Building new meanings in technical English from the perspective of the lexical constellation model

Camino Rea Rizzo and Aquilino Sánchez Pérez
Universidad de Murcia (Spain)
camino.rea@um.es & asanchez@um.es

Abstract

The need to name and communicate to others new concepts in specific domains of human activity leads to the formation of new terms. However, many of the technical words in English are not new from the point of view of form. They rather derive from the common stock of general language: new lexical units are built from already existing forms and/or meanings. The original form is used for naming a new concept by adding a distinctive specialized lexical feature while keeping some semantic features of the original concept. In this paper, we aim at explaining and visualizing the nature of some of the processes that allow for the construction of new senses in technical words through a branching and expanding process, as explained in the lexical constellation model. The analysis is performed on three words widely used in telecommunication English: "bus", "hub" and "chip". The understanding of the process may be of great help for learners of ESP in general and technical English in particular.

Key words: new meanings, technical English, lexical constellations, terminology.

Resumen

La construcción de nuevos significados en inglés técnico bajo la óptica del modelo de constelaciones léxicas

La necesidad de denominar nuevos conceptos para posibilitar la comunicación en dominios específicos de la actividad humana favorece la formación de términos nuevos. Sin embargo, muchas de las palabras técnicas en inglés no son

realmente nuevas en su forma, sino que derivan del vocabulario utilizado en el lenguaje general: nuevas unidades léxicas se construyen sobre formas y/o significados ya existentes. En este artículo, se explica y visualiza la naturaleza de algunos de los procesos que permiten la construcción de nuevos sentidos en palabras técnicas mediante la ramificación y extensión de significados. Siguiendo el modelo de constelaciones léxicas, se analizan tres palabras utilizadas con frecuencia en el inglés de las telecomunicaciones: *bus, hub* y *chip*. La comprensión de tales procesos puede ser de gran utilidad para el aprendizaje del inglés con fines específicos en general y, concretamente, del inglés técnico.

Palabras clave: nuevos significados, inglés técnico, constelaciones léxicas, terminología.

Introduction

New words reflect new concepts and new things, and new concepts and things require new words to name them. An old question in semantics and lexicology is "what a word is" (Lyons, 1980 & 1995; Cruse, 2004; Hoey, 2005; Almela, 2006, among others). From the point of view of meaning, words or lexical units are often described in terms of "semantic features", that is, as bunches of semantic properties that become distinct units and differentiate in some way from each other. The explicit description of those features or properties constitutes the core of definitions of words in dictionaries (Nattinger & DeCarrico, 1992; Almela, Sánchez & Cantos, 2004; Sánchez & Almela, 2004; Sánchez, 2005).

Defining words implies "defining" their boundaries. However, the boundaries and organization of features in lexical units are not always clear or transparent (Kilgarriff, 1993; Jorgensen, 1990; Yarowsky, 2000; Hoey, 2005; Almela, 2006; Joyce, 2008), among other reasons, because the same word or form may enclose more than one meaning, at times totally unrelated (consider "bank" = sloping raised land, especially along the sides of a river, and "bank" = organization for investing, keeping, borrowing, etc., money), but most often closely connected in meaning and sharing some of the defining features (consider "give" = 1. to offer something to someone; 2. to put into the possession of another for his use, etc.). The assertion by Kilgarriff (2006: 43), "There is no decisive way to identifying where one sense of a word ends and the next begins", reveals a key problem in sense identification, and its correlate, sense disambiguation.

The more we know about words and meanings and the way they relate to

each other, the more it becomes evident that meaning is not easily enclosed into the formal elements we call words or senses as traditionally considered or as dictionaries may suggest. Meaning spreads in language as a complex web of semantic relationships, organized in an intricate network, with multiple connections in a multi-dimensional space. The structure of the neural network itself is probably the best model to look at when looking for structural similarities. Cantos and Sánchez (2001) propose a constellation-like organization when explaining lexical dependency and attraction. Cantos and Sánchez's (2001) "lexical constellation model" provides a suggestive description of the structure of meaning as it appears in larger structures (for example sentences) and in smaller lexical units (traditionally called "words"). Moreover, we also consider that this model can also be used to describe one of the processes, semantically based, through which new meanings and senses are permanently created, in general and in the field of technical English in particular. Together with this, the model will also shed some light on the nature of polysemy, synonymy, antonymy and homonymy.

The lexical constellation model

In daily use, a constellation refers to a group of celestial bodies or stars, with boundaries of some kind, perceived as forming a pattern; that is, a constellation implies an organized set of elements or units related to each other in some way. Out of this basic meaning, Cantos and Sánchez (2001) apply the term to lexical semantics and complex lexical units with elements inside which keep some kind of relationship to each other and submit to a hierarchical organization. They assume that "each sentence unit is formed by minor units and these in their turn are formed by other minor units and so on, which indicates that each unit is a structure formed by other sub-structures, and each sub-structure by sub-sub-structures, etc." (Cantos & Sánchez, 2001: 222). Additionally, they also assume a hierarchical structure whereby each element is directly or indirectly dependent on other elements. The lexical constellation they seem to bear in mind resembles the solar system, with a central sun around which planets and moons orbit.

Figure 1 shows a visual picture of the model, which allows for a multimensional interaction and connection among the units or elements within the construct. Any element may connect with any other element in many directions. This potential for describing multiple connectivity is of

great help in understanding the semantic web and the intricacies of lexical relationships inside and across words. Meanings in fact are far from adjusting to linear connectivity. Figure 1 illustrates how the core meaning of C is shared by three other lexical units, while D connects with C and E and this one shares its meaning with two other lexical nuclei.

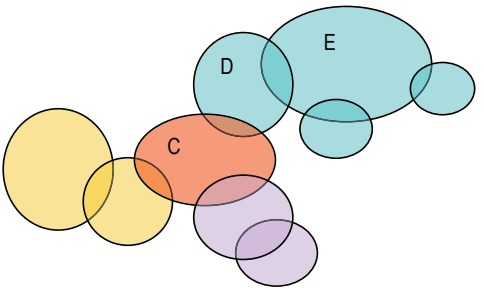

Figure 1. The structure of a lexical constellation.

Lexical units result from the clustering of semantic features perceived as units by the speakers. Those units however should not be viewed as isolated entities; they may share part of their features with other lexical units, so that the units intervening in the same set of connections are not fully independent regarding their semantic properties. Such interconnectivity is the very foundation of a lexical constellation.

In this study, we will take advantage of Cantos and Sánchez's (2001) lexical constellation model to describe the potential and behaviour of semantic features to shape meanings and senses (including new ones) within the lexical unit traditionally called "word". Connections between the various constituents of the lexical unit we call "word" and with other lexical units (other words) are of various kinds, but they are governed by and rooted in one or more of the defining semantic features, while the rest are left aside. Some of the features taken from the nucleus plus the addition of one or more new features may also build new meanings or senses, in such a way that the base features kept serve as a link to the original meaning or sense, while the new ones added are capable of shaping new meanings or senses. The fact that new senses are often based on older ones, the complexity of the connections among lexical units and changes that affect meaning but not the form through which it is transmitted is a permanent source of ambiguity, hence of possible misunderstanding. The lexical constellation model

constitutes a powerful tool for describing those processes, which sometimes – as already mentioned – lead to ambiguity and in any case trigger many new meanings and senses.

The urge for new words

Technical English abounds in new words. The field of science discovers new realities, enlarges the comprehension of natural phenomena, conceives novel machines and devices, and there is a pressing need for new words to name the new things and concepts generated around them. Technical English faces as well the problem of ambiguity, deeply embedded in the language and heavily affecting the identification of senses in polysemous words. The fact that English is an international language for professional communication, the urge for standards in the industry in order to avoid misinterpretations or misunderstanding, and machine translation demand high precision in the use of terms, and more especially in new terms. *AECMA Simplified English*, created by the European Association of Aerospace Manufacturers (AECMA) in the 1980s, is a case in point to illustrate the urge for accuracy. It was first developed for the aerospace industry. The aim was to restrict and define the words used in manuals and official communications or industrial specifications, in such a way that polysemous words should only be used with one single sense. *AECMA Simplified English* is therefore a controlled language, with precise specifications that affect not only vocabulary but also grammar; it is clearly an attempt at avoiding ambiguity, a common characteristic of natural language. Any simplified language will prescribe, for example, that a polysemous word, like "open", should only be used to mean "to move something to a position that is not closed" (= to open the door), and not as "to begin" (= to open the Olympic Games). In doing so, ambiguity and misinterpretation is avoided. Keeping to those simplified standards in language use requires important restrictions and gets close to what might be termed a "special language or code".

Generating new meanings and new senses

The task of building a simplified language is difficult to implement, since it goes precisely against the natural tendency to expand meanings adding new elements to already existing ones and consequently increasing complexity.

There are various mechanisms for generating or creating new elements in the lexical component of language. One of them, for example, are coinages, a second one is based on the derivation of new forms from already existing ones (through affixation), a third one consists of directly borrowing from other languages, and there is a fourth one which is more subtle and takes place within the semantic unit itself, with no changes in the form of the word. This fourth source of vocabulary enlargement is at the basis of polysemy, because new meanings are added to the same form and hence various concepts or things ("denotata") are associated to one single concept or thing ("denotandum").

The process of building new lexical units from already existing meanings is economical from the point of view of the effort required from the speakers. It is so because (i) the same formal "platform" is used for naming a new concept or thing, and (ii) part of an already existing semantic unit or construct is taken as the basis for the new semantic unit (new meaning or sense), to which one or more features are added. The added features function as differentiating properties against other lexical units, especially against the ones covered by the same form. The new meaning is not totally different from the other meanings covered by the word – they still share some semantic features –, but it keeps distinct contrastive features against the rest of meanings or senses within the same constellation. If we analyse the word 'heart", for example, we can easily visualize the web of semantic features interconnected, as shown in Figure 2.

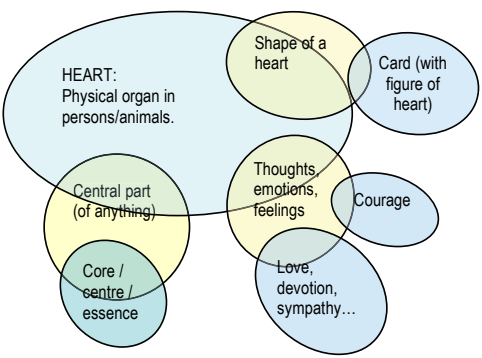

Figure 2. Lexical constellation of "heart".

The core feature of "heart" is the physical organ in people and animals. Human beings have traditionally considered the "heart" as the most important organ for life. The senses covered by this word have developed along three main features or expanding directions: (i) being the core or centre of something, (ii) having the shape of a "heart", and (iii) keeping the emotions and feelings attributed to this organ in human beings (Sánchez, Cantos & Almela, 2009b). Altogether, the meanings of the lexical constellation of "heart" may be specified in eight different semantic senses, as follows:

1. The hollow, muscular organ in a vertebrate animal that receives blood from the veins and pumps it through the arteries by alternate dilation and contraction.
2. The human heart considered as the central part or core of something.
3. The human heart considered as the essence of something.
4. The human heart considered as the center or source of emotions, personality attributes, etc.
5. Any of the various humane feelings, like compassion, love, devotion, enthusiasm, etc.
6. Courage and bravery, as rooted in the heart.
7. Something like a heart in shape; conventionalized design or representation of a heart, shaped like this.
8. A red figure of a heart stamped on a playing card, or a playing card marked with a conventionalized figure of a heart.

The senses are hierarchically organized, so that the ones lower in rank are contained in the higher ones (Sánchez, Cantos & Almela, 2009a & 2009b). And the distance from each other increases as more features are added in each one of the directions. The three directions of "heart" are rooted in the central meaning of "heart" (a physical organ), which is viewed from different perspectives: as the core of something, as the source of emotions and feelings, and as something having a similar shape. The meaning at the end of each direction enlarges the semantic gap regarding the meanings in other directions. If the process of addition of meanings went on, the stage could be reached in which the end-meanings would be so distant from each other that their common source could be hardly visible or recognizable.

The building of lexical constellations in technical English

The process of formation of new words and meanings in technical English shares the mechanisms described in the previous paragraphs. We will consider here the formation of new technical words from the perspective of the lexical constellation model, as already described. Shaping or coining new meanings without changing the denotandum and enlarging the lexical constellation is not exclusive of technical English though. The model itself (shaping or generating new things reshaping older ones, or recombining the existing elements available) is not exclusive of language either. It is present everywhere around us, in the world we live in.

Rea (2008) has analyzed in depth the characteristics of the technical vocabulary in telecommunication English. The analysis is based on a fairly representative sample of technical language, a five million word corpus of telecommunication English. One of the conclusions points out that many of the technical words in English are connected to or derive from common language and there is evidence of a regular word transfer from the general to the subject domain language. In fact, in the ranking of the 1,000 most statistically significant word families in the corpus, 20% corresponds to those registered in the "General Service List of English Words" (West, 1953). Furthermore, the quantitative criteria established to determine the specialized character of a word have detected that many members of those families are given a technical use ("system", "packet", "net", "server", "filter", "path", "host", "flow", "stream", "threads", "wave", "model", "type", etc.). On the other hand, a qualitative detailed analysis in context also reveals the specialized meaning of some forms that the application of quantitative criteria fails to discriminate automatically ("bus", "linear", "log", "mapping", "memory", "noise", "program", "radio", "shell", "signal", "window", etc).

The fact that many of the technical words derive from general language is fully relevant regarding our thesis here. The resource to the common lexical stock of the English language is the quickest way to have easy and "comfortable" access to new words. Words habitual in telecommunication English ("execute", "scroll", "paste", "flux", "terminal", "earth", "memory", "drag", "window", "coil", "energy", "positive", "firewall", "shell", "gate", "host", "packet", "resistance", "print", "program", "icon", "drain", "load", "plate", "bus", "hub", "chip", etc.*)* are all of them used in

habitual communication outside the technical field. The words have been semantically enriched by developing a specific and additional sense proper of the technical field in which they are used. Their specialized meaning is likely to be comprehensible from their meaning in a general context. Some authors call them quasi-technical words (Sager, Dungworth & McDonald, 1980; Alcaraz, 2000).

We will apply the lexical constellation model (Cantos & Sánchez, 2001) as the tool of analysis for "bus", "hub" and "chip" – three widely used words in telecommunication English. In doing so, we will discover the relationships and connections between the new technical meaning generated and the "old meaning or meanings" in which the new sense is rooted or from which it derives.

(a) "Bus"

"Bus" is a recent word in English (dated in 1832, as an abbreviation of the Latin dative plural of "omnis", *omnibus*). It appears 711 times in the technical corpus compiled by Rea (2008). This same word appears 1,711 times in the general corpus *Lacell*. The keyness of the term (269.7) is high in the technical corpus, as expected, and the ratio of occurrence is 2.25 higher if compared to its frequency in general English. CALD (*Cambridge Advanced Learner's Dictionary*, 2003) defines the word as "a large vehicle in which people are driven from one place to another". Webster's dictionary offers a similar definition: "A vehicle carrying many passengers; used for public transport." To this definition a new sense, or perhaps two, have been added in some dictionaries. The New Oxford Dictionary of English includes one, Webster's does not include any technical definition, and technical dictionaries and encyclopaedias include one or two:

> One of the sets of conductors (wires, PCB tracks or connections in an integrated circuit) connecting the various functional units in a computer (Foldoc Dictionary).
>
> A bus is a subsystem that transfers data or power between computer components inside a computer or between computers. Unlike a point-to-point connection, a bus can logically connect several peripherals over the same set of wires (Wikipedia).

The basic meaning of "bus" in general dictionaries is notoriously simple from a lexical point of view; it appears in most dictionaries with only one

meaning (= A vehicle carrying many passengers). The two senses found in technical English have been added as a further specification from the original one. The functional meaning of "bus" as "a vehicle used to transport people from one place to another" is transferred to the structural characteristics of the computer, where various devices interact with each other. The device with the function of facilitating such information to other devices is called "bus", as examples (1) and (2) reveal:[2]

(1) The values so obtained can be sent to the chip through the I 2C *bus*, or can be used in the Simulink environment to simulate either the chip alone or the complete system controlled by the fuzzy chip.

(2) A von Neumann Architecture computer has five parts: an arithmetic-logic unit, a control unit, a memory, some form of input/output and a *bus* that provides a data path between these parts.

As an extension to the physical device facilitating communication from and to other devices in the computer, the same word is also applied to the transfer system as a whole, i.e. the set of devices involved and the process mediated by them. This is shown in example (3):

(3) There are many different types of *bus* transfers, typically, memory read, memory write, I/O read, I/O write and interrupt. Each type of transfer is called a *bus* cycle. A *bus* transfer takes place in stages called *bus* states. A clock regulates the states; for expanded local *buses*, the CPU generates the clock signals that control the *bus*. For a system *bus*, the *bus* controller may either have its own clock or use a system-wide clock. *Bus* transfer requests are sent through *bus*-request lines and are resolved by the *bus* arbiter. The convention of resolving *bus* requests is called a *bus* protocol.

Figure 3 illustrates the lexical constellation of this term. The word "bus" had originally three identifying features: (i) a (motor) vehicle (with a specific shape), (ii) to transport (from one place to another), and (iii) people (being transported). In this case, one of the core meanings of "bus" is kept (transportation), while the means for such a function changes and applies to a different physical device (an electronic chip), and the object of transportation is not people but information. The hierarchy of the constellation is consequently enriched and enlarged with a new branching node (transportation of information), out of which two senses derive: (i) the electronic device serving this function in a computer and (ii) the system (several interconnected devices and wiring) that facilitates the transfer of

information in larger computing systems. From a lexicological perspective, the economical side of the new meaning is obvious, since an old form is preserved, as well as a part of its lexical content. The selection of some features in the lexical unit "bus", by enlarging the semantic field of "vehicle" and the object of "transportation", allows for new meanings, which keep their dependency on the original semantic unit while at the same time they gain enough independence to become different.

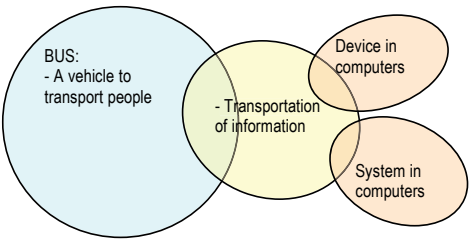

Figure 3. Lexical constellation of "bus".

(b) "Hub"

"Hub" is not as frequent as "bus" in the telecommunication corpus (Rea, 2008). It occurs 245 times (about 1/3 of the occurrences of "bus"), but its keyness in the technical corpus is high (445.4) and the ratio regarding the *Lacell* corpus is very high (11.77).

The definition of "hub" in CALD reads as follows:

1. The central or main part of something where there is most activity.
2. The central part of a wheel into which the spokes (= bars connecting the central part to the outer edge of the wheel) are fixed.

Webster's dictionary defines the same term in a similar way:

1. The central part of a car wheel (or fan or propeller etc) through which the shaft or axle passes.
2. The chief center of activity.

This word was first recorded in the 16th century, but was only widely used in the 19th century in connection with bicycles, referring to the central part of the wheel. Soon afterwards it was also used to designate a "center of interest

or activity or importance". The new technical meaning derives from the core feature of the word. In computing, "hub" keeps the value of "center of something" and it applies to devices or computers connected to a central one, both as hardware and serving the purpose of information exchange:

> A hub is a central node in a network; a device connected to several other devices. In ARCnet, a hub is used to connect several computers together. In a message handling service, a number of local computers might exchange messages solely with a hub computer. The hub would be responsible for exchanging messages with other hubs and non-local computers.

The idea of centrality is also kept when the term is used in electrical engineering:

> A circular device on which the magnetic tape is wound.

This meaning is illustrated in the technical corpus (Rea, 2008) with examples as the following:

(4) All these networks are co-ordinated by a master earth station known as a *hub* that both enables the rest of the remote terminals to establish their communications channels and keeps an overall control of the network.

(5) Another use of wireless LAN technology is to support nomadic access by providing a wireless link between a LAN *hub* and a mobile data terminal equipped with an antenna, such as a laptop computer or notepad computer.

(6) Each packet the *hub* receives is sent out to every system connected to the *hub*.

The lexical constellation of "hub" is shown in Figure 4:

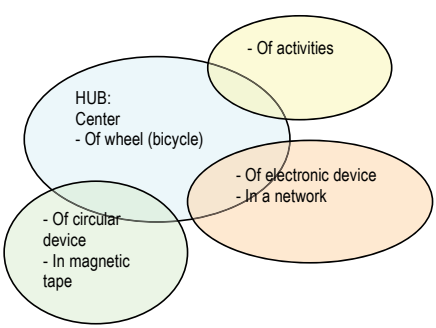

Figure 4. Lexical constellation of "hub".

The building of a new sense for "hub" (electronic device as a center for distributing/sharing information) is efficient in terms of the effort it takes: the new tool/thing appropriates an already coined word, and the concept is built by selecting a semantic feature from the original word and extending the application of this feature to other tools or things. In that case, the core meaning of "being central to something (an object, device or function)" is kept; only the function (exchange of information) and the object (electronic device) changes. The expansion of the original lexical unit covered by "hub" takes place (i) extracting the core feature of an already existing lexical unit (something is the center of something [of a wheel]), (ii) generalizing this same feature with the potential to be applied to other things or concepts, and (iii) applying this core feature to a different tool or concept. The coinage of new senses with this scheme may therefore be applied to multiple objects or concepts adjusting to an extremely simple and potentially rich process.

(c) "Chip"

"Chip" is nowadays a very frequent term in computing. The telecommunication corpus has registered 1,229 occurrences of this form (Rea, 2008), against 353 in the *Lacell* corpus. The keyness of "chip" is very high (2,340), as it is the ratio of occurrence against a general corpus of English (13.22). According to the Online Etymology Dictionary, "chip" derives from Old English ("small piece of wood", separated by cutting). Its sense as "a thin slice of foodstuffs" is found in the second part of the 18th century. The meaning of "potato chip" is registered in the 19th century the technical meaning of the term is later on applied to electronic devices in computers in 1962.

Modern English dictionaries differ significantly in the amount of senses registered for that word. CALD includes three general meanings for "chip" together with a technical one (number 4 below):

1. A long thin piece of potato that is fried and usually eaten hot.
2. A thin slice of fried maize, banana or other food which is eaten cold.
3. A small piece that has been broken off a larger object, or the mark left on an object such as a cup, plate, etc. where a small piece has been broken off it: wood chips. Polly fell and knocked a chip out of her front tooth.
4. A very small piece of semiconductor, especially in a computer, that contains extremely small electronic circuits and devices, and can perform particular operations.

Webster's dictionary online includes a more detailed account of meanings (seven general meanings plus two technical ones – numbers 2 and 7 below):

1. A small fragment of something broken off from the whole; "a bit of rock caught him in the eye".
2. (nautical) a triangular wooden float attached to the end of a log line.
3. A piece of dried bovine dung.
4. A thin crisp slice of potato fried in deep fat.
5. A mark left after a small piece has been chopped or broken off of something.
6. A small disk-shaped counter used to represent money when gambling.
7. Electronic equipment consisting of a small crystal of a silicon semiconductor fabricated to carry out a number of electronic functions in an integrated circuit.
8. A low running approach shot.
9. The act of chipping something.

"Chip" as a technical term in the sense registered in 7 ("Electronic equipment consisting of a small crystal …") is used in computing with two senses:

1. An integrated circuit (silicon die).
2. More specifically, a microprocessor.

In telecommunications new meanings have also evolved from the original technical sense, as follows:

1. In satellite communications systems, the smallest element of data in an encoded signal.
2. The most elemental component of a spread spectrum signal when it is decompressed in time; that is, the longest duration signal in which signal parameters are approximately constant.
3. In micrographic and display systems, a relatively small and separate piece of microform that contains microimages and coded information for search, identification, and retrieval purposes.

The different meanings are evidenced in our technical corpus (Rea, 2008) as shown in examples (7) to (10):

(7) 8K-byte SEWD cache *chip* consists of 489,000 transistors on a die size of 0.853 x 0.827 cm and is implemented in 0.8 um DLM CMOS process operating at 60 MHz.

(8) These new developments require changes to the frequency multiplier in the transmitter and the inclusion on the *chip* of part of the network for implementing the electromagnetic transitions for wideband interconnects.

(9) This is achieved by using a technique which introduces a code to represent a symbol of the transmitted message. A code is made up of a number of binary digits (bits), each one of which is referred to as a *chip*. The whole code consisting of all of the *chips* representing a symbol takes up the same time span as the original symbol. Thus if a single symbol is represented by a code of 8 *chips*, the *chip* rate must be 8 * the symbol rate.

(10) The performance of a synchronous system with random sequences is on average the same that of an asynchronous system. A random sequence can be generated by selecting independently each *chip* of the sequence which can take the value v with equal probability.

The lexical constellation of "chip" is more complex than the ones for "bus" or "hub" and is particularly interesting because the senses coined in computing first and in telecommunications later reveal a significant enlargement of the constellation with the addition of more senses, as shown in Figure 5.

The lexical constellation of "chip" perfectly illustrates the incremental and diverging enlargement of meanings, anchored around a central core and evolving through partial feature selection from the already existing lexical features and the addition of new features that cater for new things or concepts. The process of enlargement in the constellation is based on the original "small piece resulting from cutting something from a whole" (most often a piece of wood). The resulting piece is a slice, rather thin if compared to the whole. The shape of this cut piece (thin slice) gives origin to the "thin slice of a fried potato" or "fried maize" and is also at the basis of the "thin slice of silicon" used in computing for integrating electronic circuits. The feature "small" is kept in telecommunications for referring to the "smallest amount of data or signals" transmitted, or for directly naming a microimage

in a micrographic system. On the other hand, the small electronic device containing circuits gives rise to a new sense when it is applied to the microprocessor itself (which includes the thousands of built-in circuits contained in the chip).

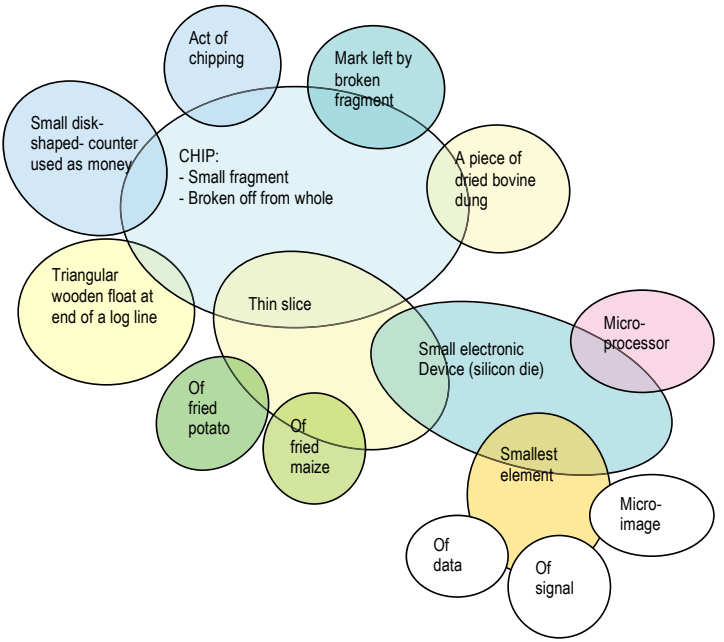

Figure 5. Lexical constellation of "chip".

Conclusions

There is a need for new words or new senses in technical English, based on the new and innovative technical and electronic devices and the functions they provide. The lexical constellation model offers a useful and powerful method to explain how meanings and senses are structured and how they expand, taking the ones already shaped as a basis for creating new ones.

On the one hand, the new meanings derive from partially transforming older ones, recombining new features with already existing ones. Consequently, the system itself and the speakers gain in economy and efficiency, since new meanings result from a partial reprocessing of existing elements. The new

meanings are built (i) taking advantage of already existing forms, and (ii) selecting and keeping specific lexical features from the core meaning, while others are left aside; to the bunch of selected lexical features some new lexical features are added and a new unit is born. The process is efficient in terms of effort, and economical in terms of new resources required. The constellation-like process of enlarging the meanings or senses covered by the same linguistic form follows and adjusts to the web-like and hierarchical organization of meanings.

On the other hand, it must be acknowledged the lexical structure resulting from this process contributes significantly to ambiguity in language use. This is the problem that machines, automatic translation and science face, particularly, when maximum accuracy is required or recommended.

The lexical constellation model (Cantos & Sánchez, 2001) proves to be efficient in explaining and visualizing the generation of new meanings with ecological efficiency, recombining the new with the old; and we may predict that such a process will tend to be applied more frequently whenever the urgency for new meanings is higher. After all, the language is a system of communication created by human beings and as such, cannot be different from other systems governing life and activity in the universe.

Finally, learners of EFL in general, and especially learners of ESP, will find in the lexical constellation model an efficient tool for comprehending how new meanings pop up from already existing ones and taking advantage of already existing forms. For a similar reason, vocabulary acquisition and expansion will be more easily and efficiently consolidated.

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Dr. Camino Rea is a part-time assistant lecturer at the English Department at the University of Murcia, and a full-time teacher at the Language Centre at the Technical University of Cartagena. Her main research interests are ESP and corpus linguistics. She is a member of LACELL research group.

Dr. Aquilino Sánchez is a full professor at the English Department at the University of Murcia. His research and teaching have centred on foreign

language teaching and learning, cognitive processes in language learning, lexicology, monolingual and bilingual lexicography and corpus linguistics. He is the head of LACELL research group.

NOTES

[1] *Lacell* is a 20 Million word corpus compiled by the research group LACELL at the University of Murcia. *Lacell* is a general purpose corpus of contemporary English. More information can be found at URL: http://www.um.es/grupos/grupo-lacell/quees.php

[2] All the given samples related to the telecommunication domain come from the corpus specialised in Telecommunication Engineering English (Rea, 2008).