Eponyms and the language of technology

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Abstract: In science and technology, discoveries and innovations are often named after the discoverer or supposed discoverer. This article deals with the significance of eponyms in ESP, especially in the scientific discourse. Eponymy may be regarded as a resourceful process of vocabulary enrichment. The study is mainly based on specific teaching activities performed by students in engineering during the English seminar. Therefore, the analysis presents the way eponyms are assimilated and used by students in various technical contexts. For ESP students the final aim is to achieve a highly efficient communicative ability in their study fields. Reinforcing concepts through specific English structures integrated in meaningful situations increases the students' interest in professional communication.
Keywords: ESP, technical texts, terminology, inventions, eponyms.

Proper names are poetry in the raw.
Like all poetry they are untranslatable.
Auden, W. H.

Introduction

This paper seeks to contribute to a better understanding of how ESP is used by students in engineering in their daily lives. After a brief overview of research in English as a specialised language is given, some general characteristics of professional communication in technical context are discussed. These theoretical assumptions are then exemplified by the results provided by a specific research performed by students in engineering during a particular language-learning task. English has been constantly used as a shared language among speakers of different mother tongues during personal or professional communication, a so-called *lingua franca*. Graddol (2006) emphasizes this function of English in his report to the British Council, *English Next,* when he stresses the increasingly important role that English is now playing in economic and technological processes, in providing access to the kind of global knowledge available in English and the jobs which involve contact with customers and colleagues for whom English is the only shared language.

General considerations on ESP and EST

English for Specific Purposes covers subjects varying from engineering or computer science to health care and business management and it focuses more on language in context than on teaching grammar and language structures. The ESP approach underlines the importance of what the students are learning and allows them to use the English they know to learn more English, since their interest in their field will motivate them to interact with speakers and texts. Students approach the study of English through a field that is already known and relevant to them; they might use what they learn in the ESP course right away in their work and studies. According to Bhatia (2012: 17), "professional practices give shape to actions in specific professional contexts, they get established so long as the members of the professional community continue to follow the conventions, which are shared by the members of a specific professional discourse community".

English for Science and Technology (EST) consists of a stock of vocabulary items, grammatical forms and functions that are common to the study of science and technology. Many ESP students throughout the world are scientists and engineers and the vast majority of scientific papers and books are printed in English. Discourse in science and technology fields evolves alongside the disciplinary knowledge and acquires individuality when the needs and practices of the respective communities require particular forms of communication. Thus, approaches as different as general discourse analysis, systemic functional linguistics, genre studies, foreign language teaching, ESP studies, corpus linguistics, or sociolinguistics brought important contributions to profiling EST. Widdowson suggests that

> we should think of 'scientific English' not as a kind of text, that is to say as a variety of English defined in terms of its formal properties, but as a kind of discourse, that is to say a way of using English to realise universal notions associated with scientific inquiry… From this point of view, scientific English is not described formally as a type of text distinguishable from other 'registers' or 'varieties' or in terms of its linguistic properties, but as the realisation of a type of discourse which is defined in functional terms and distinguishable from other uses of language in terms of what concepts and procedures are communicated (Widdowson 1979/1985: 27).

The "deep structure" of scientific discourse in Widdowson's view consists of: the "grammatical cohesion of text", the "communicative properties of language", the "functioning of language in social contexts", and the "universality of scientific discourse", "universal rhetoric" and "non-verbal modes of communication". Widdowson (1979/1985: 45) defines EST "not as a separate operation but as a development from an alternative realization of what has already been learnt, that is to say, of existing knowledge". To sum up, EST knowledge should be acquired from the students' previous background about science with the knowledge of English usage.

Trimble's approach (1985) states that EST is a spectrum/continuum extending from the peer writing of scientists and technically oriented professionals to the writing aimed at skilled technicians. It includes several types of instructional discourse, with various communicative purposes and targeted audiences. According to the author (1985: 69), taking into account the organisation of EST discourse, some rhetorical functions and structures are more observable in the scientific discourse. The rhetorical functions include the rhetoric of description, the rhetoric of definition, the rhetoric of classification, the

rhetoric of instruction and the rhetoric of verbal-visual relationships. Trimble (1985) states that the knowledge of rhetorical functions concerning English for Science and Technology reveals its usefulness to solve reading problems for non-native students.

The language of science is viewed in genre studies in the context of professional communication. Scientific and technical style is applied when certain scientific knowledge or information obtained from scientific research has to be conveyed. One crucial aspect in the evolution of scientific discourse is the need to construct technical taxonomies. The language of science is governed by the aim of the functional style of scientific prose, which is to prove a hypothesis, to create new concepts, to disclose the internal laws of existence, development, relations between different phenomena, etc. The language means tend to be objective, precise, unemotional, and devoid of any individuality. The scientific text is composed of three aspects: the linguistic, the conceptual and the rhetorical component (Walsh 1982). The linguistic component is concerned with vocabulary and syntax. The researcher also explains that the scientific text contains terms that are specific to each special subject area, sub-technical vocabulary and general English vocabulary. Moreover, there are more frequently used structures in the scientific discourse than in others. Scientific writing is often dry, wordy, and difficult to understand. As scientific text is restricted to formal situations and, consequently, to formal style, it employs a special vocabulary which consists of words associated with professional communication and a less exclusive group of so-called learned words. One can find numerous words that are used in scientific texts, for example, *comprise, compile, experimental, heterogeneous, homogeneous, conclusive, divergent,* etc. An important aspect of scientific language is the subject-neutral vocabulary which cuts across different specialised domains. Thus, a great deal of scientific work involves giving instructions to act in a certain way, or reporting on the consequences of having so acted. The general vocabulary employed in scientific texts bears its direct referential meaning, which means that words used in scientific texts will always tend to be used in their primary logical meaning. Another important characteristic is the use of terms specific to each given branch of science. Due to the rapid dissemination of scientific and technical ideas, particularly in the exact sciences, some scientific and technical terms begin to circulate outside the narrow field they belong to and eventually begin to develop new meanings. Science is the most prolific field of human activity in coining new words. The necessity to move deeper into the essence of things and phenomena gives rise to new concepts, which require new words to name them. A term will make more direct reference to something than a descriptive explanation, a non-term. Furthermore, terms are coined so as to be self-explanatory to the greatest possible degree. Terminology consisting of nouns and adjectives combined with a few tenses are characteristics of the functional style of communication for specific purposes. There are some specific features of a technical engineering text such as: the logical sequence of utterances with a clear indication of the interrelations and interdependencies; the rich use of specialised terminology, for example *combustion, chamber and force of gravity* etc. show objectivity, accuracy and expertise. The purpose of the writer's text is to describe a phenomenon or operation, a subject or a process, therefore the absence of emotional colouring should be noticed. Clearness and shortness imply application of legible grammar constructions and lexical units, abbreviations and conventional signs. The constructions with the gerund

and participle are used to make the text more condense and precise; connectors, ellipses and parentheses also occur frequently.

Each scientific field of human activity generates a great amount of new words. As a result of constant efforts to discover essence of things and phenomena, there is a need to name new concepts subsequently by means of new words. The system of terminology in scientific style is not closed and constant as one might think. It is in constant development as the new scientific disciplines emerge and develop. Words used in scientific prose will always tend to be used in their primary logical meaning. Terminology is neither emotional nor ambiguous; the terms have narrow meaning and limited field of usability. Technical terms may pass into the general language. Thus, when a word used by a restricted group of people in a restricted situation becomes used more widely by more people and the reference will tend to be less concentrated or precise. At this stage, it is worth mentioning the way in which eponyms enrich the vocabulary of the English language of science and technology, and providing succinct and accurate information on these words and their origin.

Eponyms related to science

Humans frequently find proper names – the names of specific people, places, or things – to be so useful for describing generic objects or concepts or qualities that they include the proper names, sometimes capitalised, and sometimes lowercased. There are many different types of eponyms, especially in scientific fields. Theories, laws, equations, proofs, and elements often have their eponyms in the people that first discovered or proved them. Some eponymous words are still capitalised like a proper noun, and those not capitalised are most clearly eponyms. Eponyms usually refer to words that derive from a person's name, the person whose name is the source or thought to be the source of the name of something else. As a noun an eponym refers to a name, specifically of a person after whom a discovery, invention, place, etc., is named. The important, defining property is that the word does not refer exclusively to the person or place named by the proper noun, but it is used to refer to a general category. The adjective *eponymous* is more often used to describe the work that is named after someone. The word derives from the Greek word *epōnumos* "given as a name, giving one's name to someone or something", from *epi* 'upon' + *onoma* 'name'. According to McGuigan (2007: 81), "an eponym is similar to an allusion, referring to a specific famous person to link his or her attributes with someone else. Using an eponym well can be something of a balancing act; if the person is too obscure, no one will understand your reference, but if it's too well known, it may come across as a cliché".

A general classification of eponyms mainly includes: **product eponyms**, such as *aspirin*, *Kleenex* (a brand of facial tissues, the word being used today to refer to facial tissues of any brand) or *Xerox* (a brand of photocopy machine, a word that has been since adopted to refer to any brand of photocopy machine and also employed as a verb to describe the act of photocopying), *biro* (a kind of ballpoint pen, named after László József Bíró, 1899–1985, Hungarian inventor); **historical and geographical eponyms**, historical figures lend their names to ideas, historical eras, political movements or philosophies associated with them (e.g. uppercased, *Reagonomics*, *Victorian*, or lowercased – *boycott*); **literary eponyms**, fictional characters often evoke such strong qualities that we assign their names to

them: ***faustian***, *quixotic*; **mythological eponyms** which generally retain initial capital letters, such as Midas touch, someone being a Hercules or a Venus. The last type of eponyms, which we are going to focus on in the next part, is represented by **scientific eponyms.** In science, scientists and inventors are often honoured for their work by having their names assigned in lowercase form to refer to units of scientific measurement or to processes, *galvanism*, or methods, *algorithm*. Some, quite literally, are household names, such as the terms application of electrical current and potential, *amps* and *volts*, after André-Marie Ampere (1775–1836) and Alessandro Volta (1745–1827). A special unit of measurement for temperature is the *Kelvin*, named after the Glasgow University engineer William Thomson, first Baron Kelvin. Other internationally recognized systems of unit measurement such as the *watt* and *joule* are measures of energy conversion, named after the Scottish engineer James Watt and the Lancashire physicist, James Joule. Many automobile names are eponyms, such as *Ford, Chevrolet, Ferrari* or *Porsche*, named after Henry Ford (1863–1974), Louis-Joseph Chevrolet (1878–1941), Enzo Ferrari (1898–1988) or Ferdinand Porsche (1875–1951). Words designating automobile engines are often eponyms, too, for example the ones named after Rudolf Diesel (1858–1913) or Nikolaus Otto (1832–1891) etc.

Describing the ESP activity

If the eponyms themselves are often household names, the lives of those for whom they are named are often less well known. The aim of this particular learning task is to establish a collection of life-stories of men and women who have shaped science and technology worldwide, from ancient times to the 21st century. And that includes those remembered every time we check temperature, drive a car and use an internal combustion engine or different units of measurement for power, pressure etc. Students in the first year of engineering have been selected as the target group. The curriculum of the first year English seminar introduces the students to technical English reading and writing for communicative purposes. The main purpose of the English course is to speak more accurately and fluently, expand their professional vocabulary and improve their understanding of grammar; to socialise and network with greater confidence and work successfully in a cross-cultural environment. The ESP course features identified by Carter (1983) – such as authentic content materials, purpose-related orientation, and self-direction – are to be followed in their curriculum. The students are encouraged to conduct research using a variety of different resources, including the Internet. Purpose-related orientation refers to the simulation of communicative tasks required of the target setting. In order for self-direction to occur, the learners must have a certain degree of freedom to decide when, what, and how they will study.

This research activity explores the rich heritage of the English language, with particular reference to the derivation of words from personal names. In our approach we have concentrated on the more well-known eponymous words in general use in the engineering environment and have sought to give background details on fascinating facts about that personality. The aim of this particular teaching activity is to learn more about the historical individuals whose names have been given to some everyday words naming instruments, tools or units of measurement mostly used in specialised language.

The method of collecting data adopted in this research was for each student to submit a paper on the following task: electrical and mechanical engineering students in the first year of university were asked to compile the top ten technology-related eponyms that are relevant to their field of activity, write the definitions of the selected devices and describe the personalities' professional backgrounds. The entries are listed in alphabetical order according to the names of the things referred to and the names of the people. The students' most recurrent choices are included in the tables bellow. Table 1 is an inventory of eponyms in the engineering language, names of specific technology-related devices which include the names of the inventors; definitions of selected items and origin of the words.

Table 1

Eponym	Definition	Origin
Alexanderson alternator	It is a rotating machine for the generation of high frequency alternating current up to 100 kHz, for use as a radio transmitter.	Ernst Alexanderson, a Swedish-American electrical engineer (1878–1975)
Archimedean screw	It is a machine historically used for transferring water from a low-lying body of water into irrigation ditches.	Archimedes of Syracuse, a Greek mathematician, physicist, inventor and astronomer.
Argand lamp	It is a home lighting oil lamp.	Aimé Argand, a Swiss physicist and chemist (1750–1803).
Bluetooth	It is a technology that provides a way to exchange information between wireless devices.	Harald "Bluetooth" Gormsson (probably born c. 935), a King of Denmark and Norway.
Davy lamp	It is a safety lamp for use in flammable atmospheres.	Sir Humphry Davy, a British chemist (1778–1829).
Diesel engine	It is an internal combustion engine that uses the heat of compression to initiate ignition to burn the fuel that has been injected into the combustion chamber.	Rudolf Christian Karl Diesel, a German inventor and mechanical engineer (1858–1913).
Dimroth condenser	It is an internal double type of condenser through which coolant flows such that the coolant inlet and outlet are both at the top.	Otto Dimroth, a German chemist (1872–1940).
Edison screw	It is a system of screw mounts used for light bulbs.	Thomas Alva Edison, an American inventor and businessman (1847–1931).
Ericsson engine	It is an external combustion engine.	John Ericsson, a Swedish-American inventor and mechanical engineer (1803–1889).
Faraday shield	It is an enclosure formed by conducting material.	Michael Faraday, an English scientist (1791–1867).
Francis turbine	It is a type of water turbine that combines radial and axial flow concepts.	James B. Francis, a British-American engineer (1815–1892).
Galvanometer	It is an instrument for detecting electric current.	Luigi Galvani, an Italian physician, physicist and philosopher (1737–1798).

Hele-Shaw clutch	It was an early form of multi-plate wet clutch, in use around 1900.	Henry Selby Hele-Shaw, an English mechanical and automobile engineer (1854–1941).
Kaplan turbine	It is a propeller-type water turbine with adjustable blades.	Viktor Kaplan, Austrian engineer (1876–1934).
Machmeter	It is a speedometer for measuring the speed of an aircraft relative to the speed of sound	Ernst Mach, Austrian physicist and philosopher (1838–1916).
Morse code	It is a method of transmitting text information.	Samuel Morse (1791–1872), an American inventor.
Newcomen steam engine	It is a steam engine whose piston descends by the pressure of the atmosphere when the steam which is raised is condensed within the cylinder.	Thomas Newcomen, an English inventor (1664–1729).
Otto engine/ cycle	It uses the four-stroke principle.	Nikolaus August Otto, a German inventor (1832–1891).
Phillips screw	It is a screw drive designed to cam out when the screw is stalled.	Henry F. Phillips, a U.S. businessman (1890–1958).
Richter scale	It was developed to give a quantitative measure of the magnitude of an earthquake.	Charles Francis Richter, an American seismologist and physicist.
Schrader valve	It is a brand of pneumatic tyre valve used on motor vehicles.	August Schrader, a German-American inventor (1820-?).
Shrapnel shells	They are anti-personnel artillery munitions.	Henry Shrapnel, a British Army officer and inventor (1761–1842).
Stirling engine	It is a heat engine operating by cyclic compression and expansion of air or other gas.	Robert Stirling, a Scottish clergyman and inventor (1790–1878).
Tesla coil	An electrical transformer circuit. It is used to produce high-voltage, low-current and high frequency alternating-current electricity.	It was invented by Nikola Tesla around 1891.
Tesla turbine	It is a bladeless centripetal flow turbine.	Nikola Tesla, a Serbian-American inventor, electrical engineer and mechanical engineer (1856–1943).
The Edison screw fitting	It is a system of screw mounts used for light bulbs.	It was developed by Thomas Edison and licensed starting in 1909.
voltaic pile	It was the first battery that produced a reliable, steady current of electricity.	Alessandro Giuseppe Antonio Anastasio Volta, an Italian physicist.
Wankel engine	It is a type of internal combustion engine; a rotary engine.	Felix Heinrich Wankel, a German mechanical engineer and inventor (1902–1988).
Wells turbine	It is a low-pressure air turbine.	Alan Arthur Wells, a British structural engineer (1924–2005).

Wiegand wire	It is a fully annealed wire, made of a ferromagnetic alloy made of cobalt, iron and vanadium.	John R. Wiegand, a German American inventor.
Wollaston wire	It is a very thin platinum wire clad in silver and used in electrical instruments.	William Hyde Wollaston, an English chemist and physicist (1766–1828).
Yablockhov candle	A type of electric carbon arc lamp invented in 1876.	Pavel Nikolayevich Yablochkov, Russian electrical engineer.

Besides the majority of eponyms related to technology at an international level, the students' corpus also provides some Romanian origin eponyms such as: the *Karpen pile*, a uniform temperature thermoelectric cell, invented by Nicolae Vasilescu Karpen, Romanian engineer and physicist (1870–1964); the *Coandă effect*, the tendency of a fluid jet to be attracted to a nearby surface (the principle was named after Romanian aerodynamics pioneer Henry Coandă (1886–1972), who was the first to recognize the practical application of the phenomenon in aircraft development); the *Basgan effect*, which led to an improvement of the drilling techniques, named after Ion St. Basgan, a Romanian engineer; the *Procopiu effect* – a circular effect of magnetic discontinuity with important applications in the development of computer memory, named after the Romanian physicist Ștefan Procopiu (1890–1972); *Carafoli profiles* – the rounded trailing edge profiles, named after the electromechanical engineer Elie Carafoli (1901–1983); the *Cartianu-Loewe criterion* – a new stability criterion for linear and non-linear power systems, 1940, named after Gheorghe Cartianu-Popescu (1907–1982), a professor, inventor, founder of the Romanian school of radio engineering and radio communications; the *Dragu injector* – named after the railway engineer Teodor Dragu (1848–1925), who invented the fuel injector in 1896; *Hurmuzescu electroscope* – named after Dragomir Hurmuzescu (1865–1954); the *Cantacuzino method*, a cholera vaccination method named after the Romanian doctor Ioan Cantacuzino.

Table 2 includes a list of units of measurement provided by the target group of students as a result of their own individual research:

Table 2

Unit of measurement	Description
An amp (ampere)	It is a unit of electric current It was named after the French mathematician and physicist André Marie Ampère (1775–1836).
Celsius or centigrade	It is a unit of measurement for temperature, named after the Swedish astronomer Anders Celsius.
The farad	It is the unit of capacitance in the meter-kilogram-second system, as an appreciation of Faraday's research.
Fahrenheit	In honour of Daniel Gabriel Fahrenheit, Dutch German physicist and engineer, the inventor of the mercury thermometer.
A joule	It is a derived unit of energy, work, or amount of heat, named after the English physicist James Prescott Joule (1818–1889).
The hertz	It is the SI unit of frequency; named after Heinrich Rudolf Hertz.

The newton	It is the standard unit of force; this name honours the English physicist and mathematician Isaac Newton (1642–1727).
The ohm	It is the unit of electrical resistance, named after German physicist Georg Simon Ohm (1789–1854).
The pascal	It is a unit of pressure, named after the French mathematician, physicist, inventor, writer, and philosopher Blaise Pascal.
The volt	It is a derived unit for electric potential (voltage), named in honour of the Italian physicist Alessandro Volta (1745–1827).
The watt	It measures the rate of energy conversion or transfer; it is named after James Watt, a Scottish engineer (1736–1819).

A selection of the most recurrent scientific laws mentioned by the students in their corpus include: *Joule's first law*, which is a physical law expressing the relationship between the heat and current flowing through a conductor; *Joule's second law*, which states that the internal energy of an ideal gas is independent of its volume and pressure, depending only on its temperature; *Kirchhoff's Law* was named after Gustav Robert Kirchhoff (1822–1887), a German physicist who contributed to the fundamental understanding of electrical circuits, spectroscopy, and the emission of black-body radiation by heated objects; *Newton's law of motion*; *Ohm's law.* Other scientific inventions that bear the name of their inventors but were not mentioned so frequently by the target group, are the following: the *Bollee wind turbine*, developed by Ernest Sylvain Bollee in France; Candido Jacuzzi who invented the *Jacuzzi whirlpool bath*; Ernő Rubik who invented the Rubic cube; *Crookes tube*, which is an early experimental electrical discharge tube invented by English physicist William Crookes; *Thompson submachine gun* invented by John T. Thomson in 1919; *Mills bomb*, a famous British hand grenade, invented by William Mills in 1917; *Yale safe lock* made by Linus Yale, Jr., an American mechanical engineer and manufacturer; the *Colt revolver* patented by Samuel Colt, an American inventor in 1835; *Weston cell*, invented by Edward Henry Weston (1886–1956), an American photographer; *Franklin stove*, invented by Benjamin Franklin; the *Odhner arithmometer*, a pinwheel calculator invented by Willgot Theophil Odhner (1845–1905); a *Nipkow disk* is a scanning disk invented by Paul Gottlieb Nipkow (1860–1940) etc.

A follow-up of this teaching/ research task could include a selection of EFL activities on the topic of inventions: *Make your own inventions* – to make their own inventions in groups and then present them to the other groups; *Presentation of inventions* – to present their own inventions, real inventions or science fiction inventions, answering questions related to their presentations, voting the best ideas; *Alternative stories about inventions* – about who invented what or how it was invented, for example "Who really invented…?" and "Myths about…" Students should read alternative stories, decide what they believe and give arguments for their choices.

Discussion of the results

The analysis of the corpus shows that the registers particularly rich in eponyms are science, biology, chemistry, mathematics and physics. The eponyms mentioned by our

target group are presented in the tables and sections above. Many words maintain a form which points obviously to the person they are named after, for example *Alexanderson screw*, *Faraday shield, Tesla coil* or *Tesla turbine* etc., while other scientific eponyms have become more lexicalised in form from that person, such as *voltaic pile, galvanometer, machmeter, volt, Archimedean screw* etc. Proper adjectives, common nouns, noun modifiers or adjectives are derived by acquisition, e.g. *Voltaic, Archimedean*, or zero-derivation, metonymy – *biro, diesel, ampere, watt, joule, newton* etc., giving the name of the inventor/discoverer to the invention/discovery. The largest number of eponyms in the corpus are conversions, from proper nouns to common nouns. Next to conversion, suffixation is a productive process, particularly in scientific terminology. Some of the suffixes to be noticed in the selected engineering vocabulary corpus are *-ize* (the verb structure of a process denoted by its originator: *galvanize, pasteurize* etc.) or *–ic* (adjective form, *Voltaic*). There are also eponymous expressions which are made up of associations between proper nouns, inventors' names and common nouns, names of devices or process used in engineering such as: *Argand lamp,* the *Coandă effect, Edison screw, Hele-Shaw clutch, Karpen pile, Morse code, Tesla coil, Schrader valve, Wiegand wire* etc. The possessive forms are also use to denote scientific laws: *Kirchhoff's law*, *Newton's law of motion, Ohm's law.* The ability to use inflection such as the plural, i.e. *amps, volts* or *watts*, is also an indication of the strict eponymous status of a word. Words may be real eponyms if they no longer refer specifically to the person whose name is used and especially if the capitalization may be dropped. A special category includes tribute-paying eponyms, specific to scientific discourse: in the honour of a scientist, e.g. all units of measurement in science are named after scientists – *ampere, hertz, joule, ohm, pascal, tesla, watt* etc. Most of the eponyms mentioned in the data have noun or adjective form. Eponyms which have verb form are quite rare, such as *to galvanize*, in engineering to cover (iron, steel etc.) with a protective zinc coating by dipping into molten zinc or by electrodepositing or (in Physics/General Physics) to stimulate by application of an electric current (derived from the name of Luigi Galvani); and *to google* – to use the Google search engine to obtain information about various items on the World Wide Web.

Conclusion

As the analysis of the collected data reveals, the focus of this particular ESP activity is mostly on reading comprehension and technical terminology. The collected data confirms the assumption that there is a great variety in terms of names of devices, instruments, laws, units of measurements in the field of technology that bear the names of their inventors. Reading about and discussing specific details related to famous people's lives and discoveries should enrich the students' level of knowledge and raise their cultural awareness. Therefore, it can be concluded that the usefulness of ESP teaching activities cannot be denied, since they have been successful in establishing background knowledge on terminology, discourse and culture of a certain specialised language.

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