presents different approaches, and each is applied in a different manner. For the purposes of technical writing, it can be, however, simply categorized into two kinds: formal and informal. By analysis of various technical texts, it can be observed that a higher level of formality is used in the writings where the provided information is further specialized. Such texts are characterized by sophisticated vocabulary, complex sentences, objectivity, and the usage of a third person. It is assumed that readers with higher knowledge in the given field communicate with a higher level of professionalism. Therefore, written texts in such an environment usually comply with high formality standards.

Informality, on the other hand, is used in a setting where recipients are not expected to have immense knowledge of the subject. Informality in technical texts is usually presented in popular scientific texts, learning materials, and manuals. It is expressed by the usage of personal pronouns, short terms, simplified explanations, and sometimes even idioms.

#### **Formality**

*The address layer that **is used** inside the VSN description **is treated** as a virtual address layer. Addresses at this layer **are not required** to be globally unique, as they are **only considered** in the context of the (unique) namespace that is assigned to each VSN by the ISONI. From a conceptual point of view, any arbitrary layer 3 protocol could be used for ISONI SC interconnections in the VSN at the virtual address layer. As the ISONI has to have a basic understanding of the addressing concept used in a VSN in order to perform routing decisions, the ISONI proof of concept implementation uses an approach specifically based on IP at present.*

Oberle and collective, p.3

## Informality

*A capacitor can store electrical energy **for hours on end**. You'd be wise to **make sure** a capacitor is discharged before handling it, lest it discharges **through you**. To discharge a capacitor, carefully place a small incandescent bulb across its terminals, using insulated alligator clips (refer to Chapter 2) to make the connection. If the bulb lights up, **you know** the capacitor was charged, and the light should dim and go out in a few seconds as the capacitor discharges. **If you don't have** a bulb handy, place a 1 M $\Omega$  1 W resistor across the terminals and wait at least 30 seconds.*

Shamieh, McComb, p.108

In the presented texts can be noticed a notable difference in the style of writing. The former text contains all the elements which were described above. Usage of passive voice is a common phenomenon when describing technical concepts as it often eliminates personal aspects of the author, which are, in this case, not needed.

The second extract is, however, outlined with the usage of personal voice and many informal aspects. By using the personal pronoun *you*, which appears a few times in the text, the author can address the reader directly and therefore make the text more appealing. An interesting phenomenon is also the usage of the idiom *for hours on end*, which adds to the text's more entertaining aspect.

To conclude the chapter dealing with pragmatic aspects of technical texts, it can be said that depending on what approach the author chooses, the text is presented in a different light. It can be observed that: Impersonality, Objectivity, Certainty and Formality often correspond to each other. They would be used in cases where findings are to be presented in a serious manner. On the other hand: Personality, Subjectivity and Informality are used in the cases where an author wishes to lessen the severe tone of his writing or communicate with the public. As for Uncertainty, this approach does not necessarily indicate that the presented text is less serious; it may likely be used to observe the Politeness principle. All the presented pragmatic aspects may help us with further analysis of the Cooperative principle in technical texts.

## 4 ANALYSIS OF THE COOPERATIVE PRINCIPLE

After concluding all the theoretical aspects of the Cooperative and Poliness principles, the further analysis of the technical and non-technical texts continues. This chapter presents several subchapters where the various technical texts are analyzed and further described from the perspective of pragmatics. Analyzed technical texts are also compared with texts of non-technical character, and the difference in Cooperative and Poliness principle usage in technical and non-technical texts is observed. More information is provided further in the chapter.

### 4.1 Quantity - comparison

As previous chapters state, adherence to the Quantity maxim is one of many essential elements that make the written text comprehensible. Since the theoretical aspects of this maxim were already discussed, its usage is presented in one technical text, which is compared with the non-technical text.

#### Technical text – Quantity

*The support for positioning/searching within media content depends on the content's media properties. Content exists in a number of different types, such as on-demand, live, and live with simultaneous recording. Even within these categories, there are differences in how the content is generated and distributed, which affect how it can be accessed for playback. The properties applicable for the **RTSP** session are provided by the server in the **SETUP** response using the **Media-Properties header** (Section 18.29). These are expressed using one or several independent attributes. A first attribute is **Random-Access**, which indicates whether positioning is possible, and with what granularity. Another aspect is whether the content will change during the lifetime of the session. While on-demand content will be provided in full from the beginning, a*

*live stream being recorded results in the length of the accessible content growing as the session goes on. There also exists content that is dynamically built by a protocol other than RTSP and, thus, also changes in steps during the session, but **maybe** not continuously. Furthermore, when content is recorded, there are cases where the complete content is not maintained, but, **for example**, only the last hour.*

Schulzrinne and collective, p.13

The presented technical text displays the relevant case of usage of the Quantity maxim in technical writing. The authors of the text describe the function of the application protocol while assuming that the reader is already familiar with some technical concepts. Considering that the authors provided an introductory explanation at the beginning of their work, it is unnecessary to repeat the full name of the described concept, *Real-Time Streaming Protocol*, and an established abbreviation *RTSP* is used instead. By doing so, the final text is made shorter, yet still remains informative as required. It can also be noticed that the authors refer to the *Media-Properties header*, which is something to be further explained in the upcoming section, as marked in the text. By doing so, the authors adhere to the Quantity maxim by describing the information which is only within the scope of the current chapter. The mentioned *Media-Properties header* is not the main subject of this chapter, and therefore talking about it further would make the text more informative than momentarily required. In technical texts, many concepts are interconnected with each other, and they might be mentioned even before they are explained in detail.

By using the word *maybe* and *for example*, authors discuss different cases where the described content has different properties, indicating that there may be a number of mechanisms that are yet to be discussed. By doing so, authors adhere to the Politeness principle and consider that there may be different points of view on a given problem. Even though it may seem a little redundant, this behaviour does not flout the Quantity maxim since all the required information is delivered.

After the analysis of the technical texts, it needs to be compared with the analysis of non-technical texts, which should allow us to spot differences between the usage of the Cooperative principle in the technical and non-technical sciences. Non-

technical sciences are, in this case, considered human or other sciences not related to technology where the author of the work may work solely in the theoretical domain and where directly verifying the provided information is not always feasible. Therefore, it may be expected that usage of the Poliness principle and hedging is much more prominent, making the whole text less brief in delivery.

### **Non-technical text – Quantity**

*For example, for both a promise and a warning, the content of the utterance must be about a future event. A further content condition for a promise requires that the future event will be a future act of the speaker. The preparatory conditions for a promise are significantly different from those for a warning. **When I promise** to do something, **there are** two preparatory conditions: first, the event will not happen by itself, and second, the event will have a beneficial effect. **When I** utter a warning, **there are the** following preparatory conditions: it isn't clear that the hearer knows the event will occur, the speaker does think the event will occur, and the event will not have a beneficial effect. Related to these conditions is the sincerity condition that, for a promise, **the speaker genuinely** intends to carry out the future action, and, for a warning, **the speaker genuinely** believes that the future event will not have a beneficial effect. Finally, there is the essential condition, which covers the fact that by the act of uttering a promise, I thereby intend to create an obligation to carry out the action as promised.*

Yule, p.50

After looking closely into the second presented text, it can be noticed that the text has a different structure in terms of Quantity maxim. As the author describes the function of Felicity conditions in pragmatics, he directly gives examples of how these conditions would function in a real-life scenario. Therefore the question stands whether some of the exemplary descriptions may not be a little superfluous. Looking back at the case of technical text, the author first describes the concepts' core functions and proceeds to provide the reader with examples in a different part of the book. Whereas in the case of the second text, which describes non-technical concepts, the examples are

presented directly next to the explanation of the concept. It could be argued that the structure of these examples may not be directly in adherence with the Quantity maxim since the information presented may be more contributive than momentarily required. Considering the repetition of phrases, such as *When I, there are...*, and *the speaker genuinely...*, one could argue that the text has unnecessary wordiness, which contains more information than necessary.

However, as stated previously in the theoretical chapters of this work, the texts concerning non-technical concepts may have a different structure. Since the author of the non-technical text describes a topic that may not be yet very established or even describes the concept for the first time, it can be assumed that there is a need to present as much information to the reader in an individual chapter, since the author may not refer to them again. The reason might also be the fact that since the author is a single person and the whole work, therefore, may not be very long. In the technical text, however, it can be assumed that the described topic is already partially known to the scientific community, and therefore the information is presented more broadly in the whole work, yet less concretely in the individual parts. As stated previously, the flouting of the Quantity maxim, in this case, may be an arguable subject; however, the goal to show the difference between two types of text regarding this maxim may have been satisfied.

## **4.2 Quality - comparison**

The Quality maxim is the fundamental maxim that must be applied to every text concerning technology. Even in the humanities, this maxim should be considered a priority. However, as shown, the writer may unintentionally flout this maxim. This non-observance may occur primarily in the cases where all the described concepts are purely theoretical, and there is no way of verifying the claimed facts. Even though this occurs both in technical and non-technical sciences, the technical sciences are more often presenting claims which are based on previously done calculations or real-world observations, whereas, in non-technical ones, there may be presented claims that can sometimes be the reflection of authors point of view.



## Technical text – Quality

*Relativity and Quantum Physics predict that a universe which collapses to a singularity will not explode outward, but will implode, creating a singularity which punches a hole in the **space-time quantum continuum** (Joseph 2010) and then forming an expanding "mirror universe" linked via an **Einstein-Rosen bridge**, to the collapsing universe on the other side (Einstein and Rosen 1935). Einstein's theories predict length contraction to sizes smaller than a **Planck length**. Space smaller than a Planck length cannot be conceptualized by quantum mechanics or classical physics: Geometry ceases to exist, Cartesian coordinates,  $x$ ,  $y$  and  $z$ , cannot be applied, and time ceases to have meaning (Garay 1995). As based on **quantum** mechanics, a **particle shrinking** to less than a **Planck length** gains incredible mass and energy, but not **infinite mass** (Joseph 2010). Space-time, within the **Planck scale**, is therefore subject to extreme uncontrollable **quantum fluctuations**, as it is continually being bent, folded, crumpled, and torn apart by these powerful **gravitational forces** (Bruno, et al., 2001). A defining feature of these tiny spaces is gravity so powerful that it punches a hole in space-time (Joseph 2010). According to Heisenberg (1956), "when quantum theory is combined with relativity, it predicts time reversal" in spaces smaller than 10-13cm; smaller than the radii of an **atomic nukleus**...*

Rhawn, p.72

In the presented text, the author describes the relevant theories in the domain of astrophysics. The highlighted terms in the text are primarily theoretical concepts based on calculations in mathematics and physics. However, considering the character of this scientific domain, there are still no ways of verifying many of these phenomena as they are still within reach of today's technology. Therefore, they are described based on the concepts that have been verified only in the human-reachable environment and on the mathematical computations, possibly excluding the unknown variables. From the Quality maxim perspective, it could be the point of argument whether the scientists in the given domain have enough evidence to give some statements regarding the behaviour of out-of-human-reach physical objects. It is, however, not the job of

linguists to verify the truthfulness of given theories but of the other scientist in the given domain. Therefore, it can be considered that all the given information is truthful and in adherence with the Quality maxim unless it is disputed and misrecognized by the wider public. After all, it can be said that authors presenting their theories have no intention to mislead the reader but, on the contrary, to broaden their knowledge. Therefore it can be stated that authors firmly believe that what they are presenting is true, thus adhering to the Quality maxim. The author, in this case, does not strictly adhere to the Politeness principle since he presents already established theories and therefore is not concerned with different points of view.

### **Non-technical text – Quality**

*Even those persons whom the child seems to love from the very beginning, it loves at the outset because it has need of them, cannot do without them, in others words, out of egoistical motives. Not until later does the love impulse become independent of egoism. In brief, egoism has taught the child to love. In this connection it is instructive to compare the child's regard for his brothers and sisters with that which he has for his parents. The little child does not necessarily love his brothers and sisters, often, obviously, he does not love them at all. **There is no doubt** that in them he hates his rivals and it is known how frequently this attitude continues for many years until maturity, and even beyond, without interruption. Often enough this attitude is superseded by a more tender feeling, or rather let us say glossed over, but the hostile feeling appears regularly to have been the earlier. It is most noticeable in children of from two and one-half to four or five years of age, when a new little brother or sister arrives.*

Freud, p.178

The second presented text shows an extract from Freud's book on psychoanalysis. Similarly, as in the technical text, all the presented information is primarily theoretical. The very prominent characteristic of this writing is that even though the author possibly describes his own views from the world of psychology, all information is presented as pure facts. Considering that the described behaviour overreaches to the real world,

where the readers can observe the phenomena themselves, it is much easier for them to consider whether the provided information is truthful or not. As in this case, the author describes the perceived nature of the children, which may seem like something erratic as the described behaviour may differ from person to person. The question, therefore, stands whether, by providing such statements, the author writes in adherence to the Quality maxim.

Furthermore, it is questionable whether about the described information author has enough evidence, as required by the Quality maxim. Contrary to the technical text, which has some kind of technical backing for its described concepts, in this case, the described nature is based purely on the author's own perception, which may vary from individual to individual. The author of this text likely believes in what he is presenting, yet it is questionable whether the Quality maxim is being observed, considering the character of the evidence. As for the Politeness principle, it is not observed since the author presents all the information in a very confident tone, with no regard for other views.

### **4.3 Relation - comparison**

If taken into account that the author's goal in the technical text is to convey information to the reader as clearly as possible, the Relation maxim is very often not flouted. However, considering the context and level of technicality of the analyzed text, it can be discussed whether, in some cases, the provided level of information is not above the extent of the text. For example, excessively technical information is not expected in popular-scientific texts, assuming that readers may not be familiar with more complicated concepts and may read the text purely for entertainment. Such occurrence would be considered a non-observation of the Relevancy maxim since the presented information would not be relevant to the expected information. In the professional technical texts, all the presented information is usually on the same informational level; therefore, flouting of the Relation maxim is often not observable.

## **Technical text – Relation**

*A client MAY issue a **SETUP** request for a stream that is already set up or playing in the session to change transport parameters, which a server MAY allow. If it does not allow the changing of parameters, it MUST respond with error 455 (Method Not Valid in This State). The reasons to support changing transport parameters include allowing application-layer mobility and flexibility to utilize the best available transport as it becomes available. If a client receives a 455 error when trying to change transport parameters while the server is in Play state, it MAY try to put the server in Ready state using **PAUSE** before issuing the **SETUP** request again. If that also fails, the changing of transport parameters will require that the client perform a **TEARDOWN** of the affected media and then set it up again. For an aggregated session, not tearing down all the media at the same time will avoid the creation of a new session. All transport parameters MAY be changed.*

Schulzrinne and collective, p.71

The authors in the presented text describe the client and server operational concepts. All the described information concerns the specified topic, and the Relation maxim is observed. Authors describe the functioning of the concepts, such as **SETUP**, **PAUSE**, and **TEARDOWN**, in capital letters, which were previously described in the book and are already known to the reader. It can also be noticed that authors use capital letters for verbs: **MAY** and **MUST**. The reason for doing so is likely to highlight the difference between the workings of the described concepts, mainly stating that one is optional while the other is mandatory. As stated before, all the described aspects are relevant to the given topic, and nothing in the presented text is out of the extent of the text as all the concepts are on the same informational level.

### **Non-technical text – Relation**

*Because tax terminations ditch that entity classification election, you can reorganize your company if you decide you want to be taxed like a partnership and don't want to wait for five years. The easiest way to reorganize your LLC is to have a corporation be a member of the LLC. When you want to trigger a tax termination, you just form a new corporation and transfer the LLC's membership to that entity. Assuming you transfer more than 50 percent of the membership, this is a quick and easy way to change from corporation tax status back to a partnership tax status. If your LLC has been tax terminated, you don't need to file new articles of organization or even acquire a new tax ID. Really, you don't have to do much of anything except consult with your company accountant so he can work out the tax issues, if there are any. However, you and your partners may have to recognize a gain or a loss on your personal federal tax returns.*

Reuting, p.208

When looking into the second presented text, it can be assumed that observation of maxim occurred as well. Considering that author of the text does not tell anything which is out of the scope of the requested information, it can be assumed that all the requirements for the Relation maxim are satisfied. It can also be noticed that the author presents different scenarios regarding company creation, all of them being relevant to the topic. As described previously, in both technical and non-technical texts, the maxim of Relation is usually not flouted, as in contrast to the spoken word, the written texts are usually single topic-oriented and therefore flouting of Relation maxim is unlikely to happen. The reason for non-observance of the maxim of Relation could possibly be the implication which, as seen in the two presented texts as well as the other ones regarding the professional topics, is not the case since the author's goal is to deliver information to the reader as clearly as possible, with no hidden meaning.

As to the other aspects of the analysis, it can be noticed that the author describes the topic using a very personal approach which is directly connected to informality. This is characteristic of certain kinds of instruction books where authors choose a personal approach to address the reader directly.

## 4.4 Manner - comparison

In contrast to other analyses in this chapter, the maxim of Manner looks into how is information presented rather than the information itself. In technical texts, as in any other texts, it is essential to present the message to the reader or hearer in the most straightforward and orderly Manner. Nevertheless, it is to be the point of debate whether the texts, in some cases, either flout or violate the maxim of Manner. For example, in technical texts, the reader may believe that the maxim of Manner is not observed, and the reason could be due to the reader's insufficient technical qualification and knowledge, which makes the concepts in the text seem obscure or ambiguous. Therefore, the non-technical or popular scientific texts may be more in alignment with the maxim of Manner, at least for the general audience.

### Technical text – Manner

*Create a new **transmission control block (TCB)** to hold connection state information. Fill in **local socket identifier**, **foreign socket**, **precedence**, **security/compartments**, and **user timeout information**. Note that some parts of the **foreign socket** may be unspecified in a passive **OPEN** and are to be filled in by the parameters of the incoming **SYN segment**. Verify the security and precedence requested are allowed for this user, if not return "error: precedence not allowed" or "error: security/compartments not allowed." If passive enter the **LISTEN state** and return. If active and the foreign socket is unspecified, return "error: foreign socket unspecified"; if active and the foreign socket is specified, issue a **SYN segment**. An **initial send sequence number (ISS)** is selected. A **SYN segment** of the form **<SEQ=ISS><CTL=SYN>** is sent. Set **SND.UNA** to **ISS**, **SND.NXT** to **ISS+1**, enter **SYN-SENT** state, and return. If the caller does not have access to the local socket specified, return "error: connection illegal for this process". If there is no room to create a new connection, return "error: insufficient resources".*

Eddy, p.54

Many technical concepts and expressions highlighted in the presented text, as

previously stated, may seem unfamiliar to the general audience. The whole text may therefore seem ambiguous and obscure to somebody who is not familiar with these technical concepts. However, it must be noted that since the presented text is directed toward the people knowledgeable in the field, it is not expected that the reader would understand it without some prior knowledge. Considering that, the authors have no intention of flouting the maxim of Manner since they expect the audience to be aware of the phrases and therefore understand the conveyed message.

As to the brevity of delivery, it can be agreed that this text and most of the other technical texts are brief in conveying the information. Considering that the authors of the text deliver everything essential for further understanding of the given concepts while also omitting any redundant information, it can be stated that the maxim of Manner is observed. Furthermore, the orderliness of information can be considered something obvious, especially in written texts, since the author has the idea of what they are going to write about, and therefore, the accidental change in the order of presented information is improbable.

### **Non-technical text – Manner**

*I turn now to the explanatory challenge: what learning processes can create representational resources with more expressive power than, or qualitatively different from, their input? This is one place where the project of characterizing the logical tool box available to human beings, including representational capacities drawn upon in number representations, is important. In the bootstrapping mechanism sketched below, I appeal to an old favorite—the uniquely human capacity to create external symbols. I assume that the capacity for human language—the capacity to form lexical, syntactic, and morphological representations—has innate support, as do the logical capacities needed to express meanings and the inferential relations among propositions, and to engage in a variety of modeling processes. I will help myself to many of these capacities in accounting for the capacity to represent natural number. But the human capacities for language and logic do not, by themselves, account for the origin of concepts like 32, infinity, gene, cancer, and democracy. We seek specific proposals for how new conceptual systems (in this case a system of natural number representations) are built.*

Carey, p.15

Similarly to the first one, the second presented text explains certain concepts in a non-technical domain. However, in this case, it is more debatable whether the author flouts or violates the maxim of Manner. Considering the complicated sentence structure and usage of obscure expressions, the message of the text may be unclear to the reader. Again, it must be noted that this text is likely not directed to the general public, yet still, in comparison to the technical text, the non-technical text is written in a much more obscure manner with much unnecessary wordiness. The example may be the first sentence, where it seems unclear what is the author trying to ask. The usage of complicated phrases, some of them invented by the author himself, creates a very confusing and hard-to-understand text for the reader. Apart from that, the required brevity is ignored as well since the produced text is made unnecessarily longer. After considering these factors, it could be argued that the author violates the maxim of Manner to make the described topic seem more sophisticated than it actually is. It could also be argued that this violation of the maxim of Manner occurs more commonly in



non-technical sciences, such as psychology or linguistics, where the authors may tend to write using complicated sentences and expressions, thus making the topic seem more complex. However, this point of view may be a matter of deeper conversation.

On a different point, it can be noticed that the author adheres to the Poliness principle by using the phrase, *I assume*, indicating that written ideas are his own, thus not imposing on others. The usage of inclusive *we* can also be noticed as to include the reader in the view. In the technical text, on the contrary, hardly any instances of the Poliness principle can be found.

## 5 CONCLUSION

The present thesis focused on explaining the usage of the Cooperative principle and its corresponding aspects in relation to technical texts and analyzing its usage directly in the extracts. As explained in the first chapter, the Cooperative principle, as defined by Grice, is a description of a way of effective communication either in spoken or written form. Considering that technical texts are in written form, this applies to them as well. It can be even said that some of these maxims are mandatory to be applied to the text so it can convey its pragmatic meaning correctly. Since the essential goal of the technical text is to convey truthful information in a comprehensible manner, the most important maxims for such tasks are considered Quality and Manner.

The same chapter described cases of maxim non-observance where the authors, for different reasons, could not observe the maxim. The common case would be considered the maxim flouting, where the author is forced to flout one maxim in order not to disregard the other. As described by Thomas, such a case of non-observance is called the clash of maxims. In the provided extracts, the reason for such non-observance is the intention of the author to prolong the explanation of the topic in order to avoid uncertainty in later text or to comply with the Politeness principle.

The Politeness principle, as described in the second chapter, is a way of conveying a message so as to not possibly oppose the views of the recipient or the other authors. With the definition of Leech's Politeness principle, the extracts were presented where its observance is admitted or neglected. As seen in the analyzed text, the observance of the Politeness principle comes with the usage of hedging and polite expressions, which may seem redundant from the view of the Cooperative principle. It is, however, noted that such tactics are used most commonly in the conclusions of the scientific research, where all the findings are just summarized. On the other hand, the neglecting of the Politeness principle may oppose the views and opinions of the reader, even though the presented findings are factual. The chapter on the Politeness principle also explained the Brown & Levinson Politeness theory and explained its appliance in the technical text using both negative and positive politeness strategies. Each of these strategies is

outlined by the usage of different elements, such as inclusive or exclusive *we*, where positive strategy can be considered somewhat less formal.

As for the third chapter, the various pragmatic aspects of the written texts were presented, where each of them plays a different role in the compilation of the technical writings. The usage of the mental schemata is explained as well as the explanation of the meaning of the terminology in the technical texts. As seen in the extract presented in Czech, such terminology conveys its English form and meaning to other languages where the professional community adapts to using it. The prominent part of the chapter described the approaches to the recipient. As classified by Krhutová, there are various approaches that producers of technical texts choose in order to convey their message in a different manner. It is observed that authors use various pragmatic tools in their texts, and by doing so, the Poliness and Cooperative principle could be applied.

The final chapter of the bachelor thesis concerned itself with the comparison of a series of technical and non-technical texts and observed the cases of adherence, flouting or possibly violating of Cooperative principle. As observed in the analysis of these texts, some Cooperative principle maxims may be the subject of argument since the judgment on whether the maxim is observed or flouted may depend on the reader's perspective and expertise. Generally, it could be stated that the Cooperative principle is likely to be observed in technical texts since they can rely more on terminology and, therefore, be less prone to non-observance. Nevertheless, in most of the analyzed texts, it has been agreed upon that the Cooperative principle maxims are observed in different forms.

The main goal of this bachelor thesis has been achieved by providing the reader with theoretical knowledge of the Gricean Cooperative principle and showcasing its practical usage in the various texts. Therefore, this thesis can be used as an example for further studies of pragmatics in the domain of technical writing.

## REFERENCES

- Bahaziq, A. (2016). Cohesive devices in written discourse: A discourse analysis of a student's essay writing. *English Language Teaching*, 9(7), 112. <https://doi.org/10.5539/elt.v9n7p112>
- Brown, P. & Levinson, S. C. (1987). *Politeness: Some universals in language usage*. Cambridge: Cambridge University Press.
- Grice, H. P. (1975). *Logic and conversation*. New York: Academic Press.
- Grice, P. (1989). *Studies in the way of words*. Harvard Univ. Press.
- Joos, M. (1967). *The five clocks*. Harcourt, Brace & World.
- Krhutová Milena. (2010). *Parameters of professional discourse: English for electrical engineering*. Tribun EU.
- LEECH, G. (1983). *Principles of pragmatics*. Longman.
- Ltd, A. A. (2021, August 12). *Non observance of Grices Maxims*. UK Essays. Retrieved December 12, 2021, from <https://www.ukessays.com/essays/english-language/non-observance-of-grices-maxims.php>.
- Salom, L.G. & Monreal, C.S. (2009). *Interacting with The Reader: Politeness Strategies in Engineering Research Article Discussion*. International Journal of English Studies
- Shujaat, R. (2020, November 14). *Objectivity in technical writing – why it's important*. 198 online academy news. Retrieved December 12, 2021, from <https://198onlineacademynews.com/objectivity-in-technical-writing-why-its-important/>.
- Sučková, M. (2021). Theories of politeness. Lecture at Brno University of Technology. Brno; Jihomoravský kraj.

Suraishkumar, G. K. (2004). *Improving coherence in technical writing*. Chemical Engineering Education,

Thomas, J. (1995). *Meaning in interaction: An introduction to pragmatics*. Longman.

van Olmen, D. (2017). Politeness in language. *Oxford Bibliographies Online Datasets*.  
<https://doi.org/10.1093/obo/9780199772810-0161>

Widdowson, H. G. (1996). *Linguistics*. Oxford University Press.

Yule, G. (1996). *Pragmatics*. Oxford University Press.

## CORPUS OF ANALYZED TEXTS

- Carey S. (2009). Where Our Number Concepts Come From. *The journal of philosophy*, 106(4), 220–254. <https://doi.org/10.5840/jphil2009106418>
- Eddy, W. M. (1981, September). TRANSMISSION CONTROL PROTOCOL. Transmission control protocol (TCP) specification. Retrieved April 10, 2022, from <https://www.ietf.org/archive/id/draft-ietf-tcpm-rfc793bis-25.html>
- Freeman, R. L. (2005). *Fundamentals of Telecommunications*. John Wiley.
- Freud, S. (2009). *A general introduction to psychoanalysis*. Dodeul saegim.
- G. Wijesinghe, S. Mat Shah, and V. Ciesielski, “Grid vs. arbitrary placement of tiles for generating animated photomosaics,” Proc. 2008 IEEE Congress on Evolutionary Computation (CEC 2008), Hong Kong, China, Jun. 2008
- Gooch, A., Gooch, B., Shirley, P., Cohen, E.: A non-photorealistic lighting model for automatic technical illustration. In: Conference on Computer Graphics and Interactive Techniques (1998)
- Janovský, D. (n.d.). *Úprava textu*. Úprava textu pomocí HTML: b, i, span... Retrieved December 12, 2021, from <https://www.jakpsatweb.cz/html/text.html>.
- Joseph, Rhawn. (2017). A Collapsing Cyclic Universe, Colliding Galaxies, Antimatter Mirror Universe, Singularity and the Quantum Big Bang. 70-95.
- K. Oberle, M. Kessler, M. Stein, T. Voith, D. Lamp, and S. Berger, “Network virtualization: The missing piece,” in Intelligence in Next Generation Networks, 2009. ICIN 2009. 13th International Conference on, 2009.
- M. A. Al-Absi, A. A. Al-Absi, M. Sain, and H. J. Lee, “A state of the art: future possibility of 5G with IoT and other challenges,” Smart Healthcare Analytics in IoT Enabled Environment, P. Pattnaik, S. Mohanty, and S. Mohanty, Eds

- Martin, V., Brito, J.P., Escribano, C. et al. Quantum technologies in the telecommunications industry. *EPJ Quantum Technol.* 8, 19 (2021). <https://doi.org/10.1140/epjqt/s40507-021-00108-9>
- Predko, M. (2005). *Digital Electronics Demystified: A self-teaching guide*. McGraw-Hill.
- Reuting, J. (2008). *Limited liability companies for dummies*. For Dummies.
- Schulzrinne, H., Rao, A., Lanphier, R., Westerlund, M., & Stiemerling, Ed., M. (2016, December). RFC 7826 - real-time streaming protocol version 2.0. Retrieved April 9, 2022, from <https://datatracker.ietf.org/doc/rfc7826/>
- Shamieh, C., & McComb, G. (2009). *Electronics for dummies*. Wiley.
- Yule, G. (2011). *Pragmatics*. Oxford University Press.