TIME DEIXIS IN ENGINEERING DISCOURSE

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Abstract. Nowadays, it has become commonly accepted that the meaning of linguistic elements is interconnected with the context of their use. Deixis is one of the classical pragmatic phenomena that illustrates that context-dependence is inherent in language as meaning of deictic expressions cannot be constructed without the identification of the speech event where these expressions occurred. The present article discusses cases of time deixis in the context of engineering discourse. The goal of the research is to demonstrate how the deictic expression use in different genres of professional discourse impacts meaning construction. The study deals with the data obtained from scientific articles, encyclopaedia chapters and coursebooks. The findings indicate that temporal deictic expressions can be utilized both deictically and non-deictically and their frequency may depend on the genre within each professional discourse. Further research can be conducted to investigate the use of other categories of deictic expressions in engineering discourse.

Key words: time deixis, deictic expressions, pragmatic meaning, reference, engineering discourse

INTRODUCTION

In the recent decades, the phenomenon of the *semantics-pragmatics interface* has been one of the most debatable issues in the theoretical literature on pragmatics. The standard accepted account of meaning draws a distinction between '*what is said*' (i.e. the semantic part of the meaning) and '*what is implied*' (i.e. the pragmatic or contextual part of the meaning). Scholars (e.g. Recanati, 2004: 3; Evans, 2009: 5) refer to this account as *literalism*.

By emphasising the contrast between linguistic and extra-linguistic aspects of meaning, literalism highlights the existence of context-independent part of meaning. However, this stance is opposed by *contextualism* (e.g. Sperber and Wilson, 1995; Recanati, 2004; Evans, 2009). Borg (2012: 519) suggests that the underlining idea of contextualism is 'that pragmatics can contribute to semantics even when such a contribution is not required by anything in the lexico-syntactic content of the sentence'.

Huang (2007: 242) concludes that 'the boundary between them [semantics and pragmatics] is not easy to draw in a neat and systematic way'. The division of labour between these branches of linguistics depends on a scholar's theoretical stance.

Whereas semantics operates with the notion of *sentence meaning*, pragmatics deals with *utterance meaning*. At the lexical level, *word meaning* or *lexical concept* can be applied to both domains of semantics and pragmatics. The previous research (Čerņevska, 2019: 4-8) discussed word (i.e. lexical concept) meaning ambiguity in mechanical engineering discourse. The study investigated the pragmatic processes of *lexical narrowing* and *lexical broadening*. Lexical narrowing refers to the instances of a word conveying a more specific meaning in the context than it encodes linguistically (Huang, 2012: 171-172). For example, the same word could have a narrower meaning as a technical term utilized in professional discourse than it would have in general vocabulary. On the other hand, lexical broadening deals with the cases of words acquiring a more general meaning in the context than is lexically encoded (ibid.: 171). It has been concluded that, while meaning ambiguity is frequent in the discourse under analysis, word meaning tends to narrow rather than broaden in the context of mechanical engineering discourse (Čerņevska, 2019: 8). The present study continues the discussion of the interconnectedness of linguistic and non-linguistic aspects of word meaning in relation to the concept of *deixis*.

Huang (2012: 87) defines deixis as 'a phenomenon on the intersection of semantics and pragmatics [that] deals with features of the context of an utterance and how they are encoded in the language by lexical and grammatical means. This includes the identification of a specific speaker, addressee, time and place of an utterance'. Moreover, Levinson (1983: 54) states that deixis is 'the single most obvious way in which the relationship between language and context is reflected in the structure of languages themselves'. *Deictic expressions* (i.e. *indexicals*) adjust their meaning to the context of use and cannot be fully comprehended without any knowledge of this context. Consequently, deixis has become an extensively debated issue among scholars.

Huang (2007: 237-241) outlines this debate by offering a comparative analysis of five different theoretical frameworks (Grice, 1989; Bach, 2004; Sperber and Wilson, 1995; Levinson, 2000; Recanati, 2004). The scholar (ibid.: 241) concludes that deixis can be viewed as part of 'what is said' or the semantic content of an utterance; as a *conversational implicature* (i.e. 'part of the meaning [...] beyond "what is said"' (Huang, 2012: 73)) or as part of the explicit content of an utterance that needs to be resolved pragmatically.

Levinson (2004: 97) also admits that the concept of deixis is one of the underresearched areas of pragmatics as there has been no agreement on the boundary between the semantic and pragmatic parts of its meaning.

The present paper focuses on one category of deixis, namely, *time* (i.e. *temporal*) *deixis* that links an utterance to the time period when the utterance is produced. The use of time deixis in the discourse produced within the domain

of engineering is analysed. Engineering discourse utilizes a significant amount of descriptions of sequence of events where the temporal aspect is crucial for a variety of activities such as a successful application of material processing techniques and others.

The goal of the study is to research the theoretical implications of the notion of deixis in relation to the semantics-pragmatics interface and to analyse the use of temporal deictic expressions in different genres of engineering discourse. It has been hypothesised that the genre impacts the frequency of deictic expression use and the pragmatic meaning construction of these linguistic elements.

Engineering discourse is underresearched from the pragmatic perspective; however, previous publications (e.g. Čerņevska, 2016, 2019) deal with other aspects of the pragmatic meaning construction in mechanical engineering discourse such as presuppositions and scalar implicatures.

The paper offers an analysis of the theoretical considerations on the concept of deixis and discusses professional discourse as a means of communication within a *discourse community* – a group of people who share texts and practices (Barton, 2007: 75-6; cited by Hyland, 2009: 35). The present research also focuses on the selected instances of time deixis in the discourse under analysis.

LITERATURE REVIEW

Deixis has always presented a challenge for semantic analysis as the interpretation of deictic expressions requires knowledge of the context of their use. The utterance cannot be assigned its *truth-value* (i.e. evaluated as 'true' or 'false') without identifying the referents of the deictic expressions.

Semantics operates with the notion of *sense*. There are various sense relations between words such as antonymy, synonymy, etc. Sense is usually opposed by *reference*, which can be defined as 'a relation which holds between expressions and entities, properties or situations in the outside world' (Lyons, 1981: 168). Thus, reference, similarly to deixis, is context-dependent.

The relationship between the concept of deixis and reference is not unanimously defined by different scholars. For instance, Ariel (2010: 149) implies that deixis is part of reference stating that 'reference in general, and deixis in particular, have been considered classical pragmatic phenomena'. However, Lyons (1981: 180) notes that 'reference can be deictic or non-deictic; and deixis does not necessarily involve reference'. Levinson (1983: 67) also discusses non-deictic usages of deictic expressions. The scholar states that non-deictic usage is 'deictic terms being relativized to the text instead of to the situation of utterance' (ibid.). In other words, the anaphoric use of such linguistic elements is defined as non-deictic.

This theoretical stance seems to emphasise the physical dimension of the context and to differentiate it from the linguistic context. Consequently,

it should be admitted that the same linguistic expressions can be used either as deixis or not, which, in its turn, suggests that the link between the linguistic structures and the concept of deixis depends on certain extra-linguistic factors. It can also be the case that particular expressions are both deictic and non-deictic in the same utterance (Archer, Aijmer and Wichmann, 2012: 27).

The phenomenon of deixis includes the notion of a *deictic centre*. Huang (2007: 135) lists three major categories of a deictic centre: the person who is speaking, the time of the utterance and the place of the utterance. The scholar adds (ibid.) that deixis is 'a self-centred phenomenon, its centre being typically I-here-now'. Archer, Aijmer and Wichmann (2012: 26) state that 'deixis grammaticalizes features of the speech event such as the (role/status of the) participants, the activities being talked about or referred to and the spacio-temporal context'. However, Sidnell (2009: 117) points out that the meaning of the deictic expressions is not necessarily calculated in relation to the speaker. It can be not only an ego-centric, but also a sociocentric phenomenon, which means that the speaker is able to understand their addressee's perspective and take it into consideration when producing an utterance. Mey (1993: 54) also states that 'an ego-centred organization of deixis [...] is not always and necessarily the case'. This shift of the deictic centre can be referred to as a *deictic projection* where the deictic centre shifts from the speaker to the addressee (Huang, 2007: 135). Therefore, the meaning of deictic expressions depends on the focus of the speaker.

There are five main categories of deixis; the first three correlate with three main aspects of a deictic centre – *person deixis* (who the speaker is), *time deixis* (when the utterance is produced) and *space deixis* (where the utterance is produced). Besides, scholars (following Levinson, 1983: 85-94) define two additional categories – *discourse deixis* (i.e. *text deixis* – a reference to the text within which the utterance containing this reference occurs (ibid.: 62)) and *social deixis* (i.e. linguistic elements that encode the 'social relationship between the speaker and addressee' or other referents (ibid.: 63)). Whereas all these categories can be analysed separately, the focus of the present study is on temporal (i.e. time) deixis and reference.

Thus, an utterance occurs at a certain point in time which can be regarded as the temporal dimension of the deictic centre. The first complication arises from the fact that the deictic centre can be projected from the speaker to the addressee, and, in this case, the referent of the deictic expressions is modified as well. Levinson (1983: 73) differentiates between the concepts *coding time* (CT) and *receiving time* (RT) of an utterance. If the deictic centre is not projected, one can assume *deictic simultaneity*. Otherwise, CT and RT will differ. The second issue is concerned with time deixis as being referred to the entire span of the particular time period (e.g. today) or a point within this span (ibid.: 74-75; Huang, 2007: 144-145).

Time deixis can be grammaticalized in a language via deictic adverbs of time ('now' and 'then'), deictic calendrical unit terms ('today', 'tomorrow', 'yesterday') and a grammatical category of tense (ibid.: 145-149). Moreover,

deictic components like 'this', 'next' and 'last' can collocate with non-deictic components such as days of the week or names of months (Huang, 2007: 146). Besides, the use of such words as 'today' or 'tomorrow' has 'priority over the use of calendrical terms for the relevant days' (ibid.: 145), which indicates the possibility of linguistic scalarity.

While it has been mentioned that reference and deixis are not applied interchangeably as deixis can be used both in a narrower or broader sense (Lyons, 1981: 180), L. de Saussure (2012: 423) defines *temporal reference* as 'some moment or interval of time where the situation is holding', which roughly corresponds to the temporal dimension of the deictic centre of an utterance. The scholar (ibid.) emphasises that many utterances remain ambiguous in spite of the existence of the grammatical category of tense. This ambiguity is related to the fact that tense systems of particular languages 'represent lots of different temporal relations' (ibid.: 424). Levinson (2004: 115) also states that 'the interpretation of tenses often involves implicatures'. In other words, the grammatical realization of time via the system of tenses in a language is not sufficient to establish the referent in the context as it also implies the subjective interpretation of an utterance based on background knowledge of the affairs in the world. When there is a clash between the grammatical representation of an utterance and the content of the utterance, the interpretation is affected by it. It should be noted that the present study excludes the discussion of tenses, although they can be interpreted in 'purely deictic and strictly temporal' (Levinson, 1983: 77) terms.

Ariel (2010: 204) states that there are two types of information that are encoded by referring expressions – *conceptual* and *procedural* information. The scholar (ibid.) suggests that conceptual information in the case of referring expressions is the 'instructions on how to retrieve the representation of the intended referent from the context'. Thus, 'tomorrow' is 'the next day for the speaker'. On the other hand, procedural information discusses 'how accessible the representation of the retrieved referent is for the addressee according to the speaker's best estimate' (ibid.).

Moreover, the encoded part of meaning (both conceptual and procedural) is not sufficient for interpreting an utterance and the gap between the encoded and the speaker's meaning should be 'filled in by inferencing' (ibid.: 151).

Consequently, deixis can be approached differently depending on the theoretical stance of the scholar. First, instances of deictic and non-deictic use of deictic expressions can be separated. It can be assumed that if the referent of an expression can be identified based on the preceding linguistic discourse, the expression is applied non-deictically (i.e. anaphorically). This view suggests that the context can be described linguistically and, thus, does not have to require the pragmatic component for meaning construction. Another theoretical perspective emphasises that, whereas certain aspects of meaning are encoded at the linguistic level, there exists a gap between the linguistic level of discourse and the enriched meaning that requires inferential processing.

The present study combines these theoretical perspectives as it distinguishes between deictic and non-deictic use of time deixis and attempts to identify the gap between the linguistic form of deictic expressions and their contextual meaning in professional discourse.

Hyland (2009: 8-18) discusses two approaches to text-oriented research. The scholar states that texts can be viewed as *objects* (i.e. as being independent of the context of use) or as *discourse* (i.e. the language used for communication in order 'to achieve purposes in particular situations') (ibid.: 8, 12). Van Dijk (2011: 4) also emphasises that being contextually situated is one of the discourse properties. Besides, discourse is viewed as a communicative event which goal is 'the expression and communication of beliefs among language users' (ibid.) Due to its interactive nature, discourse implies the participation of both the writer and the reader in the meaning construction process (Hyland, 2009: 44-45). The role of the audience in writing adds 'a social dimension to writing research' (ibid.: 8) and allows to approach the concept of discourse as *social interaction* (Van Dijk, 2011: 3). Thus, it can be argued that the writer needs to take the intended audience into account when producing discourse.

The communicative goal of discourse depends not only on the field, but also on the genre. Swales (1990: 58; cited by Hyon, 2008: 12) defines genre as 'a class of communicative events, the members of which share some set of communicative purposes. These purposes are recognized by the expert members of the parent discourse community [...]'. Hyland (2009: 15) underlines that each genre differs from other genres; it 'has a specific purpose, an overall structure, specific linguistic features, and is shared by members of the culture'.

Consequently, deictic expressions can be comprehended at three levels. First, an expression contains conceptual information which can also be viewed as the semantic part of the meaning. For instance, 'now' refers to the current situation at the moment of the utterance production. This information can be retrieved by any reader who possesses the linguistic competence. Then, the context referred to by a deictic expression can be identified using common background knowledge. For instance, if the discourse discusses the increase of the pace of online communication in relation to 'now', most Internet users would be able to identify an approximate time period as they can construct the meaning of 'now' based on their Internet usage experience. Finally, a more precise identification of the time span can be available to those readers who possess professional knowledge in the field of engineering. This could refer to the discussion of the technical procedures less familiar to the general public.

Sperber and Wilson (1995: 39-46) introduce the concept of *mutual manifestness*. The scholars (ibid.: 15-21) argue that the mutual-knowledge hypothesis is implausible as two people could never share exactly the same knowledge. Consequently, the professional knowledge of two representatives of the same discourse community (e.g. engineers) does not necessarily overlap. However, they share a larger *cognitive environment,* since they have acquired or

are acquiring a profound knowledge of a professional field. Consequently, this would increase their abilities to successfully communicate within a discourse community in comparison with non-professional readers of engineering discourse.

METHODS

At the empirical level, the study is approached from the qualitative perspective. Three corpora of approximately 50,000 words each have been selected for the analysis. The discourse is represented by different genres (coursebooks, scientific articles and an encyclopaedia) in the field of engineering. The material selection criteria have been justified by the author's goal to investigate the difference in the use of time deixis in different genres within one area of professional discourse.

Whereas the coursebooks under analysis are intended for engineering students in general, the study analyses the chapters that refer to four main areas that can be applied to mechanical engineering, i.e. computer-aided design (CAD), material technology, machining and computer numerical control systems (CNC) and health and safety regulations at a manufacturing plant. The Encyclopaedia chapters included in the corpus deal with the discussion of occupational health services, iron and steel, metal processing and metal working industry and woodworking. The scientific articles have been selected from the Journal of Mechanical Engineering and also focus on this specific field of engineering.

The research is designed as a case study. It employs the *purposeful sampling paradigm* (Perry, 2011: 65). The paradigm purpose is 'in-depth information gathering' (ibid.: 65) and it concerns 'the unique characteristics of the sample itself' (ibid.: 57). *Convenience sampling* strategy (ibid.: 58) has been applied as the analysed discourse was readily available. Besides, *stratified purposeful sampling* (i.e. a few cases from each strata selection (ibid.: 59)) strategy has been added in order to ensure the external validity of the research.

The research method is discourse analysis. Following Roziņa (2013: 16-17), the present study focuses on the language use 'in professional settings with the emphasis on communication as a social action' since communication is a discourse property (Van Dijk, 2011: 3-5) and genre can be viewed as a communicative event (Swales, 1990: 58; cited by Hyon, 2008: 12). Whereas it can be argued that content analysis can be applied within a discourse analytical framework (Hardy, Harley and Philips, 2004: 20-21), discourse analysis 'highlights the precarious nature of meaning and focuses on exploring its shifting and contested nature' (ibid.: 20) the present study emphasises the role of context in meaning construction. The phenomenon of deixis is viewed as pragmatic in nature which implies the shift of meaning in the context of use.

The research tool sketchengine.org has been applied in order to research the frequency of different deictic adverb of time use. First, the study has been approached from the semantic perspective and the words are counted based on their linguistic forms. Then it has been established if the adverbs are used deictically, i.e. if the extra-linguistic context is necessary for identifying the referent. Finally, the study has attempted to identify the time span referred to by the selected deictic expressions and discussed if professional knowledge of engineering is essential for constructing the meaning of these deictic expressions.

RESULTS AND DISCUSSION

The present discussion comprises three subchapters that deal with different linguistic realization of time deixis in discourse.

1 DEICTIC ADVERBS OF TIME – 'NOW'AND 'THEN'

Deictic adverbs of time are represented by the words 'now' and 'then' that indicate the proximity of the time referred to and the deictic centre of an utterance. The deictic centre can be projected, which also imposes a challenge on identifying the referent of a deictic expression.

Table 1.1 indicates that the use of 'now' is considerably less frequent than the use of its counterpart 'then'. However, these findings only indicate the use of the specific linguistic forms that can be applied deictically or non-deictically in the discourse under analysis.

Table 1.1 **The use of deictic adverbs of time in engineering discourse**

Deictic adverbs	Scientific articles	Encyclopaedia	Coursebooks
Now	3	4	11
Then	28	58	58

For instance, the word 'now' linguistically means that the time referred to is concurrent with the time of the utterance. This part of meaning is supposed to remain stable despite the context of use. Following Ariel (2010: 204), it can be defined as conceptual information encoded in deictic expressions or instruction on how to identify the referent. However, 'now' can be stretched from a single moment to a quite prolonged period of time, which depends both on the speech act participants' subjective interpretation of time and on the events or states of affairs, to which 'now' can be attributed. For example, 'now' in the context of a historical period can last for a few decades or even longer, whereas 'now' in the context of everyday situations can last for a few minutes or even less. Thus, it can be argued that not only the time of the utterance, but also the discourse characteristics impact the pragmatic meaning of 'now'. This challenges the idea of the semantic meaning existing outside a context.

Although coursebooks present more instances of the use of 'now', it can be argued that all three analysed genres of engineering discourse contain a limited amount of such examples. Italics are added for emphasis in all of the selected samples.

[1] 'Thirteen AMT out of twenty reduce staff cost, but the significant reduction is in using software for production planning and scheduling which was done manually before and is *now* replaced by software.' (articles)

[2] 'As the complexity of the machinery increases, the requirements for lubricants and metal process oils become more stringent. Lubricating oils *now* range from clear, very thin oils used to lubricate delicate instruments, to thick, tar-like oils used on large gears such as those which turn steel mills.' (encyclopaedia)

[3] 'Thanks to the Internet it is *now* possible for people all over the world to communicate with one another in a fast and cheap way.' (coursebooks)

[4] 'We *now* have a full set of working drawings for the main ski lift (attached).' (coursebooks)

[5] 'Biotechnology / genetic engineering methods – this technology is really in its infant stage, so the negative relationships to profits for *now* are understandable.' (articles)

Although the use of 'now' in the selected utterances seems quite similar, it would be interesting to indicate the differences.

First, the impact of the linguistic context on the meaning of 'now' is identified. It can be observed that utterances [1], [2] and [5] contain other linguistic elements that presuppose the contrast between the present time period and others. Utterance [1] contains an adverb 'before', which literally compares two different periods in the history of machinery development. Moreover, the use of the verb 'to replace' also indicates the change. The verbs 'to increase' and 'to become' in the sentence that precedes the use of 'now' in example [2] linguistically presuppose the change of state; thus, also highlighting the contrast between 'now' and 'earlier'. Utterance [5] contains the expression 'in its infant stage' that also linguistically indicates the possible development of biotechnology. However, unlike utterances [1]-[4], this instance contrasts the present period with the future rather than the past.

Utterances [3] and [4] do not contain an explicit indication to the past or the future that would be readily available for general public understanding. A reader's general knowledge about the development of the Internet suggests that online communication is constantly becoming faster and cheaper. Thus, utterance [3] seems to apply to any point of time since the invention of the Internet and it would be problematic to identify the exact time period referred to by 'now' without the immediate context of an utterance.

Utterance [4] also seems to lack the contrast between 'now' and other time periods. Besides, it represents a line from a dialogue between engineers in the coursebook where the participants of the speech event discuss their work on a project. In this example, 'now' can refer either to a point of time or to a time period. Moreover, the reader is not able to define the exact temporal dimension of the utterance context as the dialogue could have occurred at any time, which is similar to the use of 'now' in utterance [3]. However, a technical term 'working drawing' can be contrasted with 'a preliminary drawing' that would refer to an earlier stage of the product design development process. As a result, a reader who possesses the professional knowledge about this procedure will infer that the product design development process might have been completed. The meaning is constructed at the linguistic level, but it might not be understood fully by a general reader.

The second step is to analyse the impact of the extra-linguistic factors and professional knowledge in engineering on the meaning construction of the adverb 'now' in the selected utterances.

It can be argued that the meaning of 'now' in utterances [1]–[5] can be comprehended even by non-professionals in the field. The reader can rely both on the linguistic information and the background knowledge of the world. The text itself states that certain procedures have been altered. For instance, production planning is now done by software [1] and the requirements for lubricants have increased [2].

However, the encoded part of meaning could be enriched by the background knowledge of the world to identify the time period more precisely. Thus, the deictic adverb of time 'now' has its semantic and pragmatic aspects of meaning that contribute to the meaning of an utterance.

Whereas the use of 'now' covers the time period as contrasted with 'earlier' or 'later', the linguistic part of the meaning does not indicate when the period that referred to by 'now' starts or ends. Thus, the background knowledge is required to identify the period. However, the professional expertise in the field of engineering does not seem necessary in order to retrieve this part of meaning.

The aim of the coursebook is not only to provide information, but also to practice the communication skills and improve the linguistic competence of a language learner who specialises in engineering.

Consequently, the examples encode different meaning of deictic expressions. The adverb 'now' in utterance [4] refers to a shorter time span than in utterances [1]–[3] and [5] as it deals with a working situation which is being resolved at the moment. The genre of coursebooks allows the author to introduce the context where 'now' is applied in a short dialogue as in the case of utterance [4]. Some examples contain the extracts from professional texts used for reading assignments, where 'now' is utilized similarly to its application in the encyclopaedia and scientific articles. The selected instances of the use of 'now' in the discourse are compared in Table 1.2.

Table 1.2 **The comparative analysis of the use of 'now' in the selected utterances**

Utterance	The impact of the utterance linguistic content on the meaning construction of 'now'	The impact of the readers' background knowledge on the meaning construction of 'now'
1. (articles)	The use of 'before' and 'to replace'	Linguistic context and general knowledge of the world are sufficient to infer the contrast between 'now' and 'before' in relation to the software development. Professional expertise could be beneficial for identifying a more precise time span – are these years? Decades?
2. (encyclopaedia)	The use of 'to increase' and 'to become'	Similar to utterance [1] the utterance describes metal processing procedure details as well
3. (coursebooks)	No explicit comparison with the past or the future	General knowledge of the world suggests that the utterance can refer to any time period; more information about the dates is required to identify a more specific span – both for engineers and non-professional readers
4. (coursebooks)	The use of 'now' between the subject and the verb might emphasise the contrast between 'now' and 'before'. However, the word order might be impacted by the example being intended to modulate spoken discourse. The knowledge of the term 'working drawing' can help to infer the contrast with the previous stages of design development process	The utterance can refer to any period of time as expected from the genre of an ESP textbook modulating dialogues; professional knowledge can only identify the stage of the product design development process based on the knowledge of terminology
5. (articles)	The expression 'in its infant stage' can linguistically presuppose the future development of biotechnology	Similar to utterances [1] and [2]; however, 'now' is contrasted with the future rather than the past

The less frequent use of 'now' in comparison with 'then' can be accounted for non-deictic use of 'then' in the discourse. No instances of deictic use of the adverb 'then' in the discourse can be reported. The description of material processing is divided into stages that are characteristic of this process, and the adverb 'then' is often utilized in order to present the procedure clearly. The previous steps, before 'then' are usually reported in the same or previous utterances, which means that the linguistic context is sufficient for identifying the referent and, therefore, 'then' is applied non-deictically. It also does not require a significant cognitive effort in order to establish the reference. Consequently, the example can be defined as the anaphoric use of 'then'. The adverb usually describes the sequence of actions and does not indicate any lack of proximity to the speaker.

> [6] 'Resin sand is injected into a metal pattern (the core box). The pattern is *then* heated – by direct natural gas fires in the hot box process or by other means for shell cores and moulding.' (encyclopaedia)
>
> [7] 'Complete the texts with the words in the box. *Then* listen and check.' (coursebooks)

Utterances [6] and [7] demonstrate that the adverb 'then' is applied similarly both in the description of a metal processing technique in the encyclopaedia and in the instructions for the exercise in the coursebook. Thus, the meaning of 'then' does not vary depending on the genre as both examples utilize 'then' to explain a process. However, there is a pragmatic component which has not been fully encoded in the utterances. It requires background knowledge to understand the time gap the adverb 'then' refers to. Utterance [7] usually implies that the listening part of an exercise starts instantly after the texts have been completed with the words. However, to infer this, some background knowledge of the language learning process is required. Utterance [6] requires the knowledge of the field of engineering and metal processing, in particular for the reader to be able to infer the time period between injecting resin sand into a metal pattern and heating the pattern. Thus, the pragmatic component of the adverb 'then' in these examples does not alter because of the genre or the topic of the discourse.

2   DEICTIC CALENDRICAL TERMS – 'TODAY', 'YESTERDAY' AND 'TOMORROW'

While adverbs 'now' and 'then' encode the distance between the time of an utterance and the referent of the deictic expressions and can last for an unidentified period of time, deictic calendrical terms additionally indicate the approximate time span as it is commonly accepted that each day consists of 24 hours. However, the context of use can extend the time period referred to by these words.

Table 2 **The use of deictic calendrical terms in engineering discourse**

Deictic calendrical terms	Scientific articles	Encyclopaedia	Coursebooks
today	3	3	6
yesterday	0	0	1
tomorrow	0	0	0

Table 2 illustrates the frequency of deictic calendrical terms use in the discourse under analysis. It demonstrates that there are a few instances of the adverb 'today' in all analysed genres, whereas the word 'yesterday' appears only once and the word 'tomorrow' does not appear in the discourse at all.

> [8] '*Today*, many market environments are characterised by the rising costs of raw materials, technological and economic uncertainty and decreasing profit margins.' (articles)
>
> [9] 'Drop hammer forging once comprised about two-thirds of all forging done in the United States, but is less common *today*.' (encyclopaedia)
>
> [10] 'Wind energy is one of the cheapest renewable technologies available *today*.' (coursebooks)

The adverb 'today' is applied in the same meaning as 'now' describing the contemporary time period and stressing the rapid development of technology in the sector. In utterances [8]–[10], 'today' can be opposed to the adverb 'earlier' or 'before' and describes a time period that is proximal both to the writer and the reader as the discourse was written quite recently. However, both 'now' and 'today' can emphasise the contrast with either preceding or following time periods, and each instance should be analysed in the context of their use.

It should be noted that there are no examples of utterances where 'today' would refer to a particular day when an utterance is produced. It can be observed that the pragmatic process of *lexical broadening* is applied to the use of 'now' and 'today' in the engineering discourse. This could demonstrate that the use of temporal deixis in the engineering discourse can be distinguished from the use of lexical concepts analysed previously (Čerņevska, 2019). The previous research findings (ibid.) demonstrated that the pragmatic process of lexical narrowing is typical in relation to lexical concept adjustment in mechanical engineering discourse. Thus, it could be stated that the meaning of temporal deixis undergoes a different pragmatic process than the meaning of other non-deictic lexical concepts in the discourse under analysis. This could be accounted for the fact that identifying a time period, unlike the comprehension of technical terms, does not require profound professional knowledge of the engineering field. The professional knowledge only assists in identifying the referred time span more precisely.

Interestingly, the coursebooks apply the adverb 'today' in order to describe a longer time period and do not mean the actual day where the discourse takes place, although this could be possible. In the context of coursebooks, such use could be expected as some of the utterances simulate the real-time conversation between the participants of the speech event.

Chafe (1982: 45) states that 'the detached quality of written language is [...] to distance the language from specific concrete states and events', whereas spoken discourse can be characterized by the audience 'involvement' (ibid.). Whereas coursebooks represent written discourse, they also aim to teach speaking skills and, thus, can contain elements characteristic of spoken discourse. One example from the analysed coursebooks is the use of the word 'yesterday' applied in reference to 'the day before the utterance was produced'.

[11] 'We had our first design meeting with the airport authority and the architect *yesterday.'* (coursebooks)

The adverb 'yesterday' is applied deictically as it is necessary to know the context of the utterance to identify the exact time span. Moreover, the adverb can define both the point of time within the time period and the whole time span. The reader's background knowledge suggests that meetings do not last for the whole day; thus, 'yesterday' probably means 'a time period within the day before the utterance'. However, it might be implied that the meeting lasted for the whole day. Thus, the identification of the time period relies both on the encoded information and the pragmatic part of meaning.

3 COMPLEX DEICTIC ADVERBS

Complex deictic adverbs consist of a deictic component (this, next, last) and a non-deictic component (month, Monday, year) (Huang, 2007: 146).

Table 3 **the use of complex deictic adverbs in engineering discourse**

Complex deictic adverbs	Scientific articles	Encyclopaedia	Coursebooks
This + non-deictic component of time	0	1	2
Last + non-deictic component of time	1	2	3
Next + non-deictic component of time	0	0	2

Table 3 demonstrates that complex deictic adverbs are not extensively represented in the discourse.

[12] 'However, much of the literature regarding neurological effects in such workers derives from the presumption that aluminium absorption results in human neurotoxicity. Accordingly, until such

associations are more reproducibly demonstrable, the connection between aluminium and occupational neurotoxicity must be considered speculative *at this time.'* (encyclopaedia)

[13] 'Remember that people *at this time* are sceptical about the technology.' (coursebooks)

[14] *'At this point,* these are initial ideas based on the client's suggestions and the approximate dimension specified in the design brief.' (coursebooks)

Although the pronoun 'this' is utilized in the discourse rather frequently, there have been observed only three instances of it being applied in relation to the temporal aspect of an utterance. Interestingly, the occurrences of such complex adverbs do not include reference to a particular month or year. On the contrary, it should be admitted that the expression 'at this time' roughly corresponds to the use of the adverbs 'now' and 'today' in the discourse. Moreover, the expression 'at this point' can be understood figuratively, where the temporal aspect of an utterance is represented as a location or a spacial dimension of the context.

Utterance [12] utilizes the expression 'at this time' to indicate a longer time period, which can be inferred both from the previous linguistic context and the reader's background knowledge of the world. Since it refers to the theoretical literature on neurotoxicity, it can be assumed that the empirical studies have been conducted to prove the link between aluminium and occupational neurotoxicity. On the one hand, this can be assumed by any reader who has experience in academic work and publications; on the other hand, the more exact time period can be identified only by experts in this field as they are aware of the time required to conduct the research and produce tangible results.

The time period in utterance [13] may be identified more precisely once the technology mentioned in the utterance has a more specific referent. Then a reader with the knowledge of this technology could make more educated assumptions about people's reaction to it. Utterance [14] represents an extract from a description of an engineering design process, and 'at this point' could refer to a particular step within this process. Thus, it is not evident that the expression is applied deictically as the linguistic context could be sufficient to understand which point of time is referred to.

The meaning of the complex deictic adverbs that contain the components 'last' and 'next' can be constructed if the time of the utterance production is established.

[15] 'Within the *last decade* the industry has tended to either not replace or to modify existent Soderberg type reduction facilities as a consequence of the demonstrated carcinogenic hazard they present.' (encyclopaedia)

[16] 'These may be accompanied by nausea and headache and, some 10 to 12 hours after the exposure, chills and fever which may be quite severe. *These last several hours* are followed by sweating, sleep and often by polyuria and diarrhoea.' (encyclopaedia)

[17] 'Automation has had a great impact on industries *over the last century*, changing the world economy from industrial jobs to service jobs.' (coursebooks)

[18] 'Let me think ... It must have been *last year, in June,* when the car wouldn't...' (coursebooks)

[19] 'Actually, I'm quite busy at the moment, Mrs Farrell, so I could give it back to you *next Friday.* Yes, it'd be perfect, because we're leaving on Sunday. I'll call you on Tuesday for a confirmation then.' (coursebooks)

Utterances [15]–[19] demonstrate differences in meaning of the deictic expressions. For instance, the expressions 'the last decade' and 'over the last century' can be assigned their meaning only if the time of the utterances [15] and [17] is identified. Provided that the sources of the utterances are acknowledged and the time when they are produced can be identified, the meaning of the expressions can be constructed as well. Utterance [16] contains the reference to the immediate linguistic context and 'the last hours' do not require a reference to a specific point of time. Rather, the expression is applied anaphorically and, therefore, non-deictically.

Examples [18] and [19] from the coursebooks deal with the structure of a communicative situation, where the expressions 'last year' and 'next Friday' do not require the referent identification and, indeed, only their encoded part of meaning can be interpreted by the reader. The conceptual information suggests that 'last year' refers to the previous year from the perspective of the speaker and 'next Friday' refers to a Friday in the future. It has been discussed (Huang, 2007: 147) that the use of terms for days of the week is pre-empted by the use of such deictic calendrical terms as 'today', 'yesterday' and 'tomorrow'. Thus, if the expression were 'this Friday' or 'on Friday', it could be assumed that the utterance did not occur on a Thursday. However, 'next Friday' does not usually imply this as it usually refers to the Friday next week. Produced on a Saturday or a Sunday, the expression might become ambiguous as it would not be evident how to identify the time span of 'next week'. Besides, as it is discussed in literature (Huang, 2007: 146; Levinson, 1983), the names of the days of the week also have deictic aspects of meaning as they form a scale with such adverbs as 'today' or 'tomorrow'. In other words, if an utterance is made on Thursday, then 'next Friday' most likely means the Friday of the next week, because the speaker would have used 'tomorrow' otherwise. However, these considerations are not relevant to utterance [19] as the time is not important for the reader.

In the current case, the reader cannot identify the time of utterance [19] and, thus, the expression 'next Friday' remains ambiguous. However, the analysis

of the following discourse suggests that 'Sunday' should be understood as the Sunday that follows 'next Friday' and the Tuesday that precedes 'next Friday'.

Utterance [19] seems to represent a line from a dialogue between a professional and a client. The deictic expression refers to 'next Friday', but the exact deictic centre i.e. when the utterance was made is not known as the purpose of the utterance is to demonstrate the language use in the professional setting, not to make an actual reference to the specific time period. This means that 'next Friday', in fact, does not mean any particular Friday, and it is not understood by the reader as referring to a particular day. The reader does not assign meaning to this deictic expression as the context already states that the exact date is not important.

This fact presents a notable difference between the encyclopaedia (and scientific articles) and coursebooks. In the first two genres the time of the utterance is very significant as the deictic expressions of time have meaning only in this context. For instance, such expressions as 'last decade' or 'in the last three years' that occur in these corpora make sense only if the reader is aware of the year when the text was written. In case the reader is going to read this text in, for example, a hundred years, he or she will understand that 'last decade' refers to the decade before the text was written. Thus, the meaning of the deictic expression of time can be inferred in case the deictic centre is known, but the reader can be far from this centre without losing the ability to identify the meaning.

Consequently, the meaning of a deictic expression of time can be identified if the utterance is produced in the authentic circumstances. In other cases, for instance, in a coursebook where the discourse has been constructed in order to enhance the linguistic competence rather than share professional knowledge, the deictic expression of time does not require assigning the meaning in the real-world situation.

CONCLUSIONS

The study demonstrates that deixis is a complex phenomenon that is discussed in relation to the semantics-pragmatics interface and comprises both linguistic and extralinguistic aspects of meaning. It should be noted that there can be deictic and non-deictic usage of deixis, which presents an additional analytical challenge.

The research results indicate that the use of time deixis in the selected corpora is rather limited, which can be accounted for the fact that deictic expressions are prone to be lexically broadened, which could present difficulties when constructing their meaning in the context of engineering. Certainly, the linguistic meaning ambiguity in the context is inevitable and is impacted by the area of professional discourse and the analysed genres that constitute a communicative event. However, previous findings (Čerņevska, 2019) demonstarted that other lexical concepts tend to narrow their meaning in the engineering discourse (e.g. when used in a technical sense), whereas temporal deixis is utilized in a broader

sense than is linguistically encoded. It is probable that the field of the analysed discourse would not benefit from the ambiguity that could occur if more time deictic expressions were applied.

Whereas the genre of discourse impacts the frequency of temporal deictic expression use, the instances of such examples are so limited that the hypothesis cannot be proved. Rather, the findings illustrate that the pragmatic meaning of temporal deictic expressions may vary depending on the genre. For instance, the aim of the coursebooks is to enhance linguistic competence and, thus, certain time deictic expressions are utilized in such communicative situations as dialogues, which permits certain flexibility of meaning of such adverbs as 'today', 'last Friday', etc. The reference to the exact time period might be less significant as it seems that the created dialogues in ESP coursebooks aim to focus on the linguistic part of these deictic expressions. On the other hand, scientific articles and encyclopaedias aim to increase the readers' general knowledge of the field of engineering and, thus, the referents of time deixis utilized in these genres should be constructed precisely.

The most common use of time deixis is the reference to the time span when an utterance is produced, such as 'now' and 'today'. However, the analysed instances demonstrate a rather loose or broad utilization of these adverbs in the context of engineering discourse.

The analysis demonstrates that meaning construction of these linguistic expressions depends both on the background knowledge available to a general reader and on the professional knowledge that the intended audience of the discourse should possess.

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TEXTS ANALYSED

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