



International Journal of
MULTILINGUAL EDUCATION

ISSN: (Print) ISSN 1987-9601

(Online) E ISSN 1512-3146

Journal homepage: <http://multilingualeducation.org/>

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To cite this article: Tamar Kvitsiani, History of Terminological Work in Georgia
and Modern Georgian Terminology:
International Journal of Multilingual Education, #22;
DOI: 10.22333/ijme.2023.22000; pp. 164-174.

To link to this article: <https://doi.org/10.22333/ijme.2023.220015>

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ABSTRACT

This paper explores modern Georgian terminology against the backdrop of the history of Georgian term formation. It studies different periods of terminological work in the country and discusses the characteristic features, challenges and achievements of each period.

The empirical data that this article is based on was collected from several biological dictionaries (see the dictionary section of references), 800 terms altogether, from the fields of immunology, genetics and biotechnology.

The study applied a quantitative method of analysis. The selected terms were also analyzed with regard to their sources and structural-semantic characteristics. The tradition of Georgian term formation differs significantly from the state of modern Georgian terminology which is mostly filled with borrowings from the English language. This determines the necessity to re-evaluate the existing practice of terminological word formation and develop new approaches.

Key words: *Modern Georgian terminology, terminological tradition, transliterated terms.*

Introduction

The study of modern Georgian terminology of different domains reveals that, in the majority of cases, new terms enter vocabularies of different fields as direct borrowings, i.e. transliterated versions of their respective English terms. Borrowed terms are not transparent, on the other hand, one of the important conditions that a good term should satisfy is its transparency and motivation. This is clearly stated in the definitions of the term, given in works of Georgian scholars (Ghambashidze, 1986; Ghlonti, 1983; Melikishvili, 1975; Pochkhua, 1974).

Terms are special linguistic units that express scientific concepts and play an important role in the process of establishing relevant communication among specialists within the field. Therefore, well-formed terminology is a precondition for the development of a certain field of knowledge.

We live in an epoch of rapid technological development. Modern technologies penetrate

different fields and cause revolutionary changes there. “The rate of technological progress is constantly increasing, leading to the introduction into our routine activities of certain things which not very long ago would seem to belong to the realm of science fiction. Such rapid development of any field of science implies the spontaneous generation of new scientific terms, and the influx of such terms in nearly every field of knowledge is another characteristic feature of our era” (Margalitadze, 2018, p. 340). The influx of new concepts in every domain, and the need to designate them, gradually caused some changes in the structural and semantic characteristics of modern terminology (Fontenelle, 2014; Margalitadze, 2018). The analysis of the above-mentioned processes and the state of Georgian terminology against the backdrop of these changes is of great importance at the present stage of the development of Georgian terminology.

Terminology and terminological work in a particular country is affected by social changes, which have a major effect on linguistic needs. Technology is growing rapidly and pervades all spheres of society. Technological developments in the fields of information and communication create the need for new ways of communication that did not exist previously. The vocabularies of these languages require constant updating (Cabre, 1992).

That is why it is so important to pay more attention to the process of the terminological work and take into consideration the history of Georgian term formation while working out terminological policy for Georgian. These considerations determined our choice of the research topic: to explore modern Georgian terminology against the backdrop of the history of Georgian term formation.

Some Tendencies of Modern Georgian Term Formation

In order to have a close look at modern Georgian terminology, we selected 800 terms from the domains of immunology, genetics and biotechnology. These fields developed later compared to traditional domains, like, for example, botany, zoology or anatomy and they enabled us to trace some tendencies of the Georgian term formation methods in the second half of the XX century and the beginning of the XXI century. The terms were extracted from several dictionaries of biology, genetics and immunology (see the dictionary section of the references). Terms were also extracted from a manual of biology and its Georgian translation (Sunj, 2012) with the help of the terminological extraction tool SynchroTerm¹. Terms were

¹ <https://terminotix.com/index.asp?content=category&cat=6&lang=en>

chosen based on the principle of random sampling.

The terms were analyzed from the point of view of term formation. We made a quantitative study of the selected terms to find out what was the predominant tendency of term formation in Modern Georgian, direct borrowing or the use of resources of the Georgian language. For analyzing term formation methods we relied on the monograph of Georgian terminologist R. Ghambashidze (1986) and the ISO standard 704-2022 “Terminology Work – Principles and Methods”.

The results of the study have revealed, that 75-80 % of Georgian terms (i.e. 600-640 terms out of 800) from the above-mentioned domains are transliterated from their respective source language equivalents, mostly from the English language. Below are given examples of borrowed terms (see examples 1-14):

- (1) **acceptor splicing site** - *biotech.* სპლაისინგის აქცეპტორული საიტი (splaisingis ak‘c‘eptoruli saiti).
- (2) **amorphic mutation** - *gen.* ამორფული მუტაცია (amorp‘uli mutac‘ia).
- (3) **annidation** - *gen.* ანიდაცია (anidac‘ia).
- (4) **antigenic shift** - *immun., gen.* ანტიგენური შიფტი (antigenuri šip‘ti).
- (5) **attenuator** - *gen., biotech.* ატენიუატორი (ateniuatori).
- (6) **clonal deletion** - *immun.,* კლონის დელეცია (klonis delec‘ia).
- (7) **clonal expansion** - კლონის ექსპანსია (klonis ek‘spansia).
- (8) **insertional inactivation** - *biotech.* ინსერციული ინაქტივაცია (inserc‘iuli inak‘tivac‘ia).
- (9) **affine gap penalties** - აფინური გეპ-პენალტები (ap‘inuri gep-penaltebi).
- (10) **expression profiling** - ექსპრესიის პროფილირება (ek‘spresiis prop‘ilireba).
- (11) **parametric bootstrapping** - პარამეტრული ბუტსტრეპინგი (parametruli butstrepingi).
- (12) **combining site** - *immun.* კომბინატორული საიტი (kombinatoruli saiti).
- (13) **electroblotting** - *biotech.* ელექტრობლოტინგი (elek‘troblotingi).
- (14) **electroporation** – *biotech.* ელექტროპორაცია (elek‘troporac‘ia).

The study also showed us that approximately 20-25% of terms (i.e. 160-200 terms out

of 800) are formed in Georgian with the Georgian language resources. Below are given some examples of such terms (see examples 15-24). As our analysis has revealed, the main methods of term formation are structural borrowing or semantic borrowing.

- (15) **binding site**- *immun.* შემაკავშირებელი უბანი (šemakavširebeli ubani).
- (16) **cross-reacting**- *immun.* ჯვარედინად მორეაგირე (jvaredinad moreagire).
- (17) **mast cell**- *immun.* პოხიერი უჯრედი (poxieri ujredi).
- (18) **fold library** - ნაკეცების ბიბლიოთეკა (nakec'ebis bibliot'eka).
- (19) **protein folding** - ცილის დაკეცვა (c'ilis dakec'va).
- (20) **shotgun approach** - საფანტის თოფის მიდგომა (sap'antis t'op'is midgoma).
- (21) **prey proteins** - მტაცებელი ცილები (mtac'ebeli c'ilebi).
- (22) **hairpin structure** - სარჭის სტრუქტურა (sarčis struk'tura).
- (23) **false negatives** - მცდარი უარყოფითები (mc'dari uarqop'it'ebi).
- (24) **false positive** - მცდარი დადებითები (mc'dari dadebit'ebi).

As can be seen from the above examples, the majority of terms are structural borrowings. The structure of English terms is preserved and English words are replaced by their Georgian equivalents, e.g. shotgun approach, prey proteins, hairpin structure (20, 21, 22), etc. Semantic borrowing is also used but less frequently. The terms “fold library”, “protein folding” (18 and 19) are examples of semantic borrowing. “Fold, folding” developed a terminological polysemous meaning in English. They have migrated to biotechnology and are used with protein. The Georgian language has borrowed the polysemous meaning of “fold, folding” and developed the same polysemous terminological meaning to the Georgian equivalent of “fold”.

Some Structural and Semantic Characteristics of Modern Georgian Terms

In this article, terms were also studied with regard to their structural and semantic characteristics. For the study of the structure and semantic features of terms, we also relied on R. Ghambashidze's monograph (1986) and the ISO standard 704-2022 “Terminology Work – Principles and Methods”. The research showed that there is an increasing number of multi-word terms in modern Georgian terminology. About 30% of terms (i.e. 240 terms out of 800), analyzed by us, are one-word terms (simple, derived or compound). See examples below (25-

30):

- (25) **aberration-** *gen.* აბერაცია (aberac'ia).
- (26) **aptamer-** *gen., biotech.* აპტამერი (aptameri).
- (27) **callus-** *biotech.* კალუსი (kalusi).
- (28) **cosmid-** *gen., biotech.* კოსმიდი (kosmidi).
- (29) **affinity** – *immun.* აფინობა (ap'inoba).
- (30) **alloantiserum** – *immun.* ალოანტიშრატი (aloantišrati).

Approximately 70% of terms (i.e. 560 terms out of 800) proved to be analytical or multi-word terms. Analytical terms are not short and laconic but, on the other hand, they are transparent, with clear motivation. The study showed that even English analytical terms are sometimes transliterated into Georgian. Transliteration of analytical terms causes considerable terminological ambiguity, which is a negative tendency for the development of any field (e.g. see examples 31-34):

- (31) **massively parallel sequencing-** *biotech.* მასობრივ პარალელური სეკვენირება (masobriv paraleluri sekvenireba).
- (32) **northern blot-** *biotech.* ნოზერნ-ბლოტინგი (nozern-blotingi).
- (33) **site-specific mutation-** *gen., biotech.* საიტ-სპეციფიკური მუტაცია (sait-spec'ip'ikuri mutac'ia).
- (34) **vascular addressin-** *immun.* ვასკულარული ადრესინი (vaskularuli adresini).

Concerning semantic features of terms, polysemy is not frequent in the above-mentioned domains. This fact is caused by the increased number of analytical terms (70%). On the other hand, the research revealed, that there are many examples of polysemy of one-word terms (see examples 35-37).

- (35) **carrier-** **1.** *gen.* რეცესიული ალელის მატარებელი ინდივიდუმი (rec'esiuli alelis matarebeli individuumi); **2.** *immun.* ჰაპტენის მატარებელი ცილა (haptenis matarebeli c'ila); **3.** ბაცილმატარებელი, პათოგენური მიკრობების მატარებელი (bac'ilmatarebeli, pat'ogenuri mikrobebis matarebeli).
- (36) **domain-** **1.** დომენი, ზესამეფო (domeni, zesamep'oi); **2.** *mol. biol.* დომენი (domeni); **3.** *mol. biol.* დომენი (domeni); **4.** *immun.* დომენი (domeni).

- (37) **follicle**- 1. *anat. zool.* ფოლიკული, ჩანთა (p'olikuli, č'ant'a); 2. *immun.* ლიმფური ფოლიკული (limp'uri p'olikuli); 3. *bot.* ფოთლურა (p'ot'lura); 4. *entom.* მუხლუხის პარკი (muxluxis parki).

We have also observed frequent cases of synonymy in the terminology of analyzed fields of knowledge (see examples 38-42).

- (38) **capping** - *gen.* კეპირება (kepireba) (*also* რნმ-კეპირება (RNM-kepireba) – RNA_capping).
- (39) **acquired mutation** - *gen.* შეძენილი მუტაცია (šezenili mutac'ia) (*also* სომატური მუტაცია, სომატური უჯრედის მუტაცია (somaturi mutac'ia, somaturi ujredis mutac'ia) - somatic mutation)
- (40) **domain** - დომენი (domeni) (*also* ზესამეფო (zesamep'o) - superkingdom)
- (41) **complementary DNA** - *gen.* კომპლემენტარული დნმ (komplementaruli dnm) (*also* კ-დნმ (k-DNM) - cDNA)
- (42) **cell-mediated immunity** - *immun.* უჯრედული იმუნიტეტი (ujreduli imuniteti) (*also* T-უჯრედოვანი იმუნიტეტი, უჯრედული იმუნური პასუხი (T-ujredovani imuniteti, ujreduli imunuri pasuxi) - cellular immune response, cell-mediated immune response).

As a result of our study, we have revealed a considerable number of borrowed terms from English into Georgian (75-80%). The next chapter will give a brief survey of the history of terminological work in Georgia, in order to review the tradition of Georgian term formation and compare it to the state of modern Georgian terminology.

Brief History of Terminological work-in Georgia

The development of terminological work in Georgia has a very long history. L. Karosanidze distinguishes four the most important periods in the history of terminological work in Georgia:

1. The 10th-12th centuries
2. The period of Ilia Tchavtchavadze and his contemporaries
3. The so-called Nikoladzes' period
4. The Soviet period (Karasnidze, 2012).

The Middle Ages was the era, when Ioane Petritsi and other Georgian translators

enriched the Georgian language with translations of theological texts from Greek. Ioane Petritsi was a well-known Georgian translator of Greek theological-philological works. In the 10th-12th centuries several unique theological works were translated or adapted from Greek into the Georgian language which created a solid basis for the development of the Georgian scientific language. Ioane Petritsi's contribution to the formation of Georgian philosophical-theological language stands out. Like Ioane Petritsi, Eprem Mtsire also elaborated special terminology while translating texts from Greek. Georgian translators tried to find adequate Georgian equivalents of Greek terms or create new terms in Georgian relying exclusively upon Georgian language resources. When necessary, they also resorted to borrowings. Georgian terms არსი (arsi) "essence, gist", მეტყველება (metqveleba) "speech", თვითმყოფობა (t'vit'mqop'oba) "identity", მოძღვრება (mozǧvreba) "teaching, doctrine", ცნობიერება (c'nobiereba) "consciousness", ენამზეობა (enamzeoba) "oratory" were created at that time. Georgian language and the words from common Georgian vocabulary were quite skillfully used for Georgian term formation.

Translations of Giorgi the Hagiorite made a pioneering contribution to the formation of the Georgian scientific terminology. He used affixes of the Georgian language (e.g. -ობა [-oba], -ება [-eba]) to create new terms. Giorgi the Hagiorite also used case endings, such as -ით (-it) or -ად (-ad) to form new terms, for example: გონებითი (gonebit'i) "mental", ხედვითი (xedvit'i) "visual", ცვალებადი (c'valebadi) "changeable", მყოფადი (mqop'adi) "future", etc. He borrowed a term only if a Georgian word could not fully express the meaning of a Greek term. However, such cases of transliteration were quite rare. There are also many examples of translation loans of Greek terms. This is a tradition that modern terminologists should follow. As D. Melikishvili argues in her book, there is no language with ready-made terminology. But there are methods of their formation in every language. Scientific terminology is formed and developed from generation to generation over centuries and this process follows economic, political and cultural development of a country. Medieval Georgian translators created terms by using resources of the Georgian language proper, this was their main principle (Melikishvili, 1975).

After the 13th century there was a big gap in terminological work in Georgia because of the political situation in the country and constant invasions. In the 19th century this process was renewed by Ilia Tchavtchavadze. As Karosanidze notes, "He and his contemporaries called for reviving literary Georgian language. Ilia Tchavtchavadze appealed to the nation

saying that all the institutions, all kinds of social activities, all the literary pieces of work be they original or translated, should serve the progress of the nation, defending national rights, through caring about the culture and language. He considered it absolutely necessary to gather a special commission, which would settle the matters of arguments related to the language adjustment, improvement and would determine the obligatory rules of the language” (Karosanidze & Khurtsilava, 2018, p. 9-10).

Establishing the first university (1918) by Georgian scholars played a key role in the process of terminological work in Georgia. The first professors of the University, led by its founder Ivane Javakhishvili, translated many terms into Georgian to create the Georgian scientific language. The years of independence gave great impetus to the development of science and scientific language. The main aim of the educated society was to develop the Georgian scientific language. They replaced many foreign words with native equivalents.

The fourth important period in the history of development terminological work in Georgia is the Soviet Period. The terminological policy was conducted by the Soviet government, who introduced a lot of internationalisms in the language, as they believed that foreign words enriched the language (Karosanidze, 2012). Using Foreign terms alongside their Georgian equivalents became obligatory at that time. This policy gradually ousted many Georgian terms from the language. New terminological policy was obvious from the press, from the dictionaries published in those years. One example from Karosanidze’s book illustrates this policy very well:

Абажур- შუქვარი (shuqfari) (1920)

Абажур- შუქვარი (shuqfari), აბაჟური (abajuri) (1921)

Абажур- აბაჟური (abajuri), შუქვარი (shuqfari) (1925)

Абажур- აბაჟური (abajuri) (1935) (Karosanidze, Khurtsilava, 2018, p. 15).

Despite many difficulties faced by Georgian scholars in the Soviet epoch, it should be noted that they managed to develop the Georgian terminological school. The Georgian Academy of Sciences which incorporated many scientific research institutes, published numerous terminological dictionaries in the 20th century which cover practically all fields of knowledge. The situation is radically different today. Nowadays the English language dominates throughout the world. It is the Lingua Franca. Naturally, it has a big impact on our native language as well. The influx of new terms in Georgian is mostly from English and the percentage of borrowed terms from English is very high as was shown in section 2 of the present paper.

Discussion

Studying the terms from the fields such as immunology, biotechnology and genetics has revealed that direct borrowing has become one of the main methods of introducing new concepts in the mentioned fields. 75-80 per cent of terms, analyzed by us are transliterated versions of their respective English terms. It is to be noted that in some cases, even multi-word terms are transliterated. As a result, terms are not transparent and motivated. This fact causes terminological ambiguity, which is a negative tendency for the development of a field itself.

Studying modern Georgian terminology against the backdrop of the history of terminological work in Georgia proved that the methodology of term formation has changed and the percentage of borrowed terms has increased.

On the other hand, the nature and characteristics of modern terminology has altered. As Margalitadze argues, we see the increased tendency of migration of common words into terminology. We observed this tendency in the fields analyzed by us as well. According to Margalitadze, the main cause of this phenomenon may be the fact that: “The language is trying to apply the principle of linguistic economy and to make the maximum use of available linguistic resources. These available resources are found, of course, in the existing common vocabulary. Consequently, to convey new knowledge, the language is trying to use existing words rather than create new ones” (Margalitadze, 2018, p. 341). Thus, more common words are used in English terminology which makes terms clear, motivated, easy to understand and remember. These terms are borrowed in Georgian instead of following the same method and applying Georgian words in terminological word formation. As a result, these terms are vague, not clear or motivated. The history of Georgian term formation provides sufficient proof of the fact that the Georgian language has enough resources for the formation of new terms and there is no need to borrow everything into Georgian.

Conclusion

As noted above, we live in the era of the rapid development of science and technology which causes the influx of new concepts in many domains. The generation of numerous terms poses a big challenge for the Georgian language. Unprocessed and unclear terminology may become an impediment factor for the development of fields of knowledge. That is why it is so important to pay more attention to the process of terminological work and take into

consideration the history and tradition of Georgian term formation.

The study of Georgian terminological work in different epochs proves that the Georgian language has enough resources for the formation of new terms. Georgian scholars and translators skillfully applied the resources of the Georgian language to create Georgian equivalents of foreign terms. This does not mean that terms were not borrowed, but such instances were comparatively few.

There is an urgent need that terminologists and domain experts make important decisions on the terminological policy for the Georgian language. William Martin writes in one of his papers: “The (ideal) terminologist as an individual does not exist. The (ideal) terminologist is a team” (Martin, 2006, p. 92). Thus, terminological work needs close collaboration of domain expertise, linguistic expertise and information management expertise in order to function properly and develop adequate terminology for the Georgian language.

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