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## **ON GENERIC DEFINITION OF TERMS: AN ATTEMPT OF A LINGUISTIC APPROACH TO TERM DEFINITION ANALYSIS**

Recent publications in terminology research remarkably demonstrate constantly growing interest in the problem of term definition analysis (Meyer et al. 1992; Sager, L'Homme 1994; Sager, Ndi-Kimbi 1995; Shelov 1996; Jose, Finatto 1995; Pozzi 2001; Shelov 2001). Definitions outline the semantics of terms and set up their logical and semantic relations. According to A. Rey, term definition is probably the very centre of terminological problems (Rey 1979, p. 39).

In some of our recent publications, we endeavoured to outline a method of term definition analysis which enables us to determine 1. what part of a Dfn denotes the nearest generic concept and 2. what parts of a Dfn denote differentiating characters (Shelov 1996) (here and below, according to the tradition in logic, we denote the expression to be defined as “Dfd” and the expression by means of which it is defined as “Dfn”). Basically, this method was oriented towards more or less refined systems of definitions developed for some computer applications since “the relatively free-text form of most definitions is not normally suitable for effective use in a database environment” [Sager, L'Homme, p. 352].

So we just took it for granted that a consistent, logically and linguistically irreproachable definition system exists for terms of a given domain. This assumption involves that any ambiguity or synonymy of the Dfn expressions is eliminated. It also implies that every common word of the Dfn expression has one and the same meaning, that every syntactic relation sticks to one and the same semantic relation only, that not a single meaning is expressed in different ways, etc). Thus, applied to this normalised definition system (or at least similar to it), a rule that enables us to parse the Dfn text into the nearest generic term and phrase/phrases denoting differentiating characters runs:

The nearest generic concept is denoted by a minimum (if counted in autonomous words) semantically accomplished and syntactically independent part of the Dfn which includes maximum (if counted in autonomous words) a term already introduced in a subject field. The rest of the Dfn denotes differentiating characteristics of this generic concept; there is only one differentiating characteristic if the rest of the Dfn is syntactically related to only one word, and there are ‘n’ (conjunct) differentiating characteristics if the rest of the Dfn is syntactically related to ‘n’ different words.

Later there turned out to be an extra argument in favour of this view, since information on the term through which a term is defined is necessary to classify definitions into different types. To demonstrate the importance of “term definability” I shall analyse a few definitions and discuss some implications of the analysis below, referred to as classification of term definitions. I shall use definitions borrowed from the following sources: 1. Rosenberg, J.M.: Dictionary of Computers, Information Processing & Telecommunications / 2nd ed. – V. 1 –

5. – N.Y., John Wiley & Sons, 1987 (in abbreviated form below – COMP); 2. Glossary of Heat Treatment /Swedish Centre of Technical Terminology. TNC 57E. – Stockholm: TNC, 1974. – 88 p. (in abbreviated form below – HEATTR).

Here are some definitions from the sources (Dfd of the definitions below is printed in italics, Dfn is printed in ordinary font):

1. Parallel computer. A computer having multiple arithmetic or logic units that are used to accomplish parallel operations or parallel processing [COMP].
2. Computer micrographics. Methods and techniques for converting data to or from micro-form with the assistance of a computer [COMP].
3. Computer architecture. The specification of the relationships between the parts of a computer system [COMP].
4. Computer-assisted management. Management performed with the aid of automatic data processing [COMP].
5. Austenitizing. Heat treatment for the purpose of altering a structure to a more or less pure austenitic state [HEATTR].
6. Blue brittleness. Condition caused by embrittlement in connection with the precipitation of foreign phases in a material of given composition and given temperature [HEATTR].
7. Critical cooling rate. The lowest cooling rate at which undesired transformation will not occur [HEATTR].
8. Equilibrium diagram. Graphic representation of the range of occurrence for a balanced system's phases expressed as a function of temperature, pressure and composition [HEATTR].
9. Soaking time. Period of time during which a material subjected to heat treatment remains at the required temperature [HEATTR].
10. Heat treatment. Application of a combination of heating, holding and quenching (or cooling, holding and heating) to a solid material below its melting point in order to affect the properties of the material in the manner desired [HEATTR].

Definitions 1 – 10 seem generic, but how can we make sure that definitions 1 – 10 are really generic?

It is worth mentioning that in the sources under consideration 1. the term parallel computer is defined through the term computer; 2. the term computer micrographics: through the terms data and micro-form; 3. the term computer architecture: through the term system; 4. the term computer-assisted management: through the term data processing; 5. the term austenitizing: through the term heat treatment; 6. the term blue brittleness: through the term embrittlement, 7. the term critical cooling rate: through the term cooling rate; 8. the term equilibrium diagram: through the term phase; 9. the term soaking time: through the term material; 10. the term brittleness: through the term material.

So according to the rule above, for definitions 1 – 10 we end up with the following results of the Dfn analysis:

1. 'computer' – THE NEAREST GENERIC CONCEPT, 'having multiple arithmetic or logic units that are used to accomplish parallel operations or parallel processing' – DIFFERENTIATING CHARACTERISTIC;
2. 'methods and techniques for converting data to or from micro-form' – THE NEAREST GENERIC CONCEPT, 'with a computer assistance' – DIFFERENTIATING CHARACTERISTIC;
3. 'the specification of the relationships between the parts of a system' – THE NEAREST GENERIC CONCEPT, 'computer' – DIFFERENTIATING CHARACTERISTIC;
4. 'management performed with the aid of data processing' – THE NEAREST GENERIC CONCEPT, 'automatic' – DIFFERENTIATING CHARACTERISTIC;
5. 'heat treatment' – THE NEAREST GENERIC CONCEPT, 'for the purpose of altering a structure to a more or less pure austenitic state' – DIFFERENTIATING CHARACTERISTICS;
6. 'condition caused by embrittlement' – THE NEAREST GENERIC CONCEPT, 'in connection with the precipitation of foreign phases in a material of given composition and given temperature' – DIFFERENTIATING CHARACTERISTICS;
7. 'cooling rate' – THE NEAREST GENERIC CONCEPT, 'the lowest' and 'at which undesired transformation will not occur' – DIFFERENTIATING CHARACTERISTICS;
8. 'graphic representation of the range of occurrence for a system's phases' – THE NEAREST GENERIC CONCEPT, 'balanced' and 'expressed as a function of temperature, pressure and composition' – DIFFERENTIATING CHARACTERISTICS;
9. 'period of time during which a material remains at the required temperature' – THE NEAREST GENERIC CONCEPT, 'subjected to heat treatment' – DIFFERENTIATING CHARACTERISTIC;
10. 'application of a combination of heating, holding and quenching (or cooling, holding and heating) to a material – THE NEAREST GENERIC CONCEPT, 'solid' and 'below its melting point in order to affect the properties of the material in the manner desired' – DIFFERENTIATING CHARACTERISTICS.

This analysis proves definitions 1 – 10 to be generic.

At the same time some questions arise as soon as we come across definitions in which Dfn does not contain a single term of the subject domain. The situation may be exemplified by the following definitions 11 – 15:

11. Coalescence. Merging of particles or drops [HEATTR];
12. Cooling. Departure of heat accompanied by a reduction in temperature [HEATTR];
13. Deformation. Alteration of an object's proportion [HEATTR];
14. Heating. Application of heat accompanied by a rise in temperature [HEATTR].

In fact the notions 'merging', 'departure', 'alteration', and 'application' are not subdivided into specific notions by means of differentiating characteristics "of particles or drops", "of

heat accompanied by a reduction in temperature”, “of an object's proportion”, and “of heat accompanied by a rise in temperature”. Taking things as they are, definitions 11 – 14 do not classify specific notions (or objects) at all, since the corresponding Dfn contains no nomination of specific objects. Accordingly, no specific generic notion for Dfd is proposed by definitions 11 – 14, and since there is no classification of notions (or objects) one can not treat definitions 11 – 14 as generic. Within the specific notions of the domain of HEAT TREATMENT, ‘coalescence’ is not a kind of ‘merging’ in 11; ‘cooling’ is not a kind of ‘departure’ in 12; ‘deformation’ is not a kind of ‘alteration’ in 13 and ‘heating’ is not a kind of ‘application’ in 14.

Definitions 11 – 14 do not fix explicitly notional relations between terms for the simple reason that their Dfn does not contain a single term at all. Their function is very different from that of generic definitions: it is to introduce basic terms and notions and to establish a “first notional level” of terminology. They set up the notional contents of a term to be defined wholly, en bloc, by means of common words and only common words. If a term to be defined is itself a common word, the corresponding definition is usually specified in logic as a stipulative definition.

Thus definitions 11 – 14 are not generic. We should call definitions in which Dfn does not contain a single term of a subject field common definitions (independently of whether Dfd is a common word or a highly specific word).

The analysis presented above highlights the fact that in order to detect a conceptual structure of terminology one should not examine individual definitions but definitional system as a whole. Thus, in analysing definition 14, one should keep in mind that the word heat is not considered a specific term in HEATTR and has no separate definition. If the word heat had a separate definition of its own, definition 14 would immediately become a generic definition with ‘application of heat’ being the nearest generic concept, and ‘accompanied by a rise in temperature’ being differentiating characteristic!

Accordingly, definition 15 can be analysed differently depending on how the word ‘transformation’ (and the notion signified by it) is treated:

15. Athermal transformation. Transformation independent of the application or removal of heat (HEATTR).

If transformation here is a common word and not a special term, then definition 15 is a common definition and the Dfn text is not to be parsed into a fragment denoting the generic concept and a fragment or fragments denoting differentiating characteristics; if transformation here is a term, then we have a classic generic definition with ‘transformation’ being the nearest generic concept and ‘independent of the application or ‘removal of heat’ being differentiating characteristic. Actually, the latter applies here since according to HEATTR, transformation has its own definition, thus becoming a term of the corresponding subject field.

Analyzing the conceptual structure of terminology turns out to be not a static but a dynamic procedure. The genus-species structure of terminology is detected by means of a procedure that deals not with separate definitions as they are, but with definitions closely tied together; it operates at the global level of all definitions scrutinized simultaneously, tout à coup, and not at the local level of a single definition.

Let us now analyse definitions 16 – 19, in which the Dfn includes at least one term of the subject field, whereas the nearest generic concept is denoted by the whole of the Dfn text, meaning that the Dfn text has no expression to denote differentiating characteristics.

- 16. Embrittlement. Increase in brittleness [HEATTR];
- 17. Heating time. Length of time required for heating [HEATTR];
- 18. Cooling rate. Quotient of temperature reduction and time in cooling [HEATTR];
- 19. Computer centre. An office or establishment providing computer services [COMP].

Here we have the terms brittleness, heating, cooling, and computer as part of the Dfn text, but according to the rule above, only the Dfn text in full may be considered as denoting the nearest generic concept, and there is only a “null part” of the Dfn left to denote differentiating characteristics. The reason why the Dfn lacks whatever expression to denote differentiating characteristics is quite clear: the term within the Dfn text takes too low a syntactic position to leave any part of the Dfn text to denote differentiae specificae. Again, we have to state here that some definitions looking very much like generic definition actually are not. Since we have no differentiating characteristics in 16 - 19, we cannot regard these definitions as generic. Definitions of this type conceptually equal Dfd to Dfn, but no generic concept (genus proximus) and none of its differentiating characteristics (differentiae specificae) are fixed, and therefore they cannot be specified as generic either. We call these definitions non-specified definitions.

The function of non-specified definitions is different from that of both generic and common definitions. Common definitions do not fix explicitly notional relations between terms, they just introduce basic terms and notions in order to establish a “first notional level” of terminology. Non-specified definitions, as well as generic definitions, stamp down explicit conceptual relations between a term to be defined (Dfd) and term/terms within the Dfn text, but in contrast to generic definitions, they do not specify a genus-species relation between them.

Thus rules and procedures involved in the definitional analysis also contribute to the proper classification of term definitions. A good deal of verbal definitions can be classified into the following types: 1. generic, 2. enumerative (extensional, denotative), 3. operational, 4. contextual, 5. non-specific, and 6. common definition, of which 1 is essentially refined and only 2, 3 and 4 correlate with the traditional classification of definitions in logic.

What has been said above suffices to put the property of term definability under more detailed analysis than it usually deserves. Moreover, we have already discussed the claim that this property underlies the idea of a conceptual level of terms which can be generalised to take into account totally different conceptual terminological structures (Shelov 2001). The

idea of the conceptual level of terms seems to be a good generalisation of the conceptual level of a term in monohierarchical structures of the genus-species type. Future investigations will contribute to the assessment of this concept if applied to some wider sphere of term definitions, including so-called contextual definitions.

## LITERATURE

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