POLYSEMY IN COMPUTER TERMS

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Abstract: *The development of computer and information technology results in the development of word meanings. Many terms in computer create multiplicity of meanings of the same words. This also deals with metaphor as the words share some common properties. This paper is aimed at examining the polysemy in computer terms driven by metaphors. The data were gathered from seven online computer articles, and there are 17 polysemous words found. The methods used to analyze the data were referential method and componential analysis. The result reveals that many terms in computer are polysemous because there are shared properties and they can be related to metaphors. Furthermore, polysemy consists of lexicon in which words are represented and the conceptual system in which the knowledge is represented through metaphors.*
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Language develops from time to time. New words appear, while the existing ones change or shift in meaning. According to Chaer (1994:310-313), the change of meaning of a word may be caused by factors such as the developments in science and technology, social and culture, and word usage, the change in perception, and association. Therefore, it can be said that the development of technology plays an important role in the development of language. New innovations and knowledge in computer and information and technology (IT) often require new terms. This results in not only the development of new vocabularies but also the meaning of the existing ones. Parera (2004:211) says that new inventions are given names or terms by creating new words, reviving words that once existed but no longer used, giving new meanings to existing words, and using loan words. Therefore, some words may have different meanings when they are applied in different fields. A case in point is the word *mouse*. In computer field, a mouse is not a type of rodent; it is a tool to move the cursor in monitor.

Meanwhile, according to Saeed (2000:63), an important organizational principle in the lexicon is the lexical field, which is a group of lexemes belonging to a particular area of specialist knowledge, such as the vocabularies used by doctors, coal miners, programmers, etc. One effect is the use of specialist term like *gigabyte* in computing. More common is the use of different senses for a word. In English, for example, bank in *river bank* and *Bank of America* have identical pronunciation and spellings but their meanings are unrelated. While the

word *head*, for example, is likely to have related meaning. It can refer to the head of a person, the head of a company, the head of a department, and a head of lettuce. The lexeme *head* has related meanings reflecting the general shape of the human head or the relation of the head to the rest of the body (Kreidler, 1998:52). Such linguistic phenomena are regarded in terms of homonymy and polysemy. Homonymy and polysemy are among other concerns in the study of meaning or semantics, more specifically, lexical semantics. Lexical semantics deals with the meanings of words and meaning relationships among words.

Homonymy and polysemy are often considered interchangeable terms. However, they have different meaning. The word *bank* above is an example of homonymy. Homonyms are words that are pronounced the same, but may or may not be spelled the same (Fromkin & Rodman, 1998:163). Homonyms can create ambiguity, as in the sentence containing the word bank in *I'll meet you by the bank*. The word bank may mean "financial institution" or "riverside". In contrast with homonyms, polysemous words as in the word *head* above have related meaning. Frath (u2.u-strasbg.fr/spiral/Equipe/Pierre/ Articles/AMB-ART.RTF) says that polysemy and homonymy can be explained in terms of reference. He classifies polysemy into two categories: referential polysemy and lexical polysemy.

1. Referential polysemy
   Objects, such as a piano, can be analyzed from a number of points of view, for example, as a music instrument or a piece of furniture. The link between these usages is clearly the object as a whole. In other words, polysemy is *referential* when one object is connected to several usages of a word.
2. Lexical polysemy
   Polysemy is lexical when words refer to objects which we think of as being somehow related. There are two types of lexical polysemy:
   a. linear polysemy, when we are able to trace a linear link, either metonymical or metaphorical, between the original object and a new object named after it (for instance *mouse-rodent* and *computer-mouse*)
   b. subsuming polysemy, when usage has created an accepted common subsuming element, as exemplified by Frath in the words *position* and *resist* below:
      I saw armed men in a crouched **position** by the swimming pool (physical)
      He could become Speaker, a **position** of some honour but no great responsibility (job)
      The Soviet **position** on German unity (point of view, stand)

      The compartment **resisted** the fire for an hour.
      The rebels **resisted** the Russians.
      Therefore, it can be said that polysemy is *lexical* when several resembling objects are connected to several usages of a word.

3. Homonymy
   Words are considered homonyms, when the object which once linked two usages has culturally ceased to exist, or when the link itself was forgotten. In other cases, objects were never actually related in any way, they just happen to share a signifier. In short, homonymy occurs when several non resembling objects are linked to several usages of a word.

Metaphorical extension is the extension of meaning in a new direction through popular adoption of an originally metaphorical meaning (http://www.langmaker.com/ ml0104.htm). As an instance, the *crane* which is a tall mechanical lifting device often used for lifting heavy loads for industrial or construction purposes was given its name by comparison to crane the a long-necked bird. When the meaning of the word daughter was first extended from that of "one's female child" to "a female descendant" (as in daughter of Eve), the listener might not have even noticed that the meaning had been extended.

Another term related to metaphorical extension is radiation. It is metaphorical extension on a bigger scale, with new meanings radiating from a central semantic core to embrace many related ideas. The word *head* originally referred to the part of the human body above the rest. Because the top of a nail, pin or screw is like the human head, that sense has become included in the meaning of head. Because the bulb of a cabbage or lettuce is round like the human head, that sense has become included in the meaning of head.

Sweetser (in Riemer, 2010:383) explains the pattern of extension as an example of what she called the mind-as-body-metaphor, that is, the persistent equation of the physical and inner self. The world of concrete physical experience serves as an analogical model for talking about abstract mental phenomena such as knowing and understanding. According to Sweetser, many Indo-European languages take their vocabulary of understanding from that of physical holding. This kind of polysemy is exemplified by English word *grasp*, which means "to hold firmly" and "to get the meaning of something".

One way of analyzing lexical meaning is by decomposing word meanings into more basic parts. This process is called lexical decomposition or componential analysis (Cipollone, et al, eds., 1998:225). The notion is that most words have meanings that are built up from simpler meanings. According to Lyons (1995, 1977), componential analysis can give a semantic structure of vocabularies of any language systematically. Besides, analysis of this kind allows us to give definitions for many words in terms of a few components (Palmer, 1981:110). Componential analysis is thus a way to formalize meaning relations that tie one lexeme to another. The meaning of a lexeme can be decomposed into the elements that make up the meaning. For instance, the words *mare, stallion, hen*, and *rooster* all have the common meaning of "animal" in them. It can be said that these words share the common semantic feature ANIMAL. Semantic features are a formal or notational device to express he presence or absence of semantic

properties by pluses and minuses (Fromkin & Rodman, 1998:161). The example is as follows:

woman	**father**	**girl**	**mare**	**stalk**
+female	+male	+female	+female	+motion
+young	+human	+young	-human	+slow
-young	+parent	+young	-young	+purposeful

Many terms in computer create multiplicity of meanings of the same words. This also deals with metaphor as the words share some common properties. Therefore, through the data gathered from computer articles, the researcher wishes to examine the polysemy in computer terms driven by metaphors.

METHOD

This study is aimed at examining the polysemy motivated by metaphors in computer related articles. A previous study on polysemy in computer terms was conducted by Juanda and Heriyati (2011). However, Juanda and Heriyati put more emphasis on Indonesian language planning and standardization dealing with the computer terms. This paper analyzes the polysemous words in computer terms by breaking them down into their semantic features to find the core meaning of such terms and then analyzing the metaphorical force. The referential method is also employed to illustrate the concepts represented by the referents used in the metaphor (Nirmala, 2011:257). The data were taken from seven articles. They were downloaded randomly from an online computer magazine (http://www.pcmag.com/) and computer tutorial websites (http://www.build-your-own-computer-tips.com/, http://www.virtualizationadmin.com/).

FINDINGS AND DISCUSSION

There are 14 polysemous words found the computer articles. The researcher uses dictionaries such as the online computer dictionary at http://www.webopedia.com and http://www.dictionary.com/ to consult the definition of each term. By the definition, the components of each term can be identified and the metaphor can be further explained. Below is the discussion of the findings.

Tablet

As mentioned above, tablet is a type of computer that allows one to hand-draw images and graphics, by moving a pen over a special pad. A tablet is also a flat stone or wood for bearing an inscription. It can be seen that the second definition has a similar sense to that of tablet PC. The two meanings share common properties as shown below.

Note: Meaning 1 henceforth refers to computer term, Meaning 2 the general term.

Components	Meaning 1	Meaning 2
Flat	+	+
To write on	+	+
Made of stone or wood	–	+
Electronic device	+	–

From the componential analysis above, both meanings of *tablet* share common properties, they are both flat and are used for writing on. Thus, as Frath suggests above, *tablet* is linear polysemy, because a linear link between the original object and a new object named after it can be traced. The use the tablet PC is also similar to that of stone tablet, so metaphorically it resembles the tablet used by the prophet Moses in Christian belief when he received the Ten Commandments from God.

Ping

Ping is a utility to determine whether a specific IP address is accessible. As a verb, ping means to send a message from one computer to another to check whether it is reachable and active. It also means to produce a sharp sound like that of a bullet striking a sheet of metal.

Components	Meaning 1	Meaning 2
Sound	–	+
To contact	+	+
Using specific programming code	+	–
Requiring attention	+	+

It can be seen that ping means contacting another party by sending a specific program. The term is also related to a sharp high-pitched resonant sound (as of a sonar echo or a bullet striking metal). This is conceptualized as the sonar technique which uses sound propagation in submarine navigation. When a submarine sends a sound signal to another submarine, it will thus reply by sending certain sound. Therefore, both the computer and the submarine's sonar send out a “ping”, whether it is in the form of program or a short burst of sound.

Package

In computer, it is a set of programs designed for a specific type of problem in statistics, production control, etc., making it unnecessary for a separate program to be written for each problem.

Components	Meaning 1	Meaning 2

A collection of things	+	+
Written computer programs	+	–
Packed	+	+
Wrapped	–	+

A package usually means a bundle of something that is packed and wrapped or boxed. Therefore, the metaphor of computer package is related to a set of programs packed as one.

Client

A client is an application that runs on a personal computer or workstation and relies on a server to perform some operations. For example, an e-mail client is an application that enables one to send and receive e-mail. A client also refers to someone who pays for goods or services

Components	Meaning 1	Meaning 2
Relying on something	+	+
Receiving action performed by certain agent	+	+
Hooked up to a computer network	+	–
Animate	–	+
Inanimate	+	–

The componential analysis shows that a client in computer has similar properties to that of client as person, except that the computer client does not refer to a person but an application. Computer client and client as person both have the same function; they depend on another party and receive a certain action.

Server

Server is a computer that provides client stations with access to files and printers as shared resources to a computer network. Its more general meaning is a person whose occupation is to serve at table (as in a restaurant)

Components	Meaning 1	Meaning 2
Providing service	+	+
Having clients	+	+
Serving the request of customers	–	+
Serving the request of other programs	+	–
Animate	–	+
Inanimate	+	–

The term server in computer refers to a computer system in a network or the software that provide the service. The componential analysis demonstrates that a server in computer performs similar duties like a server in a restaurant. In computer however, the server gives service to its customers, called clients.

Key

In database management systems, a key is a field that is used to sort data. It can also be called a key field, sort key, index, or key word. For example, if one sorts records by age, then the age field is a key. It can also be said that a key is a password or table needed to decipher encoded data. The general meaning of key is a metal device shaped in such a way that when it is inserted into the appropriate lock the lock's mechanism can be rotated

Components	Meaning 1	Meaning 2
Used to unlock something	+	+
Means of access or control	+	+
Made of metal	–	+
Dealing with data	+	–

The term key in computer has similar properties as in the key used to unlock a door. To be able to enter a system or to obtain certain data, one needs to input a certain keyword or password. The act of deciphering data by using a key is similar to the act of opening a locked door.

Firewall

Firewall is a security system which consists of a combination of hardware and software that limits the exposure of a computer or computer network to attack from crackers. The general meaning of firewall is a fireproof (or fire-resistant) wall which is designed to prevent the spread of fire through a building or a vehicle.

Components	Meaning 1	Meaning 2
Preventing damage or disturbance	+	+
Securing something	+	+
Protecting from fire	–	+
Protecting from crackers	+	–

The function of firewall in computer is similar to the firewall to protect a building from fire. In computer, the firewall is analogized as the wall to prevent a computer cracker or hacker from breaking into the system which then will cause damage or corrupt to it.

Clipboard

Clipboard is a temporary storage area in desktop publishing where text or graphics are held after the cut command or the copy command. In general clipboard is a small writing board with a clip at the top for holding papers.

Components	Meaning 1	Meaning 2
To put on things	+	+
Virtual	+	–
Physical	–	+
Using clips	–	+

Clipboard in computer application has similar function to that of the clipboard used to pin or clip papers. When one cut and paste texts or images in a certain application, the texts or images will be placed in the computer clipboard and they can be taken back if needed.

Host

In general a host is a person, place, company, or the like, that provides services, resources, etc., as for a convention or sporting event. Host also means a computer system accessed by a user working at a remote location.

Components	Meaning 1	Meaning 2
Providing service	+	+
Animate	–	+
Inanimate	+	–

It can be seen that host as a computer system serves similar function to host as a person: they both provide service and things needed for users or guests. A computer host provides the infrastructure for a computer service. As an example, there are many companies that host files, programs, applications or a Web server for companies and individuals. In the case of a Web server, these hosting companies provide the hardware, software, and communications lines required by the server. This metaphor can be compared to for example the host of a convention. The host provides all the equipments and place needed for the event.

Directory

Directory is an organizational unit, or container, used to organize folders and files into a hierarchical structure. Directories contain bookkeeping information about files that are beneath them in the hierarchy.

Components	Meaning 1	Meaning 2
Hierarchical	+	+
Organizing files	+	+
Files are softcopy	+	–
Files are hardcopy	–	+

Directory in computer is a metaphor a book containing an alphabetical index of the names and addresses of persons in a city, district, organization, etc.,

or of a particular category of people. This is similar to a file cabinet that contains folders that contain files.

Command

Command is an instruction to a computer or device to perform a specific task. In general command is the act of commanding or ordering, it also means an order given by one in authority.

Components	Meaning 1	Meaning 2
Set of instructions	+	+
Using imperative	+	+
Given to men	–	+
Given to an interpreting machine	+	–

Command in computer performs the similar function to that of, for example, a command of a colonel in military. As an illustration, the colonel gives the command to attack. The colonel gives the command in imperative language. Similarly, command in computer is given through statements that are written in a manner similar to the imperative mood.

Memory

Memory is the internal storage areas in the computer. The term memory identifies data storage that comes in the form of chips. Memory also refers to the mental capacity of retaining and reviving facts, events, impressions, etc., or of recalling or recognizing previous experiences.

Components	Meaning 1	Meaning 2
Storing experience	+	+
Dealing with human brain	–	+
Dealing with electronic device	+	–
Involving mind	–	+

Both definitions show that memory deals with the ability to store and retrieve experiences. In computer, memory functions as data storage. The computer's memory, however, does not “remember” anything when the power is turned off. It is called memory because the first memory did “remember,” but today's RAM (Random Access Memory) chips do not. That is why files have to be saved before the application is ended. Despite that, the term memory is a metaphor which can be compared to brain which stores experiences and facts.

Mouse

The term *mouse* in computer and *mouse* the animal have different meanings. The pointing device is so-named because the tool looks like a mouse the animal, not because the meaning of mouse made it possible. However, as

Frath states above, both meanings can be traced through a linear link, that is metaphorically between the original object (the animal) and the new object named after it (the pointing device).

Components	Meaning 1	Meaning 2
Having the shape as that of a rodent	+	+
Having tail	+	+
Animate	–	+
Inanimate	+	–

The meaning of *mouse* in computer has also been extended through metaphor. The cord which connects the device to the computer makes it resemble the animal.

Bug

In English bug is a general term for any insect. In computer, bug is a fault or defect in a computer system, program, or machine.

Components	Meaning 1	Meaning 2
Animate	–	+
Inanimate	+	–
Causing problem	+	+

It can be seen that the difference of bug the animal and bug the error is their animateness. The term bug was taken from the story of Grace Murray Hopper, the late Admiral and computer pioneer, about an early computer that kept calculating incorrectly (http://en.wikipedia.org/wiki/Computer_ bug#Etymology). When the computer case was opened to examine the wiring, a huge dead moth was found. It shorted out one of the circuits and caused the faulty logic. The term *bug* now can refer to an error in computer logic. Moreover, the word *bug* also means to annoy. The bug that causes error to computer can be annoying too. Therefore, the word *bug* meaning *to annoy* and *insect* is a metaphor to bug in computer logic.

CONCLUSION

The rapid development of information technology has resulted in polysemy in computer related terms. The polysemous words in computer terms indicate that multiplicity of meanings can be generated by metaphors and the common properties which the words share. It can be said that polysemy consists of lexicon in which words are represented and the conceptual system in which the knowledge is represented through metaphors.

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