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Teaching Foreign Language Communication through Scientific Texts

Alsu N. Makhmutova [1]

Abstract

Nowadays foreign language communication of novice scientists is limited to speaking. However, scientific communication features duality: it is both face-to-face conversation involving various forms of scientific speech and "dialogue of texts" involving ongoing exchange of information through scientific publications. Literature review shows that science-reading skills advance with skills of scientific intercourse, i.e. comprehension of foreign language message must serve as stimuli for activation of background knowledge.

The paper presents functional classification of scientific texts that can be used for foreign language teaching. This classification is based on text functions, which are highlighted from the reader's point of view and mode of scientific discussion the reader has with the author. The article further discusses the ways the given classification can help foreign language teachers select and activate language material for reinforcing students' linguistic and scientific communication proficiencies.

Nowadays communicative foreign language teaching (FLT) has already become top principle in linguistic methodology. However, there are some questions expecting special attention from researchers. Dependency of teaching foreign language (FL) communication on conversational specifics of each sphere of speech is one of them. Although it is unarguable that FLT for adults should be function, purpose and profession-oriented. Indeed, if someone wants to attain success in some field of human activity, they primarily need acquire the variety of the language used for communication in the field [1]. Thus, nearly all spheres of communication can be subjects of scientific research as well as research-backed teaching.

Communicative FLT of novice scientists must focus on specifics of communication mechanism peculiar to academic community. Scientists "construct knowledge as members of particular disciplinary communities" [2]. Linguistic characteristics of this mechanism have been given considerable exploration in genre analysis. Yet they are not widely applied in FLT. And it is hardly surprising that communicative FL for science purposes highlights only oral skills and face-to-face talks. In the meantime, as previous research shows scientific communication today features duality: it encompasses various formats of verbal communication and interchange of texts – ongoing exchange of information through publications. This constitutes an indivisible chain of communication acts, complementing verbal and written communications.

Research papers have many features of the dialogue: a journal article is usually written "in response" to what has been stated earlier and in anticipation of a feedback from colleagues. Moreover, scientists often read with some bias, willing to accept/ reject new suggestions, agree/ disagree with conception, use/ verify others' data. Such convergence of writing and oral communication leads to functional and stylistic similarity, spotlighting reading for communicative language teaching. Indeed, scientific texts reflect conversational practices common in today's science collaboration and FL learners of scientific communication need to master them.

To make scientific communication construct a basis for teaching we must specify the learners' role in communication and communicative tasks they need to perform. In present-day Russia, fundamental education for science is granted in Master's degree programs. Training at this level is rightfully considered graduate and profession-oriented. Being based on bachelor's programs, it, to some extent, flows organically from them. For example, "Foreign Language Course Syllabus" for Master of Physics Degree Programme in Kazan Federal University (Russian Federation) states "enhancement and further consolidation of professional knowledge, skills and competencies at the undergraduate level" as one of the course objectives [3].

However, along with consistency of knowledge and competencies these two stages feature fundamental differences. Education at the bachelor's level is mainly informative, since undergraduate programs provide progressive accumulation of information in each discipline. Book is primarily a main

[1] Kazan Federal University, Russian Federation

source of theoretical knowledge, which must be received, inherited, etc. In a similar vein, the teacher can be a living counterpart of the book. Learning mainly focuses on reading and listening for information and acquiring knowledge. Hence, in FLT, reading is not only a basic and key skill, but, in some ways, it is also a model one. Profession-related communication in bachelor's FL courses mainly involves receiving /inquiring and reporting/presenting information.

At master's level, cognitive activity loses informative value. For students preparing thesis information retrieval is not an end but a means of solving standalone scientific problems. From now on, research problems and academic pursuits determine sifting and gaining information from publications.

One of the key tasks for novice scientists is elaboration of research methodology. And master students turn to thesis tutors for advice, endorsement and critical reviews. In some ways, practising scientists can help apprentice researchers get their ways in science, elaborate methodology, and engage with collaborative teams. Thus, graduate education induces special cognitive activities as well as interactions within particular disciplinary communities. These interactions are two-faceted including direct discussions and scientific publications. Therefore, reading is still a key cognitive activity but goals and nature of reading is fundamentally different.

Reading of books are sidelined; top priority is given to journals, preprints, conference proceedings – sources of the newest information on current issues of disciplines. With that, methods, unsolved problems attract the reader more than final solutions and answers, mistakes in solutions and weak points of others' conceptions receive as much consideration as unquestionable evidence and strong arguments, etc. Novice scientists rather read texts for new knowledge, not for the one obtained by others.

According to Sildmae, two pieces of knowledge constitute a new one; one being added to the other leading to inference [4]. When solving problems, scientists read others' publications to find that very "other piece" for making right inferences. And getting down to reading, scientists know what to expect from it, what ideas they want to find out, clarify or verify in the paper. These ideas contribute to the "dialogue with the text", casting away older views and generating new ones.

This cognitive dialogism also features social dimension: in creative work, inner dialogue is nothing but internalization of real communication, since society in any human thinking or doing [5]. Thus, reading science makes inner dialogue progress like a real one. Consequently, science-reading skills advance with skills of scientific intercourse, i.e. comprehension of FL message should serve as stimuli for activation of background knowledge; the model for this intercourse is communication between carriers of "the older knowledge" in the making of new one.

This approach arises from substantial analysis of science communication and requires influential changes in FLT at master's degree level. In reading these changes centre around selecting, using and presenting scientific texts. Indirect discussion in science is genre-specific; therefore, text selection should be genre-based. Moreover, language learners must know limitations of each genre in publications ranking, which must be identified for countries, disciplines and even journals.

Genre and style norms direct interaction between the author and the reader. However, a virtual reader might not coincide with the real. As readers are active in intake of speech, thus, received message is not equal to author's sign decoding and does not rely only on these signs [6]. Therefore, the teacher is bound to appreciate the learners' activity in knowledge gain and be so much concerned not about language the author uses to convey meaning but purposes making the reader turn to text and language items needed for this. That is to say, learning texts are to be classified by reader-focused functions and dialogue formats the reader has with the author. This approach consolidates speaking and aids use of scaffolding strategies for teaching reading.

The easiest type of texts is an informative text, which offers meaningful data or ready-reference facts. As a rule, from this kind of texts readers expect only answers to specific questions. A similar knowledge updating occurs in the process of dialogical exchange.

Much greater challenge presents conceptual texts. The reader looks forward to explanations, solutions, understanding of causes and relationships, etc. Understanding requires not only to reconstruct logical operations, but also match them with own ideas, analyse the author's evidence, make amendments into argumentation, etc. In other words, the FL reader has to engage with the author in a problem dialogue often hampered by language barriers. Given that the author is 'unreciprocated', in case of contradiction, readers, lacking comprehension, are especially inclined to read their own thoughts into author's words. In these circumstances, reading loses its cognitive value. Therefore, reading conceptual texts assumes development of skills similar to those you need to produce such a text and carry on a problem dialogue.

Finally, the most intricate text type is the one, which contains critical evaluation. In this case, the reader must figure out not only the meaning, but also author's attitude. This component can appear both in author's explication of his own views and in others' concepts. In both cases, readers do not just accept the author's judgements but also weigh them up, agree or disagree with them. Therefore, reading an evaluative text is controversial by nature. It is particularly important to catch all nuances of author's stance, expressed by linguistic means. Proficiency in virtual scientific argument should be reinforced by skills in truly reciprocal debates. Simultaneously, polemical reading prepares to practicing such key skills as abstracting, referencing and reviewing.

These three types of scientific texts meet a number of genre varieties. For example, informative texts comprise compendiums and reference books, chapters of coursebooks and multi-discipline monographs. Similar functions have topical publications in periodicals, when reporting experiments without thorough theoretical interpretation. Conceptual texts constitute a significant part of problematic essays. Evaluative texts are widely represented in reviews and discussion papers.

This classification provides a framework for scaffolding grammar teaching. Complication of syntax matches sophistication of information and communicative functions. With this end in view, for each text type the most representative functional utterances should be identified. For example, informative texts abound in definitions, characterization, description of the process, phenomenon, event, whereas conceptual texts contain different types of inferences, etc. As a rule, each functional utterance features regular grammar pattern. It is them students have to acquire first to be well-versed in any text types. This grammar-comprehension interdependency allows sidestepping rote revising of undergraduate programs as well as advances grammar and boosts students' motivation.

Likewise, this approach welcomes innovative linguistic research in FLT. The idea of active grammar is not novel for FLT methodology. Already Shcherba argued about grammar, which proceeds "from semantics irrespectively of language features" and brought up "means of expressing a thought" [7]. Contemporary Functional Linguistics promotes this paradigm through categorization bringing together heterogeneous linguistic resources. Additionally, meaning representation analysis helps reveal sophisticated means 'hidden' inside intricate language relations. The last point is particularly important as complex logical and semantic relations become explicit through implicit, mingled, non-categorical means at microtext level including multiple super phrases. Therefore, mastery of scientific text grammar involves learning super-phrase and inter-sentence links.

Frequent exposition to a grammar structure in specific context, make learners recognize as well as anticipate it detecting situations and words around it. Such progressive acquisition raises students' awareness of grammar and functions of utterances and contributes to correct interpretation. What generally happens is that we teach reading and learners gradually acquire conscious attention to language features of scientific texts and gain an objective tool for evaluating their insights. As a result, skills acquired in the classroom not only advance cognitive processing, but also enhance reading proficiency and, accordingly, standards of scholarly communication.

Thus, there is every reason to believe communicative teaching of reading is one of the developmental teaching methods that increases interest in the educational material, makes information more meaningful and helps students internalize creative scientific thinking. Use of such methods is an essential part in postgraduate education.

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