Linguistic Taxonomies for Teaching English at a Technical University

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Abstract: Underdeveloped awareness of and skill in using linguistic terminology is viewed as one of the factors that compromises mastering the English language at a technical university. Drawing from an ecological semiotic perspective on a language as a technology of meaning construction, the role of linguistic terminology in foreign language learning becomes obvious. It requires innovative instructional designs that support students' acquisition and mastering of this important group of academic vocabulary. Bilingual classifications of linguistic terms as one of such instruments were introduced as a curricular intervention. An experiment was conducted to evaluate the classifications' efficiency. Its results have revealed that students who systematically worked with the classifications possessed a higher level of knowledge of grammar terminology and metalinguistic skills in comparison with those who did not work with the classifications.

1 INTRODUCTION

At the current stage of technological development the demand for well-educated specialists grows. It contrasts with the situation that most students entering technical universities often lack the basic skills and competences even in their native language. Their knowledge of linguistic terminology, even that of grammar they studied at school, is especially weak. The task of university professors and teachers is to create such conditions for study which could substantially improve their knowledge and facilitate intellectual growth. The role of foreign language (FL) instruction is to contribute to this mission by helping students develop various competences in academic language, especially genre competences (Kolesnikova, 2018), in the target language and the first one alike. To make it happen, different methods and approaches can be applied. One of them is developing academic vocabulary by promoting acquisition of terminology in the area of specialisation, along with linguistic terms. In doing so, it is important to teach linguistic terminology as a system. This approach would help students systematise the fragmentary knowledge they bring from school, come to a deeper understanding of the terms' meaning, and learn how to apply them when

using language. The understanding that this task is a challenge is present in the FL teaching field. University instructors are concerned about how to help their students to acquire grammar terminology in the target language based on the upgrading of often fragmentary knowledge of their native language terminology (De Faria, 2021).

Teaching language as a technology implies the introduction of new instructional materials and algorithms of their use, thus expanding the range of pedagogical technologies in the foreign language classroom. Bilingual linguistic classifications, or taxonomies, can be considered as such innovative means, or know-how tools, that allow for an ongoing practice and systemic acquisition of this group of academic vocabulary.

Acquiring linguistic terminology in the form of classification helps students to better understand each term and complex semantic relationships among them. It also prepares students for understanding the role and workings of terminology in their future area of specialisation, which they are to acquire both in their first language and in English. Thanks to strong skills in Russian and English linguistic terminology, students develop metalinguistic and cognitive skills. Obtaining the former supports their abilities to see the whole/part, to generalise/analyse, deduce, and so on.

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In the FL classroom, the term 'linguistic terminology' is usually understood narrowly as grammar terminology. This treatment leaves behind some important elements of the language system that students need to be aware of and able to work with. Among others, these include word building, systemic relations in lexis, and stylistic features. Linguistic terminology equips students with tools they need to analyse and construct various messages and texts of different genres. This is true not only for language students whose future profession will be connected with the language but also for students of all different specialties, for example for future teachers (Ryabukhina, 2019). Thus, the ability to interpret text based on its form and language is a compulsory academic skill that all university students have to master.

The place of grammar teaching in the foreign language classroom and especially how this has to be done has always been controversial and requires new innovative approaches (Pawlak, 2021). There are different views on the question as to whether the linguistic terminology has to be taught in the English language classroom and how. These views are grounded in more general theories of language, language learning and teaching. Behind this diversity there might be distinguished four main perspectives on what language is. These include structural, cognitive, interactive (communicative) and socio-cultural (semiotic) approaches.

The structural approach dates back to the ideas of a Swiss linguist F. de Saussure. According to his theory, language is a semiotic system consisting of units of different levels (De Saussure, 1959). From this perspective teaching grammar is an inalienable component in a foreign language classroom which has been implemented in such methods of foreign language instruction as grammar-translation and later audio-lingual method (Richards, 2014; Soloncova, 2018).

The second approach to language – the cognitive one – views language mainly as a tool of cognition which facilitates the process of learning by making it more conscious. It emerged in the 1950s based on cognitive psychology studies, in particular, psychology of education. Educational psychology offered a general framework of school learning objectives including the goals of students' cognitive development, namely their knowledge and skills. This framework is known as Bloom's taxonomy, or pyramid (Bloom, 1956). Its hierarchical structure reflects the growing complexity of cognitive processes and learning outcomes that students have to achieve to master the curriculum of any academic discipline. The original taxonomy of learning objectives had the following six levels: (1) knowledge, (2) comprehension, (3) application, (4) analysis, (5) synthesis, and (6) evaluation. Each level implies certain knowledge and skills that can be demonstrated by specific tasks. This theoretic approach was implemented in such instructional methods as 'learning by doing', functional methods, situational and genre–based. The common feature of these methods is that they are focused on fostering 'good habits'. In the foreign language classroom, it means that students are expected to acquire some stable forms of communication in a particular cultural context. This means grammar structures and units are selected, introduced and taught as elements of particular communicative situations. This reduces the focus on teaching grammar and its terminology as a system (Richards, 2014).

The third approach, communicative or interactive, is linked to an American scholar in the field of ethnography of communication, Dell Hymes. In 1966, he introduced the notion of communicative competence as a more comprehensive term than language skills or linguistic competence. His ideas were inspired by a socio-cultural theory of language and learning. According to Hymes, language learning has to be focused on cultural practices of language use (Hymes, 1972). It covers the four language skills (listening, speaking, reading, and writing) and grammar accuracy, but also highlights cultural practices of language use, including text-based communication forms. Despite the fact that the communicative competence approach expanded the scope of instructional goals in the foreign language classroom, its practical implementation narrowed down the number of competences pursued by teachers who had adopted this approach. The main focus had shifted to content and the development of students' mostly oral performance of daily topics, which resulted in weak lexical and grammar skills, leaving alone the mastery of linguistic terminology. This crisis revealed itself in numerous critical research publications on communicative approach and stimulated a search for new approaches to language teaching (Bax, 2003).

A new semiotic perspective on language became a source for new approaches to language teaching. Based on the scholarship of L.S. Vygotsky, M.M. Bakhtin, and the American semiotician C.S. Peirce, socio-cultural theories of language emerged during the 1980s. They were enriched with the notion of design, whereas this term was adopted in communicative linguistics and the theory of language teaching.

In the US, the term 'design' was employed in curricular studies in the 1980s as Bloom's theory (1956) was reapplied for creating school curricula and planning instruction. The terms 'backward design' and 'understanding by design (UbD)' were introduced (Wiggins, 1998 / 2005). The latter term was adopted by educational linguists and researchers of language learning. It sent the message that in communication, it is not just content that is important but also the context including the text itself and its form. These researchers understood the term design as a socially constructed process and product of communication. This view was popularised by the British scholar Günther Kress, credited with creating the theory of social semiotics as a multimodal theory of language (Kress, 2003). The theory asserts that language use always takes place in a rich semiotic context where other sign systems that accompany verbal expressions might support language decoding / encoding or harden it. In terms of grammar teaching the theory points out that grammar is content, genre, and medium dependent. For example, simplified written representation of date expressions differ significantly from their oral form (Oct. 5 is read as 'the fifth of October', or 'October the fifth', or 'October fifth'). So understanding grammar and acquiring grammar terminology is important because certain contexts of communication require full mastery of this competence.

The theory became inspirational for a new approach to language teaching known as multiple literacies, or multiliteracies (Cope, 2018). It supplemented the term 'competence' with the term 'literacy' understood broadly as the ability to use in communication not just linguistic resources but other semiotic means (such as music, gestures, colours, artifacts, etc.) that help to create multimodal texts. Introduced in 1966 by an international group of language education scholars (the New London Group), this approach views language not just as a semiotic system and a design process but also as a particular technology that has a terminology that needs to be mastered (New London Group, 1996). This group had attempted to generalize all the previous approaches to teaching language and introduced the concept 'learning by design' (Neville, 2008). This idea underscores that form is meaning, and that understanding the forms of language involves the explicit teaching of these forms and mastering linguistic terminology is one of the tools for achieving this goal (Kern, 2012; Cope, 2013).

From the point of view of the multimodal semiotic approach, language is a kind of technology for expressing and interpreting meaning via its forms, including texts, which mediate communication and reflect its cultural norms. Besides, the term 'technology' can also refer to the very approach to teaching language and linguistic terminology. Since in the literature devoted to the teaching of grammar and linguistic terms, one can rarely find a detailed description of this technology, this article attempts to fill in this gap. It offers preliminary results of a small experimental study. The study aimed at revealing the level of skills in Russian linguistic terminology and the efficiency of implementation of innovative pedagogical materials. Introducing new pedagogical designs is an urgent necessity in the time of fast informatisation of society (Turlo, 2020) and increased demands for professional training.

2 METHODS AND MATERIALS

Based on the multiliteracies semiotic approach a curricular intervention was designed and implemented in the form of four classifications, or taxonomies, of linguistic terms.

The purpose of the intervention was to facilitate the development of several academic competences. These skills include (1) metalinguistic – the ability to discuss language as a system and technology, (2) metacognitive – the ability to analyse concepts, (3) academic genres skills – understanding different texts structures, (4) academic vocabulary – general and field specific terminology and word formation, (5) oral and written bilingual skills, (6) information search, and, finally (7) language analysis and synthesis skills.

This scope of literacies is supported by the taxonomies' one-page design. As Figure 1 shows, each text opens up with a line to enter student's information. The heading, title and subtitle are followed by terms organised in numbered lines. The page provides instructions as to how to turn it into a bilingual learning tool. The English terms are followed by gaps left for Russian equivalents that students are to fill in step by step.

The gaps' small size allows for the Russian equivalents to be inserted in commonly known abbreviated forms. At the end of each taxonomy, one to three questions are provided to be translated and answered. Their goal is to draw students' attention to some important terms for the given classification, e.g. the term 'conversion' in morphology. To encourage students to explore some terms in more detail, links to online sources are given at the very bottom of the page, as Figure 2 shows.

This format allows the teacher to introduce, and

Figure 1: Taxonomy 1, the upper part.

Figure 2: Taxonomy 1, the lower part.

the student to practice and acquire linguistic terms as a system and thus come to see language as a whole. At the same time, it reveals various semantic and formal relations between the terms, which leads to a deeper understanding of their meanings. These include synonymy, antonymy, homonymy, paronymy and word building links. This way, taxonomies make it possible for students to apply the methods of analysis, synthesis, observation, and discovery.

Other methods were also used. The first one is the so-called flipped classroom method. It means that students gradually get familiar with the new material on their own first at home (read English terms and write down their Russian equivalents in abbreviated form), and then their work is checked, discussed and commented on during a frontal survey in the classroom. When working at home, students have to use the search method to fill in the lines of the classification with the corresponding Russian terms (usually they are asked to prepare 2-3 lines for the lesson). In parallel, the norms of the abbreviated notation of academic terminology are acquired.

The next methods are visual and systematic methods of presenting material. It should be noted that although the names of the parts of speech used in both Russian and English should already be familiar to students from school, however, introducing grammar terminology in a systematic and visual form is new for students and allows them to see, feel and discuss various systemic relations between linguistic terms and their concepts.

Students prepare 2-3 lines of translation at home, and in class all terms and examples are read aloud and discussed in order to correct translation errors and practice pronunciation. This way, step by step students create individual learning materials they use during at least one semester of learning English. First, they create a draft version, and after in class discussion and error correction, students create an error-free and edited version of taxonomy, and use it in subsequent lessons as a reference tool as they analyse and construct sentences and texts.

And, finally, the method of individual survey is used to stimulate the mastery of this important group

of academic vocabulary as well as the ability to apply it. This survey is conducted as a control task, when students submit their final versions of classifications for verification and evaluation.

3 EXPERIMENTS

A preliminary test was carried out to determine the degree of formation of competence in Russian linguistic terminology among students of the technical university. Another goal of conducting this experiment was to reveal if taxonomies can improve students' knowledge and the understanding of this academic vocabulary. The test was designed to find out what linguistic terms the students are aware of and had mastered. The experiment tested the knowledge and skills in the following areas: (1) parts of speech – noun, adjective, numeral, adverb, pronoun, verb, preposition, and conjunction, (2) some grammar forms – plural number, degrees of comparison, tense/aspect, participle/gerund, (3) students' ability to identify these structures and name them correctly.

The participants of the experiment were students of a technical university. The testing involved two groups: (1) an experiment group of students who had worked with the classifications for one full semester, and (2) a control group of students who had not worked with the taxonomies. The total of 120 undergraduate students in their first or second year of study took the test. They were split evenly between the experiment/treatment and control groups, each consisting of 60 participants.

Different test items required one, two or three answers, so the maximum total number of correct responses for different items was 60, 120, or 180 points, as shown in brackets in tables 1 and 2.

4 RESULTS AND DISCUSSION

Table 1 presents data reflecting students' knowledge of the parts of speech and their ability to identify and correctly name these classes of words.

The results of the experiment showed that all the students, regardless of whether they had worked with the classifications, were able to recognize and identify in the context of a short poem such an important part of speech as *the verb*. Perhaps this is due to the pronounced predicative nature of the Russian language and its rich verb morphology.

However, not everyone was able to recognize a *noun* when it was used not in the nominative singular

form, but in its object case (e.g., 'без пут' – without fetters), or when a noun-based adverb was interpreted as a noun (e.g., 'поутру' – in the morning). A deeper problem is that the morphological term 'part of speech' is often confused with the syntactic term that refers to the syntactic position of the word under consideration. For example, in the phrase 'on the bank' – на берегу – instead of identifying 'bank' as a noun, students use the Russian term for 'adverbial modifier'. The same confusion is observed when the Russian term for 'adjective' is replaced by the syntactic term for 'attribute' or 'modifier', and instead of the morphological term 'adverb' the Russian term for 'adverbial modifier' is used.

Table 1: Parts of speech knowledge.

Parts of speech	Croup 1 correct answers	Group 2 correct answers
Verb	120 (of 120)	120 (of 120)
Noun	115 (of 120)	110 (of 120)
Adjective	60 (of 60)	57 (of 60)
Adverb	51 (of 60)	48 (of 60)
Numeral	57 (of 60)	57 (of 60)
Pronoun	60 (of 60)	56 (of 60)
Conjunction	47 (of 60)	46 (of 60)
Preposition	101 (of 120)	99 (of 120)

The greatest confusion in both groups was observed when students had to identify function parts of speech. Thus, the Russian adversative conjunction 'a' meaning 'but' was referred to as preposition, particle or even interjection. A similar confusion of terms occurred with identifying the preposition 'без' meaning 'without'.

Table 2 presents the test results that reflect students' understanding of grammar forms of different parts of speech.

Table 2: Grammatical forms knowledge.

Grammar form	Croup 1 correct answers	Group 2 correct answers
Plural noun	25 (of 60)	29 (of 60)
Verbal	77 (of 120)	23 (of 120)
Verb aspect	38 (of 60)	20 (of 60)
Verb tense	175 (of 180)	163 (of 180)
Comparison degree	131 (of 180)	95 (of 180)

As it can be seen from the table, the majority of students had difficulty identifying the *plural number* form of the noun used in the phrase 'без пут' (without fetters) within a short verse. Some participants gave no answer at all, others failed to understand the term 'the number meaning' in the test assignment. Instead

of the right answer 'the plural meaning' some students suggested the opposite answer (i.e., singular), while others, instead of using a grammar term for the number form, tried to figure out the lexical meaning of the noun 'путы' (fetters).

One of the tasks on verb forms tested the ability to distinguish between the two *verbals* or non-finite forms (gerund and participle). The numerical results of the task in the two groups differed significantly. In the treatment group, the total result of the task (77 of 120, or 70.4%) was more than twice higher than that in the control group (23 of 120, or 27.3%).

The conducted test experiment revealed that both groups demonstrated slightly better outcomes on tasks requiring students to identify such verb forms as *aspect* and *tense*. It is worth noting that identifying aspect forms turned out to be more challenging a task compared to tense forms, which by large did not pose a serious problem. However, in some cases of naming the forms, the participants demonstrated inaccurate knowledge of the conventional terminology. For example, in the Russian term 'прошедшее время' (i.e. *past tense*), they sometimes mistakenly substituted the adjective 'прошедшее' with a paronymous word 'прошлое'. The confusion between these cognate adjectives might in part be accounted for the fact that they both correspond to the English adjective 'past', which does not distinguish between the slightly different meanings of the two Russian words.

More often problems were observed when students were asked to identify *degree of comparison* forms in adjectives. As a rule, the term 'zero degree' was not familiar to students who had not worked with the classifications. As a rule, the intended grammar term was not usually provided by the participants, or alternatively, some expressions (semantically close to the expected term) were offered instead. Those can be translated as 'ordinary, basic, simple'.

In discussing the observed outcomes regarding students' knowledge of terms for the parts of speech (Table 1), it is necessary to point out that the participants in both groups were able to identify correctly most of the content parts of speech. They generally performed the related tasks with fewer mistakes than when dealing with other items on the test. However, the knowledge of function words and their names was much weaker in both groups. Accordingly, in further work with classifications, more attention should be paid to students' acquisition of the function words and close observations on how these expressions are used in the two languages.

In discussing the results presented in Table 2, it should be pointed out that a surprising failure at identifying 'the plural form' was observed in both groups. The low outcome can be explained in part by the fact that the participants came from different faculties, and the average level of academic skills may differ across faculties. Another factor for the low result could be the fact that the form 'пут' introduced by the prepositional phrase 'без пут' (without fetters), belongs to a low-frequency vocabulary in Russian language of today, and that circumstance might have caused difficulty with understanding.

The ability or inability to distinguish verb forms differ significantly in the two groups. Students from the control group (group 2) who did not work with the classifications do not usually possess the targeted knowledge and skills. This seems to provide evidence that the acquisition of linguistic terminology through work with bilingual classifications significantly increases students' metalinguistic skills, including their native language. Attention, however, should be paid to the very concept of 'grammatical form', which is complex and caused difficulty for some students.

The complex category of the verb aspect turned out to a problematic issue for both groups. Nevertheless, the results demonstrated by the treatment group (38 of 60) were 33.3 % higher than those produced in the control group (38 of 20), which also speaks in favour of the presented approach.

The category of grammar tense turned out to be sufficiently mastered by all students and did not cause difficulties for students identifying all three tense forms. All the errors observed here were related to naming the past tense form by using a paronymous expression.

Knowledge of the terms for degrees of comparison differed significantly in the two groups. In the first group, all degrees were named, but there were errors in naming the zero degree form. In the second group, students either did not use the degree terms at all, or applied them incorrectly, or provided non-term expressions. This difference in performance also testifies to the effectiveness of terms taxonomies as a tool for spurring academic literacies.

5 CONCLUSIONS

As the study has revealed, students who are doing their studies at technical universities usually lack strong knowledge of Russian linguistic terminology. This hardens their learning of English as an FL, including mastering academic skills in its grammar terminology and other linguistic terms. Therefore, the use of bilingual classifications of linguistic terms in the process of teaching English as a technology of

meaning construction and sharing could promote students' metalinguistic skills and language proficiency not only in English, but also in Russian.

At the next stage of the reported intervention study, it will be necessary to analyse the results of students' performance of the second section of the reported experiment test. Designed to reveal students' awareness of and skills in using Russian syntactic terminology, the second part elicits and evaluates students' skills at applying this particular area of academic vocabulary.

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