

Terminology and knowledge representation

- There is no knowledge without terminology -

The nature of (scientific-technical) knowledge

Knowledge as such does not exist in nature – it has been created by man. It has been and is constantly created by/in human brains. Only after social interaction – including communication – it becomes commonly accepted (or at least more than just individually 'decided') knowledge. There are different types of knowledge, which need different kinds of communication or transfer in order to be passed on to others. In such communication or transfer processes more or less meaningful 'contents' is provided by a 'sender' with the purpose to be understood by a 'recipient'.

Representation of (scientific-technical) knowledge

For communication purposes knowledge/contents needs to be 'represented'. Representation of knowledge can take the form of individual symbols, or strings – or even more than two-dimensional arrangements in space and time – of symbols. Symbols can be linguistic or non-linguistic, audio or non-audio, visual and non-visual etc. If symbols – by definition – are carriers of meaning, symbols in principle can appeal to any of the human senses in order to convey and transfer meaning/contents. Even in the field(s) of linguistics it has become commonly accepted that there is something like non-verbal communication.

Non-verbal representations of (scientific-technical) knowledge

Most of the types of non-verbal communication, such as gestures, mimics etc. are 'visual' and appeal to the eye or are perceived through the eye – whether consciously or unconsciously. Multimedia technology and multimodality in information and communication technologies (ICT) are substantially changing – extending – the way humans can communicate. They are also changing the nature of communication, which traditionally can be subdivided into spoken or oral and written communication (not to mention non-verbal communication). Traditional texts have been composed largely of letters or characters in one or the other kind of writing system. Word processing and other kinds of software, the electronic book and other kinds of devices are extending the nature of texts and documents in such a way that any kind of representation of meaning/contents/knowledge can be used in a more or less integrated way in or in combination with texts.

The nature of communication

Speech technology and most recently mobile telephony are having an impact on the share of oral communication as compared to written communication. Over the last decades that share was continuously diminished to the favour of written communication. Especially mobile telephony might reverse this trend to a certain extent. But it will also reinforce the trend towards specialised communication in the meaning of subject-field related communication, which in written communication captures the highest percentage. In written communication it takes the form of specialised texts (or texts written in SPL – special purpose language).

Language and terminology planning

Mobile telephony – reinforcing the impact of the Internet – also encourages the use of indigenous languages other than English and make peoples or language communities to reconsider the role of their native languages. If their native languages shall also serve as vehicles to communicate specialised knowledge/contents, they must develop the specialised terminology in order to become fit for this purpose. This is most efficiently done in a concerted, organised and concentrated – not to say systematic – approach. In fact such activities are taking place today in many language communities, which will reinforce the development towards a global multilingual information society.

The role of English as lingua franca

In this connection it may be observed that English slowly but steadily loses its role as primary interlingua or lingua franca, which it certainly will keep for a longer while in specialised communication. This is due to the fact that the 'relative strength' of a language largely depends on the economic strength of its language community. With a time lag of some years or decades increasing or fading economic power has the corresponding weakening effect on the relative strength of the respective language community. This explains why the European Commission put so much emphasis on language engineering and human language technology: Europe is highly multilingual and will become increasingly multilingual.

Macro-structure and micro-structure of knowledge

Information, communication and knowledge are closely interrelated. Information often takes the form of information on knowledge (e.g. some kinds of factual information) or information on carriers of knowledge (e.g. in the form of published or increasingly electronic texts). More and more knowledge is stored and processed directly in knowledge databases. Indexing and retrieval languages are used to find the carriers/containers of knowledge (which can be written or spoken texts, data files etc.). This is the function of classification schemes and thesauri for documentation purposes, which can also be called the 'macro-structure' of knowledge. Terminology – if applied properly – leads the user exactly to the place in a document, where the information or knowledge item occurs. Terminology, therefore, can be called the 'micro-structure' of knowledge.

Where does knowledge reside in the organisation?

Knowledge first of all resides in the heads of the people. That is why modern management theory considers the human capital as the most important asset of an 'intelligent' organisation. Knowledge – to some degree – is also represented by the organisation of the company or institution, which – under this aspect – also 'represents' the knowledge of the creators of this organisation. Knowledge is communicated – and, if it is recorded in the form of text or speech corpora, it becomes reusable. If it is not 'recorded' (viz. represented) knowledge is a volatile matter. However, if it is made reusable, it can be transferred (e.g. by teaching and training), further developed (into a commodity, services, etc.), converted (e.g. into other knowledge units), translated (into other languages), stored, etc.

Standardisation of principles and methods as prerequisite for the reusability of knowledge

In order to make knowledge data universally 'reusable' and thus really commercially viable, it needs a high degree of standardisation of methodology. ISO/TC 37 'Terminology (principles and co-ordination)' has just entered the path towards an extension of its scope in the direction of 'Terminology and other language resources' (whereby subsuming all kinds of knowledge representations, which can be communicated, under a wide concept of 'language').

There is no knowledge without terminology

SIGNS OF [REDACTED]

The signs that may be seen in [REDACTED] of the [REDACTED] are summarized in *Fig. 24.11*. Especially significant are:

1. [REDACTED]
If the [REDACTED] has [REDACTED] or wears [REDACTED] then in a [REDACTED] it is likely that the [REDACTED] will be altered. In the [REDACTED] the [REDACTED] is in a [REDACTED] between [REDACTED] and the [REDACTED]. When [REDACTED] occurs the [REDACTED] may be separated into different [REDACTED], each of which may be [REDACTED] by the actions of one [REDACTED] alone so that the normal [REDACTED] is [REDACTED]. Typical examples of this are shown in *Fig. 24.11*.

Fig. 24.11 Signs of [REDACTED]

(This and the following figures are taken and adapted from: H. Picht [1998] *Terminology and specialised communication*. E. Oeser; C. Galinski [eds.]. Eugen Wüster (1898-1977). *Leben und Werk – Ein österreichischer Pionier der Informationsgesellschaft/His life and work – An Austrian pioneer of the information society. Proceedings of the international conference on „Professional Communication and Knowledge Transfer“*. Vienna, 24-26 August 1998. Wien: TermNet, 1998. Vol. 1. p. 117-131)

If one deletes all terminological 'units' from a specialised text (i.e. a text written in SPL – special purpose language), this text becomes unintelligible – from the point of view of specialised communication as well as of common language. If, however, one deletes the common language elements, the text (or what remains of it) is to quite some degree intelligible to an expert. Something similar happens at international conferences, where experts from different language communities talk 'expert pidgin' to each other – and somehow (but of course not always) understand each other. Text technology identifying meaningful 'units' in texts can help people to find 'contents' in texts. It could further be developed – within certain limits as posed by the very nature of language – into information and knowledge extraction technology.

SIGNS OF [REDACTED]

The signs that may be seen in [REDACTED] of the [REDACTED] are summarized in *Fig. 24.11*. Especially significant are:

1. [REDACTED]
If the [REDACTED] has [REDACTED] or wears [REDACTED] then in a [REDACTED] it is likely that the [REDACTED] will be altered. In the [REDACTED] the [REDACTED] is in a [REDACTED] between [REDACTED] and the [REDACTED]. When [REDACTED] occurs the [REDACTED] may be separated into different [REDACTED], each of which may be [REDACTED] by the actions of one [REDACTED] alone so that the normal [REDACTED] is [REDACTED]. Typical examples of this are shown in *Fig. 24.11*.

Fig. 24.11 Signs of [REDACTED]

With a few clues, experts can guess what subject field the text is about, but still do not understand anything of the contents.

INDIVIDUAL FACIAL FRACTURES

Mandible

fracture mandible

Deranged Occlusion

patient teeth dentures displaced
fracture dental occlusion
normal state mandible state of balance
elevator muscles (pterygomasseteric sling) depressor
muscles (digastrics and mylohyoids). fracture
mandible segments,
displaced group of muscles
balance disrupted

Muscle pull

**Deranged
dental
occlusion**

**Sublingual
haematome
Mental
sensory
disturbance**

IDB

Step

Swelling

**Mental
nerve
fracture of mandible**

Without common language elements the SPL text reveals already much of its specialised contents. Reading habits of experts largely follow this pattern: identifying ,knowledge units' and restructuring them into ,multidimensional' knowledge. Every scientific-technical knowledge is essentially multidimensional.

SIGNS OF INDIVIDUAL FACIAL FRACTURES

Mandible

The signs that may be seen in fracture of the mandible are summarized in *Fig. 24.11*. Especially significant are:

1. *Deranged Occlusion*

If the patient has teeth or wears dentures then in a displaced fracture it is likely that the dental occlusion will be altered. In the normal state the mandible is in a state of balance between the elevator muscles (pterygomasseteric sling) and the depressor muscles (digastrics and mylohyoids). When fracture occurs the mandible may be separated into different segments, each of which may be displaced by the actions of one group of muscles alone so that the normal balance is disrupted. Typical examples of this are shown in *Fig. 24.11*.

Muscle pull

Deranged
dental
occlusion

Sublingual
haematome

Mental
sensory
disturbance

IDB

Step

Swelling

Mental
nerve

Fig. 24.11 **Signs of fracture of mandible**

No text – not even a whole collection of text – about a given subject can reveal all knowledge on that subject. There are inherent limits to language (being largely a one-dimensional string-type representation of contents) with respect to knowledge representation, which have to be and can be – to some extent – overcome by other means of knowledge representation – with the help of technology! On the other hand data from knowledge databases can without too much difficulty be formulated by a text creation program into a seemingly ‘natural language’ text.