

Exploring the Characteristic Features of the Language of Science and Technology

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Abstract

It is a fact that in the last few years the science and technology have developed rapidly and widely across the world. Their development has brought a number of positive and significant impacts for human life such as easy transportation, wide and various job opportunity, working mechanization and automation, longer life span, etc. But in order to sustainably and widely development and implement the science and technology, human beings must understand and master the language of the science and technology proficiently. Nevertheless, many students, scholars, academicians, researchers, even scientists find hard to understand and master the language of science and technology well. This paper attempts at exploring the nature of language of science and technology, the characteristic features, and the historical development of the language and science across time.

Keywords: *the language of science and technology, linguistic features, and historical development*

INTRODUCTION

As college students or academicians, researchers or even scientists, we often are confronted with the phrase of 'science language' or 'language of science' and 'scientific language.' In this case, we are actually not only confronted but also we are often confused what they are actually meant. As a results we then, often misuse or implement them in our scientific or academic setting.

Actually, the terms of 'science language' and 'scientific language' seem to be similar one

another by definitions and terms. It is probably true because the two are having one single root that is science. By this context. 'science language' and 'scientific language' is actually co-existed or are interconnected and correlated one another.

On the contrary, the two are seemingly also regarded different due to their lexico-grammatical patterns and structure and formation process. The 'science language' is a phrase that consists of two stems that is 'science' and 'language.' The word 'science' refers to a single discipline or study that is 'science' itself while the word 'language' also

refers to another single object that the 'language' itself. Then, actually 'science language' has its binary opposition that is different generally called the 'non-science language.' The 'non-science language' is the language usages for 'non-science' orientation or task or focus.

For example, the words or phrases like 'carbon dioxide,' 'oxygen,' 'photosynthesis,' 'green house,' etc., are the languages of Chemistry. Or the collections such as 'pidgin language,' 'sexism language,' 'compliment,' 'semantic,' etc. are the examples of words or phrases in the study of linguistics. Or the number of words or phrases like 'blood pressure,' 'cholesterol,' 'medical treatment,' 'diabetes,' 'artery,' 'Covid 19,' etc. are commonly regarded as the medical science language. Again, the words or phrases as elaborated above mean something. They have meaning of some sort depending on a certain type of science.

Discussion

The Nature of Science Language

It is a fact that in common perspective, science language and scientific language are regarded similar one another. Or at least, when we talk about science language we automatically also talk about scientific language itself simultaneously. For example, simple

definition of scientific language (s) is (are) vehicular languages used by one or several scientific communities for international communication. In this context, the science language and scientific language are regarded similar one another because both refers to science and scientific setting.

However, as highlighted previously the two terms are actually different by referring their dichotomies. For example, the dichotomy of 'science language' is 'non-science language' and the dichotomy of 'scientific language' is the 'general language' or 'common language' or 'daily language' or even often used as 'public language.' These dichotomies then, lead to different definitions, concepts, and orientation as well which consequently lead to different object, purpose, orientation, and discourse as well.

In order to have clear cut the concepts, at this point, it focuses on the language of science or science language and not scientific language. Let's say, we put aside the scientific language for a while. Even though, when talking about science language, automatically and spontaneously, we associate it with the scientific language. In fact, both of them are not always congruent one another.

Analyzing from its terms, simply the terms of language of science refers to the language usages in particular science or the languages

that belongs to a certain science. For example, the word or phrase '*non-performing loan*' (NPL) belongs to economic and business science, or the word '*hypertension*' is the language of medical science, or the language of computer science is '*malware*', or the '*fit and proper test*', '*out of court settlement*', are the language of law, or '*peak season*' and '*eco-tourism*' are categorized as the language of tourism, for examples, etc.

Regarding to the definition of science language, Gording (2015) states that science language is the specific forms of a given language that are used in conducting science or they are the set of distinct languages in which science is done. This definition may cover both terms that scientific language and science language themselves.

These languages, of course different from one science to another science. The differences of features, attributes, and characteristics of language science among sciences may falls in terms of words or vocabularies, phrases, word formation process, syntax, grammar. abbreviation, acronyms, jargons, or the origins of the language and language development etc. For example, some vocabularies of law language are created or formed by mixing languages, for examples of mixed language doublets are "*lands and tenements*" (English/French) or "*fit and proper*"

(English/French). This process may not happen in another discipline or science. Another uniqueness of the language of science can be found the features of the language of computer science. For example, there is a semantic shift process in the word formation of the computer science in which there is specialized meaning extended the range of applications of the words such '*mouse*' '*Jerusalem*', and '*slave*', etc.

The Language of Technology

It is generally known that technology refers to methods, systems, and devices which are the result of scientific knowledge being used for practical purposes. Or it is the application of practical sciences to industry and or commerce for the shake of human being needs

<https://www.collinsdictionary.com/dictionary/english/technology/2/2/2024>. By these simple definition, it can be said that the technology is the application of the science.

In line with the technology, Shortis (2000) adds that technology is inter-wined for human common good. He then further states that people use the language to communicate technological inventions, innovations, and ideas. The technology is made, manifested and developed through

the use of language; hence the use of language and technology are inseparable for the process of human development. In this matter, one must be proficient in the use of language in order to excel in the science and technology as well. Similarly, new words have been coined to capture technological inventions and innovation and also some of the new words may have become universally understood and officially entered the language (English) lexicology.

In another context, Shortis (2004) then argues that some words have taken on a whole new meaning due to modern technology. Technology has been responsible for a lot of new words. The introduction of technological equipment and or devices or things has brought about the coinage of new words and expressions. Similarly, language is used for promoting new ideas in technology and for making necessary changes. In short, thus, language is crucial for all activities in science and technology.

It is a fact that the scientists use ordinary words with specialized meaning in their communication both spoken and written modes, for example, the experts, the researchers and other similar natures, have discovered the use of semantic shifts,

blends, eponyms, coining or neologism and synonyms, for examples. Thus, the innovative nature of science and technology gives room for naming and labeling new concepts and discoveries in term of the language. For example, in the computer science and technology, the words or expressions such as 'advice', 'mouse', 'monitor', 'Jerusalem', 'slave', 'master', 'signature', 'finger service', 'cyber warfare', 'Zombie Armies', 'vulnerabilities', 'weaving', 'worn', 'love letter', 'integrity' are common.

In short, the language of science and technology are a kind of one coin with two facets. When a certain word is used in science, discipline and or study, the words itself automatically is regarded as the word of language and science of a certain science. Science and technology walk hand in hand for the need of human beings.

The Common Features of Science Language

It is generally known that science and or language of science is the language which has different meanings in terms the vocabulary, grammar, and syntax. They are all tailored to the specific needs of scientific communication. The science language is unique and typical compared to

general language or public language or everyday life language.

Concerning to characteristics of the science language such as used in Physics, Chemistry, Biology, Information and Communication Technology (ICT), Medical science, Computer science etc., experts draw a number of characteristics and attributes of the science language as follows:

a) It is difficult language

Science language is very difficult language. It contains specific terms and symbols for communication which are not used in our everyday life. Difficult and unfamiliar words are usually used in scientific world. It is a fact that only concerned person can understand the meaning of these scientific words and symbols. For example, 'Ag' is symbol of silver, H_2O is a formula of water, or 'hypertension refers to high blood pressure, etc.

b) It is complicated language

Science language has long and complicated structure and due to the usage of terms, it is not easily understandable to general people but the people who know the science can understand this language and its

complicated terms. For example, 'agree and covenant,' 'gastroesophageal reflux disease' or 'tax write-off' and so on.

c) It uses symbols

Science language is not only based on scientific terms but also uses symbolic words for communication which are used by only concerned by whom understand it. For example, $CaCO_3$ is a symbol of Calcium Carbonate. 'Homo Sapiens' is the scientific name of human beings, $E = mc^2$ (Einstein's famous equation), E stands for energy, M stands for matter and C stands for velocity of light, etc.

d) It is the language of laboratory

Science language is very limited language which is used only into the science laboratories and research centers. That's why it is called the language of laboratory, by science experts for their experiments and practice.

e) It is unbiased form

There is no use of expressions in the science and scientific language because this language communicates the facts as they are without any expression and brassiness. By this point of view, the figure language or

figure of speech is not common in the language of science.

f) It has short forms

Short form (s) is also common in the language of science. The rise of short form in science language due to the fast and straightforward communication for its purpose. For example, the word 'com' is a short form of 'computer' in computer science, or the short form of 'article' is 'art', and it is common in legal language, or the short form of 'account' is 'acct' in economic language, etc.

g) It contains hodge podge language

To bear in mind that the language of science is generally difficult and tough to understand. One of the uniqueness of the science language is in terms of hodge podge language. In some cases, the language of Hodge podge language is mostly found in a particular science such as Biology and Medical science, etc. The hodge fodge language is simply defined as a language of a little words that are linked together with another word to have different meanings. Here are some common examples of hodge podge words in the language of

science and their meanings as shown in table 1 below.

Table 1 some examples

common examples of hodge podge words in the language of science and their meanings.

Words	Meanings
<i>Hemo</i>	<i>Blood</i>
<i>Hyper</i>	<i>Above</i>
<i>Hypo</i>	<i>Below</i>
<i>Intra</i>	<i>within, inside</i>
<i>Logy</i>	<i>study of</i>
<i>Mono</i>	<i>one, single</i>
<i>Micro</i>	<i>Small</i>
<i>Macro</i>	<i>Large</i>
<i>Multi</i>	<i>Many</i>
<i>Phobia</i>	<i>dislike, fear</i>
<i>Philia</i>	<i>Like</i>
<i>Plasm</i>	<i>Form</i>
<i>Photo</i>	<i>Light</i>
<i>Poly</i>	<i>Many</i>
<i>Proto</i>	<i>First</i>
<i>synthesis</i>	<i>to make</i>
<i>Sub</i>	<i>Lesser, below</i>
<i>Therm</i>	<i>Heat</i>
<i>Zoo, zoa</i>	<i>Animal</i>

<https://www.dummies.com/article/academics-the-arts/science/biology/common-latin->

and-greek-roots-in-biology-

vocabulary-177272/1/1/2024.

- h) It uses unique way for labelling and naming

Historically and practically the labelling and naming of scientific object/idea/things/theory/terms and or organism, etc in science language originally fall into three perspectives. First, labelling and or naming of organism in particular based on geographical site of the organism, for example, the name of Alligator Mississippiensis is used because that organism is found in Mississippi river. Second, its names and label is due to its inventor, for example Ricahrdpestesia, a certain genus of Dinosaur theropodous was found and invented by Richard Estes, *Rafflesia arnoldy*, a name of flower after Thomas Standord Raffles, or Parkinson, is a name of disease is derived after James Parkinson who described the shaking palsy, or 'Pascal' new programming language invented by Blaise Pascal. In terms of a vocabulary, this is a type of coinage where the word is derived from the names of people or places called eponyms are created from names of

inventors or famous people. Finally, the body unique posture or adaptation from organism behaviors is also used to name the organism. For example, *Xanthocephalus xanthocephalus*, literally refers to yellow headed describing a kind of bird with yellow head

<https://www.detik.com/edu/detikpedia/d-6512112/penamaan-ilmiah-kok-pakai-bahasa-latin-bukan-inggris-begini-alasannya/3/3/2023>.

- i) It use abbreviations and or acronyms

The science also often uses abbreviations and or acronyms for communication both for oral and written modes. The abbreviations and acronyms such as *Deoxyribonucleic acid* (DNA), is a medical world, *Non-performing Loan* (NPL), is an economic English, *Estimated time of arrival* (ETA), is a tourism world and also maritime and aviation world, *Super Video Graphics Adaptor* (SVGA), is a computer science language, etc.

- j) It is a source of research

The science language is also a source of research. Many difficult researches in science are conducted through science language where facts and figures are analyzed and written in the form of

scientific terms and these terms make the research easy for science experts.

k) It is a source of science developments

Science language is the only source of developments of science. Due to the brevity and symbolic quality of scientific language, scientists describe easily and briefly. their long and difficult experiments and their results. For example, definition of circle is the set of all points in the plane that are equally distant from a fixed point is called a circle.

l) It is the language of experts

This language is also called language of experts because general people cannot write not understand it, only experts like scientists, doctors and professionals etc. can understand scientific language and they only use it.

The Historical Development of Languages of Science and Technologies

It is a fact that it cannot be denied that for hundreds of years Latin and or Greek become the origin of the language of science and technology. This happen because books about Biology and medicine, for examples are originally written in Latin (with a few entries in Greek). At that time, it was the international language of science.

Latin language is useful as a scientific and technical language because it is a written rather than spoken language and is therefore immune to vocal anomalies, vowel changes, consonant variations, and colloquial modification. For example, many readers, people or even scientists in in general may be unfamiliar with the word Latin- '*T-Rex*' is an abbreviation of '*Tyrannosaurs rex*', the Tyrant King of Lizard.

Since then, historically, the use of Latin and Greek dominates the formulation of science and scientific words or terminologies because by the time there really were no other sources for science and scientific descriptor but the creation of science and scientific words is not simply a matter of random borrowing but it has developed into a systematic linguistic process. It is widely known that the most dramatic and dominant influence of Latin in the science is the Biology description (Biology science). For example, the detailed description of plant was originated millennia earlier with a disciple of Aristotle, Theophrastus of Eresos (370-c) wrote '*De Causis Plantarum*' (on the origin of Plants) and '*De Historia of Plantarum*' (On the History of Plants) still have survived until now.

Later, in the development of Latin as descriptive language for botany, the work of Pliny, known as '*Historia Naturlis*' (Natural History) is one of the monumental document. He adopted Latin words metaphorically and this supplied a new familiar botanical terms such as '*corona*', '*pistillum*', and '*pollen*' and numerous others recognizable particularly by professional botanists. The influence of Pliny can be dated back in 160, '*Rariorum Plantarum Historia*' (History of Rare Plants by Cariolus Clusius (1526-1609).

In later era, the development that took botanical description beyond mere inventory occurred with Linnaeus' linguistic revolution which laid out the parameters for scientific description and notation that still established Latin as the universal language of science in the era. His influence and contribution between 1736-1753 lay first in a variety of Latin such as '*Fundamenta Botanica*' (Botanical fundamental), '*Genera Plantarum*' (Origin of Plants), '*Philosophia Botanica*' (The Science of Botany, and '*Speciies Plantarum*' (Plant Species).

He also wrote an encyclopedia in Latin language, as was regarded as standard works that scientists all over Europe that time could and did consult. He produced

and developed the term of from specific, aptly named '*species*' to the general expands or terms to '*species*', '*genus*', '*family*', '*order*' (*ordo*), '*class*', '*phylum*', and '*kingdom*.'

Also, in similar fashion, he states that in the familiar designation of modern human, *Homo sapiens*, our species sapien is one of several extinct *species* (*erecturs*, *habilis*, *neanderthalis*) in the *genus* (*Homo*), which is part of the family (*Homoinidae*) within the order or *ordo* (*Primates*), part of the class (*Mammalia*) which bellows to *phylum* (*Cordota*) within the *kingdom* of (*Animalia*). Except in Biology in particular Botany, the later in the 18th century, the science language also spread well in Chemistry science. The chemical elements also named from Greek and Latin. The names are derived from Greek deities or mythological figures such as '*Helium*' (*Helious*), '*Iridium*' (*Iris*), '*Niobium*' (*Niobe*), '*Putonium*' (*Pluto*), '*Promethium*' (*Prometheus*), '*Selenium*' (*Selene*), '*Tantalum*' (*Tantolos*). They actually are endings routinely Latinized.

Moreover, elements from Latin sometimes honor deities such as '*Mercury*' (*Mercurius*), '*Cerium*', (*Ceres*), '*Neptunium*' (*Neptune*), et. Similarly, there also more often preserve Latin name

for substance or quality such as ‘*Calcium*’ (Calx), ‘*Carbon*’ (carbo), ‘*Copper*’ (cyprum), ‘*Telurium*’ (tellus), ‘*Silicon*’ (silicis). Other science languages in new chemical elements domain are also named to honor eminent historical figures and they are regularly provided with Latin endings such as ‘*Copernicium*’ (Copernicus), ‘*Curium*’ (Marie Curie), ‘*Mendelevium*’ (Dmitri Mendeleyev), ‘*Fermium*’ (Enrico Fermi), ‘*Rutherfordium*’ (Ernest Rutherford), ‘*Einsteinium*’ (Albert Einstein), and ‘*Nobelium*’ (Alfred Nobel), etc.

Finally, as a matter of fact, English as the most widely spoken language in the world has been exceptionally receptive to scientific Latin. To large extent, this is the result of many more general Latin words have been preserved in English. For examples, *ad hoc*, *apriori*, *argumentum ad homonym*, *de facto*, *deus ex machina*, *modus operandi*, *per se*, *terra firma*, etc. Then, philosophers that are known by a Latin phrase are Descartes by *cognito er go sum*, Locke by *tabula rasa*, Freud by *ego* and *id*.

<https://jbh.journals.villanova.edu/article/download/2403/2325?inline=1#:~:text=Latin%20is%20useful%20as%20a,consonant%20variations%2C%20and%20colloquial%20modification/2/2/2024>.

CONCLUSION

In conclusion, there are two important points to conclude as follows: First, the terms of language of science refers to the language usages in particular science or the languages that belongs to a certain science. For example, the word or phrase ‘*non-performing loan*’ (NPL) belongs to economic and business science, or the word ‘*hypertension*’ is the language of medical science, or the language of computer science is ‘*malware*’ for example, etc. These languages, of course different from one science to another science. Second, the language of science has its own uniqueness, typical features, and difficulty. The use of symbols, short forms, abbreviations, are some common features of the language of science. So, understanding the features of language of science and the scientific language is a must for scientists, researchers, and other related professional. Having proper and qualified understanding of science and scientific language, the communication both in written and spoken modes lead the communication and interaction can run effectively and properly, otherwise lack of understanding them, it can lead to a misunderstanding or even conflict in

communication and interaction in science and scientific world settings.

<https://www.dummies.com/article/academics-the-arts/science/biology/common-latin-and-greek-roots-in-biology-vocabulary-177272/1/1/2024>.

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