Evaluation of Persian Academy approved genetics terms acceptance in upper graduate user population

Saeed Hesami Tackallou [1, *], Atefeh Ghanbari [2]

[1]Biology of Department, Islamic Azad University, Garmsar Branch, Garmsar, Iran
[2]Terminology Department, Academy of Persian Language and Literature, Tehran, Iran

*Corresponding Author: email address: tackallou@gmail.com (S. Hesami Tackallou)

ABSTRACT

Finding Persian equivalents for scientific terms is one of the aims of Academy of Persian language and literature, and more than 50 scientific committees are now working on this scope in terminology department of the academy. Genetics and biotechnology terminology committee is one of these teams that started his activity from 2009 and since then approved more than 500 of these terms for use in academic fields. In this research 101 questionnaires including 20 questioned term were given to more than 101 upper graduate users including MSc and PhD students and academic staff of randomly selected universities in Tehran and Semnan provinces. And then the evaluation of their acceptance was carried out by a model given by Cooper for the Study of Language Spread. All 20 studied terms were randomly selected from genetic approved terms and divided in to two groups: newly coined equivalents (those equivalents that was newly coined by the committee) and selected equivalents (those that have the selected equivalent before).
Results gathered and analyzed with statistical tests, and showed that most of accepted terms are among selected equivalents. By another words the newly coined terms has much less acceptability than the others. This research introduces a method for evaluation of approved Persian equivalents of scientific terms and besides show the state of some of these equivalents between user populations. The important point is that term selection for scientific terms including genetic terms; is not an obligatory rule, but is a proposal for meeting the researchers need to strength Persian language as a scientific language. And usage of these equivalents is completely on the part of researchers and students and their point of view to equivalents.

Keywords: genetics; biotechnology; term selection; scientific terminology

INTRODUCTION

Language planning is not the first term to appear in the literature. Perhaps the first term to appear in the literature was language engineering. This has been used far more often than glottopolitics, language development, or language regulation. Language policy sometimes appears as a synonym for language planning but more often it refers to the goals of language planning [1]. In Iran the task of language planning is carryng out by Academy of Persian language and literature.
due to the foreign origin of most scientific concepts, there are only two ways ahead of academicians; either using the foreign terms as the Persian equivalent, or coining or selecting new equivalent for terms. there is no doubt that using the foreign term is much easier, but in the long run, it affects dramatically the structure of Persian language; consequently, Persian language will be full of foreign terms so that the language itself starts to lose its identity and nothing remains out of it[2]. Moreover, these loaned terms are not clear enough for Persian speakers and they cannot internalize such terms or use them to make new constructions and combinations. Based on the mentioned problems, Persian Academy has invited Iranian researchers, who are interested in their national language in different scientific fields to start term selecting activity in the aim of trying to enrich the treasury of Persian terminology by making native and local equivalents and equip their language with devices to express new concepts. Genetics and biotechnology terminology committees is one of these teams that started his activity from 2009 and

since then approved more than 500 of these terms for use in academic fields[3].

The formation of equivalents occurs when two languages come to contact in areas especially scientific relations. When these two languages do not have commonalities in that area and one of them is more powerful and enriched in quality and quantity, the other one which doesn't contain the proper equivalents available for the phenomena in the first language will be forced to create equivalents in various ways.

Surveys on the frequently used terminology in genetic terms reveals that some processes are more frequent in the formation of new terms and equivalents [4,5] :

A - One way is to use terms which have a Latin root and derivational rules can be applied to them easily in European languages. An example can be the word cardio which means heart in different combinations such as electro cardiogram, endocarditic, epicardium, cardiovascular, and cardiologist. The use of Latin prefixes and suffixes are quite frequent in this method. Most of the roots are combined with suffixes and prefixes such as *chromo-*, *-some, allel-*, *-ome, -omics,* and *-ease* to make terms that carry more specific meanings. By finding the exact equivalents of suffixes, prefixes and roots, in most cases it is possible to make proper words for such terms [6,7,8].

The smallest meaningful unit of word is morpheme which either carries meaning or shows a grammatical function. Morphemes are of two types: Free and bound. Bound morphemes cannot be used alone and have two types, derivational and inflectional. If needed, languages begin making and producing new affixes. This can be achieved by changing a stem into an affix or by borrowing from a foreign language or either from dialects and accents available in the language itself [9]. Conclusively, affixes are elements that can't be used alone and they should be attached to a stem (simple or compound). If they only show another aspect of the word such a "plural s", they are called inflectional, and if they make a new word (no matter if they change the part of speech or not) they are called derivational.

B- Using proper names is another way of forming new terms. When a novel phenomenon is discovered, since there is not enough information about it, finding a comprehensive name for it would be difficult. That's why this phenomenon is named after the first person who encountered it or the place in which it occurred for the first time or even the similarity it may have to a particular item or thing. Cat's cry syndrome, in which a child cry sounds like of a cat, is such example. [4]

C- Another very common way is using abbreviation. The very highly frequent terms such as DNA (Deoxy Ribonucleic Acid) fall into this category [8].

Both newly coined equivalents (those equivalents that were newly coined by the committee) and selected equivalents (those that have the selected equivalent before) could be among any of these categories. So the comparison is done between coined and selected equivalents.

Cooper made a model for evaluating and study of new terms in the second language [10,11,1,12]. besides he define a framework for analyzing each person's attitude the new equivalent so each person's way of looking could be categorized in a five grade ranking including:

1- don't know: this is the lowest rank of acceptance; here the asked person doesn't know anything about the selected equivalent and even doesn't hear of that.

2- know but don't agree: the asked person knows the selected equivalent and is aware of its selecting but does not agree with it.

3- agree but don't use: the asked person know the selected equivalent and is aware of its selecting and agree with it, but for some reasons he is not using it in his works.

4- use but don't recommend: the asked person knows the selected equivalent and agrees with it, he even use it in scientific applications, but does not recommend it to his students and coworkers.

5- recommend: this is the highest rank of acceptance, here the asked person knows the selected equivalent and agrees with it, and he even uses it in scientific applications, and recommends it to his students and coworkers[11, 12].

MATERIALS AND METHODS

The frequency of these five categories were carried out for 20 questioned terms from 101 upper graduate users including MSc and PhD students and academic staff that has been randomly selected from genetic departments of universities in Tehran and Semnan provinces. And then the evaluation of

their acceptance was carried out by a model given by Cooper for the study of language spread [1,12].
Data gathered by questionnaires were prepared as the input of Statistical Package for the Social Sciences (SPSS) for Windows, version 13.0 (Chicago, IL, USA). Data were presented as percent of each category. The comparisons of the variables were performed with ANOVA test. A scoring formula was invented by the authors for facilitating comparison between terms acceptability. In this formula the number of people in each of five grades was multiplied by a constant number. The multiplying constant number is zero for number of people who don't know, one for number of people who know but don't agree, two for number of people who agree but don't use the equivalent, three for number of people who use but don't recommend, and finally is four for number of people who recommend the equivalent and are at the highest rank of acceptance. The final sore of each equivalent's acceptance is calculated via this formula; and called acceptance score.

RESULTS

Table 1 and 2 show the sex and education percent and frequency of study population respectively. As it is shown in this table, 56 women and 33 men were included in this study.

Table 1. Sex percent and frequency of study population

sex	frequency	percent	valid percent
male	33	32.7	37.1
female	56	55.4	62.9
total	89	88.1	100.0
missing	12	11.9	
total	101	100.0	

Table 2. Education percent and frequency of study population

education	frequency	percent	valid percent
M Sc	57	56.4	57.6
PhD	42	41.6	42.4
total	99	98.0	100.0
missing	2	2.0	
total	101	100.0	

Table 3 shows the final acceptance score and percent of each five grade of acceptability ranking for 20 questioned terms, and besides indicates that which term is coined and which one is selected. as it is shown in table 3 the highest scores are for "polygeny" (score: 288), "genetic code" and "dominant gene" (score: 283), "genetic drift" " (score: 256), "codominance" (score: 244) and "self-splicing" (score: 226).
The sex and education frequency pie-charts are illustrated in figure 1 and 2 respectively.

Table 3. Acceptance score and percent of each five grade of acceptability ranking for 20 questioned terms (coined or selected)

TERM	type	don't know	know but don't agree	agree but don't use	use but don't recommend	recommend	acceptance score
assortment	coined	72.3	12.9	4.0	4.0	6.9	61
atavism	coined	78.2	5.0	5.9	-	10.9	61
chromosome banding	coined	73.3	11.9	5.0	2.0	7.9	60
chromosome mutation	coined	78.2	11.9	5.9	2.0	2.0	38
chromosome puff	coined	76.2	9.9	5.0	5.0	4.0	51
codominance	selected	28.7	6.9	13.9	5.0	45.5	244
DNA	coined	78.2	6.9	6.9	2.0	5.9	51
dominant gene	selected	17.8	5.9	10.9	8.9	56.4	283
editosome	coined	78.2	7.9	1.0	3.0	9.9	59
epistasis	coined	76.2	11.9	2.0	2.0	7.9	54
genetic code	selected	12.9	10.9	14.9	5.9	55.4	283
genetic drift	selected	20.8	11.9	10.9	5.9	50.5	256
genome map	coined	54.5	13.9	4.0	5.0	22.8	129
polygeny	selected	13.9	8.9	13.9	5.0	58.4	288
progeny	selected	51.5	9.9	3.0	4.0	31.7	156
ribozyme	coined	80.2	7.9	2.0	3.0	6.9	52
RNA	coined	76.2	9.9	5.0	3.0	5.9	53
rRNA, ribosomal RNA	coined	85.1	9.9	2.0	2.0	1.0	24
self_splicing	coined	28.7	13.9	6.9	5.9	44.6	226
tRNA,transfer RNA	coined	79.2	7.9	3.0	4.0	5.9	50

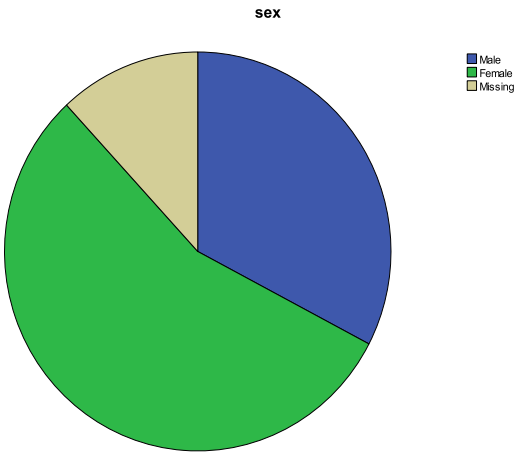

Figure 1. Sex pie-chart percent of study population

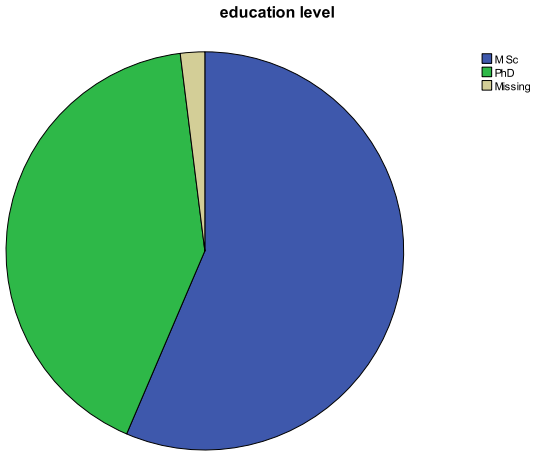

Figure 2. Education pie-chart of study population

DISCUSSION

With comparing all final acceptance scores, it will revealed that six term has an acceptance score greater than 200 these terms include: "polygeny" (score: 288), "genetic code" and "dominant gene" (score: 283), "genetic drift" " (score: 256), "codominance" (score: 244) and "self-splicing" (score:226). As it is clear in table 3 all of these terms have selected equivalents unless "self-splicing". This could be a good reason for relating the chance of acceptability to selecting the previously prevailed equivalent. But in the case of "self-splicing", it is promising that the quality of equivalent coining can guarantee its success and acceptability just like selected terms. But what make this coined equivalent as successful as other selected terms? Three reasons can be considered:

1- This equivalent is created by strict obeying Persian word formation principles. And besides no dated affix is used in it's creating.

2- The selected term is a short and one-part word (compared to its English term that is two-part).

3-before coining the equivalent for this term, there was no Persian equivalent available for "self-splicing" and so the coined equivalent have not to compete with any previous prevailing equivalent.

Because of all three above reasons this equivalent is accepted without any resistance from the part of Persian users. In table 3 the lowest acceptance score belongs to "rRNA, ribosomal RNA" (score: 24), this is a coined equivalent term.

Many other coined equivalent terms has an acceptance score lower than 60 (like: tRNA,transfer RNA, chromosome mutation, ribozyme, epistasis, editosome, chromosome puff and RNA). All of these terms are coined equivalent. These low scores (of coined terms) reveal that coining and creating area is a much more challenging field in scientific terminology rather than selecting a prevailing equivalent.

The essence of scientific terminology in terminology department of Persian Academy and any other organization, even in our mind is inevitable [13, 14]. But the point that should be mentioned is precise language policy making besides effective and scientific equivalent standardizing either by coining or selecting appropriate equivalents [15, 16]. The presence of clear and unambiguous scientific policies and the constant and precise application of principles in word formation not only has led to the production of proper equivalents for English word, but also has paved the way for specialists in genetics and all other sciences either to be able to find equivalents for the newly loaned terms by using tested methods of word formation.

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