

GENERAL TRENDS IN STANDARDIZATION OF SCIENTIFIC TERMINOLOGY IN SERBIAN: A CRITICAL ANALYSIS OF THE STATE OF AFFAIRS

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1. The term terminology has a twofold definition: (1) it represents a group of terms used in a given scientific field, and (2) it stands for a general systemic scientific approach toward formation and application of terminological systems (Bugarski 1996a, Radovanović 1986). Consequently, theoretical foundations of the science of terminology should be very broad as to cover both linguistic and science-specific requirements in a given language. In other words, theoretical work on terminology needs to be coordinated between linguists, on one hand, and scientists from the relevant scientific areas, on the other hand.

Standardization of terminology is an inherent aspect of the science of terminology. Its goal is to "sort out" the acceptable terms in relevant scientific areas, to provide the most adequate definitions of those terms, and to compile them in specialized scientific terminological indexes or dictionaries. This is a very responsible and laborious process in any language, but especially within those languages, such as Serbian, which can be said to "import" terminology, along with the "import" of science and technology from the technologically and scientifically more advanced societies.

Normally, in the initial stages of the formation of Serbian terminology in any scientific area, a series of terms appears which all refer to the same concept, process or phenomenon, ranging from lexical borrowings from the source language to different (more or less direct) Serbian translations and calques. In the past, discussions were led among linguists interested in the area of standardization of terminology (along the lines of general linguistic attitudes within our society toward the status of "internationalisms" versus "purisms"), whether it is better to opt for lexical borrowings, on one hand, or for translations and calquing, on the other hand, in situations where new concepts are introduced into the language. It was determined then that a certain degree of "sociolinguistic" variation (between the two above outlined trends) should be admitted in standardizing terminology on "purely linguistic principles" (Bugarski 1983: 69). In other words, exclusive "purism" should be avoided in order to make way for the creation of a more solid scientific terminological basis which would be open to positive influences from other (non-Serbian speaking) scientific communities.

2. The most recent linguistic research in the field of standardization of terminology in Serbian has focused on establishing a set of criteria of universal applicability regardless of the specific requirements within individual scientific fields. Bugarski (1996a, 1996b) formulated a multidimensional model for evaluating terminological alternatives. The model

is based on an open-ended matrix consisting of linguistic and extralinguistic parameters each of which is assigned a certain value, and their sum can be used to make preferences in choosing the most appropriate option in the process of standardizing the terminology (in most cases, it is the choice between the internationalism and the translated term). The experimental matrix proposed by Bugarski (1996a, 1996b) consists of 10 parameters, and those are: (1) systemicity (which measures the term's capacity to adjust to the overall linguistic system, and its suitability to occur in larger syntactic structures (NPs, PPs, VPs, etc.)), (2) productivity, (3) monosemy, (4) international value, (5) motivation, (6) diffusion, (7) stability, (8) connotation, (9) shortness and (10) easiness (in pronunciation and writing). Bugarski (1996a; 1996b) gives primacy to the first five parameters, at the same time pointing out that the model represents an open-ended set of criteria which can be expanded according to the researchers' needs. Each parameter can be assigned a "+" or a "-" value if they possess/lack the feature presented by the parameter in a significant manner, and a "0" value if they are neutral with respect to the given parameter. This experimental matrix was tested against three terms from the field of linguistics (*competence*, *performance* and *transformation*: (A1-2) *kompentencija/jezička sposobnost*; (B1-2) *performansa/govorna delatnost*; (C1-2) *transformacija/preoblika*, and the terms *computer*, *printer*, *feedback*, *management*, and *interaction*: (D1-2) *kompjuter/računar*; (E1-2) *printer/štampač*; (F1-2) *fidbek/povratna sprega*; (G1-2) *menadžment/poslovanje*; (H1-2) *interakcija/medjudejstvo*; as shown below:

	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	G1	G2	H1	H2
(1)	-	+	-	+	+	-	+	-	+	-	0	0	+	-	+	-
(2)	0	0	0	0	+	-	+	-	-	+	0	0	+	-	+	-
(3)	-	+	-	+	0	0	0	0	0	0	0	0	+	-	0	0
(4)	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
(5)	-	+	-	+	+	-	0	0	-	+	-	+	-	+	0	0
(6)	0	0	0	0	+	-	0	0	-	+	-	+	+	-	+	-
(7)	-	+	-	+	+	-	0	0	-	+	-	+	+	-	+	-
(8)	-	+	-	+	+	-	+	-	0	0	-	+	+	-	0	0
(9)	+	-	+	-	-	+	0	0	0	0	+	-	0	0	0	0
(10)	-	+	-	+	-	+	0	0	0	0	+	-	-	+	0	0
tot.	2	6	2	6	7	2	4	0	2	4	3	4	7	2	5	0

As can be seen from the above table, Bugarski (1996a; 1996b) suggests that from this set of doublets, translations of the terms *competence*, *performance*, *printer*, and *feedback* have higher values than their corresponding international terms, while the opposite stands for the international terms for *transformation*, *computer*, *management* and *integration*, which consequently makes the terms *jezička sposobnost*, *govorna delatnost*, *štampač*, *povratna sprega*, *kompjuter*, *menadžment*, and *integracija* more suitable for standardization than their corresponding opposites.

3. If we now turn to the scientific practice in various fields, it becomes obvious that the above outlined linguistic and extralinguistic parameters present a very useful set of guidelines (not only for standardization of terminology in Serbian but also in other "importing" languages). However, the hierarchical organization of parameters within the experimental matrix suggested by the author is somewhat inaccurate. The parameters which seem to be the most relevant for many researchers are the international value of terms, along with the parameters of shortness and monosemy. In everyday practice, these three parameters are often justly given primacy over other parameters, as will be demonstrated in the examples that follow from the areas as diverse as computer science, quality control and quality assurance, linguistics and engineering. The examples for this analysis are taken from works cited herein, as well as from the authors' professional experience as university professors, researchers and translators. The data set is very limited in scope, but in our opinion it clearly supports the argument made in this paper.

Before we move on to illustrating our argumentation, we should point out that in all the cases analyzed herein, the original terms come from English. Namely, as reported by many authors working in areas as diverse as computer science, finances, engineering,

quality control, etc., as well as by professional translators, English has long ago become the *lingua franca* of international business and scientific communication. Consequently, it represents a source language for all the "importing" languages (including Serbian), and researchers and translators alike often opt for borrowing given terms from English rather than choosing to seek for the most appropriate translations of the terms in question (for further discussion see Jovanović (1996); Jeremić (1996); Præić (1996); Begović (1996)).

4. As already mentioned, this pilot analysis consists of testing a small number of terms belonging to semantic fields of computer science, quality control and quality assurance, linguistics and engineering against the criteria proposed by Bugarski (1996a; 1996b) in accordance with their use in everyday professional registers within each of these scientific fields.

In everyday communication among Serbian computer users we hear terms such as *e-mail* [i-mejl], *cartridge* [kartridŭ], *web* [veb], *home page* [howm pejdŭ], *browser* [brawzer], *surf* [surf] (examples taken from Præić (1996)). It should be pointed out that, due to the fact that the above terms were introduced into Serbian only recently, they are given here in their original English orthography since their spelling has not yet been standardized in accordance with the Serbian orthography which normally adapts borrowings from other languages to the phonological and phonetic rules of the Serbian language¹. The adaptation of the above terms would yield the following spelling: *i-mejl*, *kartridŭ*, *veb*, *homepejdŭ*, *brauzer*, etc. For some of the above terms, translations into Serbian would be easily available (e.g., *web-mreŭa*; *e-mail- elektronska poŭta*; *home page - matiĉna strana*) and indeed, in some instances, such as the case of the term *e-mail*, the borrowing and the translation are used as doublets.

In the area of quality assurance and quality control studies, borrowings such as *odit* (Engl. *audit*), *sertifikat* (Engl. *certificate*), *procedura* (Engl. *procedure*) are most commonly used, despite the fact that Serbian translations of the above terms are easily available (namely, *provera*, *potvrda*, *postupak*).

In engineering, we talk about *kondukcija* (Engl. *conduction*) rather than *provodjenje*, about *ekspanzija* (Engl. *expansion*) rather than *ŭirenje*, or about *aerosol* (Engl. *aerosol*) rather than *rasprŭbene teĉnosti u gasu*.

Also, very often English acronyms are borrowed into Serbian which then behave as morphological words structurally completely adapted to Serbian morphosyntactic rules:

computer science:

CD "compact disc", pronounced as [tse-de]
RAM "random access memory" pronounced as [ram]

quality assurance:

RAB (Registrar Accreditation Board), pronounced as [rab]
TQM (Total Quality Management), pronounced as [te-ku-em]

linguistics:

NP, VP, PP, etc. (*noun phrase, verb phrase, prepositional phrase, etc.*),
 pronounced as [en-pi], [ve-pi], [pi-pi]
GB (Government and Binding), pronounced as [dŭi-bi]

engineering:

BOF (Blast Oxygen Furnace), pronounced as [bof]
ASME (American Society of Mechanical Engineers), pronounced as [asme]
MHD generator (Magnetohydrodynamic generator), pronounced as [em-ha-de]

If we test the terms and acronyms cited above against the parameters outlined in the model developed by Bugarski (1996a, 1996b), it becomes obvious that the international

¹ On the other hand, computer terms which have been present and used by the Serbian expert public for a longer time, such as *software*, *hardware*, *modem*, *scanner*, etc., have indeed been adapted to the rules of Serbian orthography: *softver*, *hardver*, *modem*, *skener*, etc. (for further discussion and more examples, see Præić (1996)).

visibility is an important and decisive parameter in all instances. Furthermore, shortness becomes decisive when the choice is to be made between the longer translation and the shorter borrowing. Consequently, in the cases of *elektronska posta* vs. *e-mail*, or *aerosol* vs. *raspršene tečnosti u gasu*, the shorter borrowings are much more frequent than the longer translations of the original terms. The same is true in cases of acronyms which should have to be translated in a circumvent manner thus making the Serbian terms too long, or new acronyms should be created made out of Serbian translations which might make them unrecognizable even within the smallest group of experts. And finally, the monosemy parameter becomes extremely important in cases when the Serbian translations of given terms have connotative values different from the targeted ones (e.g., *mreža* "web" can be confused with *mreža* "net" (which is also a computer science term used in Serbian with a different meaning), while other translations of the term, such as *paucina* as in "spider web" would mark a shift toward a semantic field too far away from that of the computer science; in cases of terms such as *sertifikat*, *odit*, *procedura*, *kondukcija*, *ekspanzija*, etc., the translations or more widely spread borrowings are not semantically specific enough since they are commonly used in everyday speech - consequently, the borrowings mark their belonging to specific scientific or business registers).

Most of the terms used as illustrative examples herein have not been standardized yet, which is precisely what makes them a suitable database for this and similar pilot analyses. The most salient conclusion to be drawn here is that the linguistic model offering a set of parameters to measure standardization potential of given terms and to determine which of the suggested options - borrowings from the source language (which in this era of advanced technology is exclusively English), or translations of the original terms - are more suitable to be accepted and standardized is very useful and provides excellent guidelines in the standardization of terminology in any language. This preliminary test of the model yields a conclusion that the hierarchy of parameters should be topped by the parameters marking the international value, shortness and monosemy, as they appear to have the strongest impact on the choice of specific terms - in all cases borrowings rather than translations. The suggestion that international terms are more suitable to be standardized in Serbian is also supported by findings of many Yugoslav researchers in this area (e.g., Pržić (1996); Jovanović (1996), etc.) who all claim that international terminology is a necessary ingredient of international cooperation and communication in any field of human life and in any type of professional and/or scientific activity. We believe the same to be true not only for Serbian, but for all "small" languages which need to free themselves of linguistic "purisms" in order to make way for more advanced and more complex international cooperation.

5. Finally, another important issue remains to be mentioned, which brings us back to the statement made at the beginning of the paper. Namely, considering the multidisciplinary nature of the standardization process, it is necessary to motivate experts from more than one scientific area to actively participate in the terminology standardization process. The borrowings introduced into the linguistic code of the Serbian scientific community (and, very likely, into other non-English scientific communities as well) need to be structurally adapted in accordance with the a specific set of well defined linguistic criteria: however, very often when new borrowings are introduced into a given scientific or professional register, they are not adequately phonetically and phonologically adapted, in accordance with English pronunciation rules and Serbian phonology and morphology². These borrowings create confusion and fail to perform the communication functions which the majority of authors working in the field of scientific terminology considers highly important. Therefore, there exists a strong need to create an atmosphere of constant cooperation between linguists, specialists in English and, in our case, Serbian phonetics and phonology, and scientists from other areas in order to achieve the best possible degree of phonetic correspondence between the lexical items in the source language and their

² For example, the English term *audit* is often transcribed as "audit" in Serbian literature, and thus pronounced as [awdit] which is not in accordance with the English pronunciation of the term. With such inadequate adaptations of borrowings in Serbian the "international value" criterion, which was shown to be crucial in the standardization process is not satisfied.

equivalents in the target language, which would make those terms easily identified by speakers of those and other languages.

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LABURPENA / RESUMEN / RÉSUMÉ / ABSTRACT

Zientzia-arloko terminologiaren normalizazio-joera orokorrak serbiera: egoeraren analisi kritikoa

Edozein zientzia-arlotako terminologia eraikitzea lan luzea eta neketsua da. Aurreko hamarkadetan, serbierako zientzia-arloko ikertzaile askok joera bat nabaritu dute eta horren berri eman dute: ingeleseko unitate lexikalen maileguak eta unitate-egitura luzeagoen maileguak hartzen dira zientzia-erregistro zehatz baterako, itzulpenak edo kalkoak egin ordez. Izan ere, iritzi ezberdinetako zientzialari serbierrek adostasuna lortu dute eta aurreko hamarkadetan ingelesari eman diote zientzia-komunikaziorako hizkuntza bakarraren estatusa.

Komunikazio honetan, joera hori modu kritikoan aztertzen saiatzen gara, linguistikaren zein soziolinguistikaren ikuspegitik. Bugarski-k (1988; 1996) diziplina anitzeko eta amaiera zehatzik gabeko ikuspegi bat garatu zuen; hitzaldi honetarako egokitu dugu eta zientzia-arlo askotatik (injinerutzatik, kalitate-kontroleratik eta kalitate-kudeaketatik, informatikatik, ekonomiatik, eta abarretik) datozen datuak alderatzeko erabili dugu. Eskuratu ditugun datuek (baita alor jakinetako adituek emandako iritziek ere) adierazten dutenez, zientzia-alor jakin batean onartuko diren terminoak ebaluatzeko hierarkia bat ezarri behar da. Hierarkia hori hizkuntzaz kanpoko irizpideetan oinarrituko da, adibidez, nazioarteko kooperazioa eta komunikazioa. Horien arabera, ingelesetik hartutako maileguei lehentasuna ematen zaie "serbieraren zientzia-barietate modernoa" izeneko hizkuntza-kodean, itzulpena eta egitura-kalkoaren aurretik.

Tendencias generales de la normalización en la terminología científicotécnica de la lengua serbia: análisis crítico de la situación

La construcción terminológica de cualquier área científica es un proceso largo y laborioso. En décadas precedentes se ha puesto de manifiesto, y así lo han atestiguado muchos investigadores de la terminología científica serbia, una tendencia a importar préstamos de unidades estructurales tanto léxicas como otras mayores del inglés a una serie de registros científicos específicos, en lugar de optar por la traducción, el calco, etc. Todo ello está estrechamente relacionado con el hecho de que se haya llegado a un acuerdo entre científicos serbios de distintas tendencias en el sentido de reconocer al inglés el estatus de única lengua de comunicación científica de las últimas décadas.

En esta ponencia intentamos evaluar críticamente la tendencia señalada sobre estas líneas, tanto desde un punto de vista lingüístico como sociolingüístico. Empleamos un enfoque abierto y multidisciplinar desarrollado por Bugarski (1988; 1996) y adaptado a los fines de esta ponencia, para contrastarlo con una serie de datos provenientes de varios campos científicos como la ingeniería, el control de calidad, la gestión de calidad, la informática, la economía etc. Los datos con los que contamos (así como la opinión de expertos de una serie de áreas) indican la necesidad de establecer una jerarquía para la evaluación de términos. Jerarquía que deberá contar con una plena aceptación en el campo científico del que se trate. Esta jerarquía deberá basarse en gran medida en criterios extralingüísticos como la cooperación internacional y la comunicación, de acuerdo a los cuales en el código lingüístico llamado "moderna variedad científica del serbio" se da prioridad a los préstamos del inglés sobre la traducción y el calco estructural.

Tendances générales dans la normalisation de la terminologie du serbe: une analyse sur la situation

La construction de la terminologie en tout domaine scientifique est un processus laborieux et de grande portée. Au cours des dernières décades on a observé la tendance, qui a été soulignée par de nombreux chercheurs dans le domaine de la terminologie scientifique du serbe, d'adopter des unités lexicales et structurelles plus importantes de l'anglais et de les convertir en registres scientifiques spécifiques, au lieu d'opter pour les traductions, les calques, etc. Cela correspond étroitement au fait qu'un consensus a été

atteint entre les scientifiques serbes de différentes orientations par rapport à la condition de l'anglais comme unique langue de communication scientifique des dernières décades.

L'exposé présent essaye d'évaluer la tendance décrite précédemment de manière critique depuis les perspectives linguistiques et sociolinguistiques. C'est une optique multidisciplinaire ouverte développée par Bugarski (1988:1996) qui a été adaptée exprès pour cet exposé, et qui est prouvée par les données qui proviennent des différents domaines scientifiques tels que l'ingénierie, le contrôle et la gestion de la qualité, la science informatique, l'économie, etc. Les données disponibles (outre les opinions expertes dans des domaines déterminés) indiquent qu'il faut créer une hiérarchie pour évaluer les termes qui vont être acceptés dans leur totalité dans n'importe quel domaine scientifique, ce processus sera basé, principalement, sur des critères extralinguistiques tels que la coopération et la communication internationale, selon lesquelles les termes anglais empruntés reçoivent priorité sur la traduction et les calques structuraux dans le code linguistique dénommé comme "une variété scientifique moderne du serbe".

General trends in standardization of scientific terminology in Serbian: a critical analysis of the state of affairs

Building the terminology of any scientific area is a long and laborious process. In the recent past, a trend has been noted, and reported by many researchers in the area of Serbian scientific terminology, of importing borrowings of lexical and larger structural units from English into specific scientific registers, rather than to opt for translations, calques, etc. This corresponds closely to the fact that a consensus has been reached among Serbian scientists of various orientations regarding the status of English as the only language of scientific communication in the last several decades.

In this paper, an attempt is made to critically evaluate the above outlined trend, from both inherently linguistic and sociolinguistic perspectives. An open-ended multidisciplinary approach, developed by Bugarski (1996a; 1996b) and adapted for the purposes of this paper, is tested against the data coming from various scientific fields, such as computer science, quality control and quality management, linguistics, engineering, etc. The analysis of the data at hand - international terms most of which have not yet been standardized in Serbian - indicate that a hierarchy of criteria for evaluating the terms, which are to be fully accepted in a given scientific register, should be organized in such a way as to give primacy to the parameter measuring the international value of terms, the shortness parameter and the monosemy parameter. In all the instances analyzed herein the English borrowings are given primacy over translation and structural calques in the linguistic code which could be labeled as "modern scientific variety of Serbian".