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Rhetorical structure of research paper introductions
in computer science: a comparative analysis

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Abstract. Research paper introductions are considered challenging, especially for academic writers whose native language is different from English. Despite the large interest in the rhetorical organization of research papers across various disciplines and cultures, little is known about the structural patterns used by Russian authors in English-language research paper introductions in Computer Science as one of the fastest growing scientific fields. To fill the gap, this paper investigates the ways Russian academic writers organize their introductions as compared to the norms of the international scientific community where English is the acknowledged lingua franca. The purpose of this study is to identify discrepancies between the approaches to structuring computer science introductions generated in the English language by Russian and Anglophone authors. Drawing evidence from 43 research papers published in highly ranked Russian and Anglophone journals in Computer Science, it addresses the main features specific to research paper introductions in this field and analyzes how rhetorical moves are realized linguistically by both native and non-native academic writers based on the create-a-research-space (CARS) model. The results of the qualitative study show that Russian authors make use of fewer strategies than native English writers; moreover, the former tend to avoid the ‘establishing a niche’ move, which is considered obligatory in the structure of a research paper introduction. The paper adds to the exploration of cross-cultural variations in academic writing.

Keywords: Research paper; Rhetorical structure; Introduction section; Create a Research Space (CARS) model; Academic writing

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**Риторическая структура введений к исследовательским
статьям по компьютерным наукам: сравнительный анализ**

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Аннотация. Введение к исследовательской статье считается сложной задачей, особенно для авторов-исследователей, для кого английский язык не является родным. Несмотря на большой интерес к риторической организации исследовательских работ, написанных на английском языке, в различных дисциплинах и культурах, на данный момент малоизученными остаются стратегии, используемые русскоязычными авторами для структурной организации введений к исследовательским статьям на английском языке в быстро развивающейся области компьютерных наук. В данной работе изучаются способы организации введений к исследовательским статьям, применяемым русскоязычными авторами, по сравнению с нормами международного научного сообщества, где английский язык является признанным лингва-франка. Целью данного исследования является выявление расхождений между подходами к структурированию введений к статьям по компьютерным наукам, написанным на английском языке русскоязычными и англоязычными авторами. Опираясь на данные 43 исследовательских статей, опубликованных в высокорейтинговых российских и англоязычных журналах по компьютерным наукам, в данном исследовании рассматриваются основные особенности, характерные для вводного раздела статьи в этой научной области, а также анализируются способы языковой реализации риторических ходов модели создания исследовательского пространства в текстах как российских, так и англоязычных авторов. Как показывают результаты исследования, русскоязычные авторы используют меньше стратегий, чем авторы-носители английского языка. Более того, они избегают коммуникативного хода "установления ниши", который считается обязательным в структуре введения к научной статье. Значимость данного исследования заключается в расширении знаний о межкультурных различиях в области академического письма.

Ключевые слова: Исследовательская статья; Риторическая структура; Введение к исследовательской статье; Модель создания исследовательского пространства; Академическое письмо

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Introduction

English is widely recognized as a medium for international communication in modern science. In recent works, scholars have given different names to English as a global language of science: English as an International Language of Science (EILS), International Scientific English (ISE), English as a Lingua Franca (ELF), English for Specific Purposes (ESP), English for Academic Purposes (EAP) (Meyerhöffer and Dreesmann, 2019; Pakir, 2009; Tardy, 2004). Despite the differences in terminology, it is generally agreed that English acts as a mediator of international scientific communication, ensuring access to a vast array of scientific literature and events. English is used at the main international scientific events, and most of materials of international conferences as well as research papers in international scientific journals are published in English. The findings of investigations published in English enable the global promotion of the scientific achievements in the international scientific community and allow for constructive communication with researchers representing other countries and cultures. On the other hand, scholars' attention has been increasingly focused on the ever-growing pressure on non-English authors in terms of their need to globally distribute their scientific results by means of the English language (Lorés-Sanz, 2016).

Research paper introductions are generally known as challenging and troublesome for novice non-English writers (Ecartot et al., 2015; Perez et al., 2020). The introduction section is especially perceived to have a significant impact on the first impression of a manuscript and thus has gained a lot of attention (Bajwa et al., 2020). Ebrahimi and Weisi describe the introduction section as a 'showcase that could motivate the reader to read the rest of the paper' (Ebrahimi and Weisi, 2019: 53). According to editors and reviewers, a well written research paper introduction can stir interest and increase the possibility of having a positive attitude when reading the rest of the manuscript (Grant and Pollock, 2011). Moreover, the introduction section in

the research paper permits the authors to convince the reader(s) of the scientific contribution of the research by announcing 'the goals, current capacities, problems, and criteria of evaluation' deriving from particular scientific disciplines and operating within them (Zapfen, 1983: 130).

In this regard, to have their papers accepted and then published in international journals, authors should work on the features that would make their manuscripts readable. Readability, or comprehensibility, is one of the main properties of a research paper introduction in English. It is achieved by using not only linguistic means like vocabulary or grammar, but also such metalinguistic means as focus and rhetorical structure. The knowledge of the rhetorical moves in the arrangement of research paper introductions is of great importance for non-native academic writers, because following a certain rhetorical structure adopted in the international scientific community helps them to keep the focus of the paper and create a text that is clear and understandable. To follow a certain rhetorical structure means to strictly adhere to the moves and steps of the conventional model.

The present paper is based on the model generally accepted for writing the introduction section of research articles in various scientific fields. It investigates how this model is linguistically realized by authors belonging to different linguistic and cultural backgrounds, to be more exact, Russian and Anglophone academic writers. It describes differences between the ways Russian and Anglophone authors organize research paper introductions in the field of computer science. Computer science has been chosen as the subject area of this research, as despite being one of the fastest growing scientific fields today, it has not received due attention in regards to specific characteristics of non-native academic writing and structuring research paper introductions. The findings of this study enable a clearer comprehension of the patterns of arranging the introduction section used by non-native Russian authors in contrast to conventional patterns shared by the international scientific

community, and thus can be useful both for teachers of academic writing at the university and for novice research writers.

Genre-based analysis of a research paper

In linguistics, the notion of genre assumes the way how a particular language is used and recognized in a community (Hyland, 2015). According to Swales and Najjar (1987), this notion refers to a particular type of a text, which complies with the needs of the rhetorical situations and develops over time responding to the recurring rhetorical needs of the researchers (compare with Devitt's (2004) reference to genre as being dynamic). The genre of the research paper is defined by Swales (1990) as a text written for disseminating the results of a scientific investigation, which must be published in a research or specialized journal. As regards the structure of an academic paper, the most widely recognized configuration is the one described by Swales (1990), which is known as IMR(a)D standing for the introduction, methodology, results and discussion sections. As his further work shows, the IMR(a)D configuration is subject to variations, depending on the peculiarities of the areas of knowledge producing the genre and the rules of disciplinary cultures (Swales, 2004). Hyland (2000) maintains that disciplines are defined through their writing, in other words the way in which the members of these disciplines write may determine considerable differences between them. In this way, writing a research paper results from the diverse social practices of authors within their disciplinary cultures.

In academic writing, genre is viewed as a set of organized communicative acts in the communicative repertoire of the members of a disciplinary culture permitting them to achieve certain academic goals (Swales, 1990). Such communicative acts are called moves, the main function of which is to transmit the author's intention in a written text (Swales, 2004). Moves are realized through steps that are smaller communicative units. All moves have specific communicative functions that are realized by means of specif-

ic linguistic characteristics (Swales, 1990). Numerous analyses have been performed of the rhetorical structures including communicative moves and steps on the materials of particular sections of a research paper, namely, the abstract (Amnuai, 2019; Behnam and Zamanian, 2015), introduction (Bajwa et al., 2020; Msuya, 2020), methodology (Cotos et al., 2017), results and discussion (Bruce, 2009; Puebla, 2008; Tikhonova et al., 2023), and conclusion (Zamani and Ebadi, 2016). Of particular interest in relation to the current study in the investigation by Tikhonova et al. (2023) that deals with the rhetorical arrangement of discussions in medical research articles written by Russian authors in the English language for international and Russian journals indexed in international databases. In their study the scholars demonstrate that, although native English writers seem to be less committed to the traditionally established rhetorical structure of the section, Russian authors prove to be more careful about it when they aim to publish in international journals.

Rhetorical organization of research paper introductions

In general, research paper introductions follow a particular organizational pattern, which is universally known as the create-a-research-space (CARS) model (Swales, 1981). Since 1981, this model has been through several revisions (Swales, 1990, 2004), and in this study the most recent version of 2012 (Swales and Feak, 2012) is considered. The model comprises three moves: (1) establishing an investigation territory; (2) establishing an investigation niche; (3) occupying the niche. The basic moves include several steps, three of which are obligatory (literature review in Move 1, indication of a gap in the literature in Move 2, and articulation of the purpose or nature of the research in Move 3), and the rest of which are optional depending on the scientific field. Of greatest interest is Move 2 in the model – establishing a niche. In the earlier versions of his model, Swales mentioned various steps completed by academic writers to establish a niche: either through making counter-claims,

indicating a gap in current research, raising a question (questions), or continuing a tradition (Swales, 1990); or through the indication of a gap, addition to existing knowledge, or presentation of a positive justification (Swales, 2004). In his latest version, the number of steps within the second move was kept to only two, which assumed the previously identified steps: a niche can be established by the indication of a gap in previous investigations or the extension of previous knowledge (Swales and Feak, 2012). In any of these versions, the steps in the second move are mutually exclusive. In other words, the choice of a particular step cancels the remaining ones.

Following the CARS model, numerous studies have dealt with the rhetorical organization of research paper introductions across various disciplines: engineering, natural and medical sciences (Safnil, 2013), civil engineering (Manzoor et al., 2020), chemistry (Afshar et al., 2018), biology (Samraj, 2005), applied linguistics (Farnia and Barati, 2017), ESL/EFL education (Shim, 2005), business management (Alsharif, 2022). Variations in the arrangement of research paper introductions have also been extensively studied across languages: Spanish (Sheldon, 2011), Portuguese (Hirano, 2009), Indian (Bajwa et al., 2020), Chinese (Loi, 2010), Korean (Shim, 2005), Indonesian (Safnil, 2013), Thai (Amnuai, 2021), Arabic (Alharbi, 2016), Persian (Rahimi and Farnia, 2017), Turkish (Kafes, 2018). Some cultural differences in academic research writing have been identified. Thus, Korean authors tend to avoid situating their studies within a research context aiming to meet urgent local needs (Shim, 2005); Brazilian Portuguese writers do not make explicit gap statements and thus ‘favor solidarity, avoiding conflict with the local discourse community’ (Hirano, 2009: 246); Iranian authors tend to list research questions or hypotheses more often than native English writers and announce the main findings less frequently than their native counterparts (Farnia and Barati, 2017).

Recent studies of Russian academic discourse mostly deal with challenges Russian

authors face in research writing. For instance, it is emphasized that the lack of a balanced syllabus and adequate teaching techniques determines poor learning background in academic writing skills, including the arrangement of the text (Bolsunovskaya and Rymanova, 2020) or lack in a substantial and systematic treatment of grammar (Fedorova, 2021). Russian-language research articles in social sciences are analysed in terms of their conformity with the IMRaD format (Zashikhina and Pechinkina, 2022). However, despite the growing interest in the overall rhetorical arrangement of research papers written for international publication across various cultures and disciplines, little attention has been given to the rhetorical organization patterns used by Russian researchers in the introduction section of English-language scientific papers. Thus, the overall goal of the current study is to explore the textual organization of English-language research paper introductions in Computer Science, which were produced by Russian and Anglophone academic writers aiming to publish in national and international journals. The study focuses on the main features specific to research paper introductions in Computer Science and reveals the strategies employed by both native and non-native (Russian) authors in research paper introductions in top-tier Russian and Anglophone journals in this field.

Materials and method

The present study has a qualitative comparative research design. The data for the study were drawn from 8 top-tier journals in Computer Science published in Russia and the United States in 2020. The journals were selected using the ranking system on scimagojr.com, which allowed categorizing the journals in terms of their location (country) and subject (area). In total, 2698 journals published in the USA and 32 journals published in Russia come under the category ‘Computer Science’. To examine the current organization of research paper introductions that were easy to download, only open-access journals published in 2020 were selected. Preference was given to top-rated journals with quartiles 1

and 2 (Q1-Q2). As there were no Q1 journals located in Russia that referred to the category

‘Computer Science’, Q3 journals were also considered.

Table 1. List of journals selected for the present study

Таблица 1. Список журналов, выбранных для данного исследования

Location	Journal	Quartile	Number of samples
the Russian Federation	Computer Optics	Q2	6
	Computer Research and Modeling	Q3	2
	Cybernetics and Physics	Q3	7
	Supercomputing Frontiers and Innovations	Q3	5
the United States of America	Journal of Artificial Intelligence Research	Q1	9
	Journal of Cloud Computing	Q2	2
	Journal of Machine Learning Research	Q1	7
	Theory of Computing	Q2	2

The open-access Russian and Anglophone journals selected for the study are listed in Table 1. From these journals, papers written in the English language were selected using purposive sampling taking into account such criteria as the publisher’s location (the Russian Federation or the United States) and the authors’ linguistic and cultural background. To determine the linguistic and cultural background of the authors, I explored their affiliations, background and education provided on their personal websites or the websites of the universities they affiliate themselves with. Such analysis enabled dividing the selected papers into two main corpora: (1) the native corpus represented by native speakers of English and affiliated with American, Australian, British and Canadian universities, whose papers were published in Anglophone journals indexed in Scopus (Q1-Q2); and (2) the non-native corpus represented by Russian speakers of English and affiliated with Russian universities, whose papers were published in Russian journals indexed in Scopus (Q2-Q3). The native corpus comprised 20 samples of introductions in research papers in Computer Science written by native English speakers mainly from the UK, the USA and Canada, and published in Anglophone journals. The non-native corpus contained 20 samples of research paper introductions written by non-native (Russian) authors and published in Russian journals in Computer

Science. Interestingly, Q3 open-access journals published in the USA in 2020 did not contain papers written by native English speakers.

Among the papers randomly selected from 8 open-access top-tier journals, there were 3 papers that did not fit the main corpora. One of them was written by Russian authors and was published in an American journal, while two other papers were written by native English speaking authors and were published in a Russian journal. These papers were treated separately for the purpose of comparison with the two main corpora.

Swales’ CARS model was used to explore the rhetorical structure of research paper introductions. The units of analysis were individual sentences; the classifications into moves and steps were based on linguistic features that indicate the use of a particular move or step as suggested by Swales (1981, 1990). For example, concerning grammatical signals, gaps in the literature on the topic were frequently indicated through negation (‘have not been carefully analyzed’; ‘that do not satisfy the formula’; ‘have not widely reported’; ‘no studies to date have directly reported’; ‘was not known’; ‘were not observed’; ‘have not been as successful in’), while descriptively or purposively announcing the current investigation was most commonly made by using personal pronouns (‘we focus on’; ‘we seek to address’; ‘we explore’; ‘we aim to study’).

Lexical signals were often quite straightforward, for example when claiming centrality ('has played a prominent role'; 'have been the focal point of significant research interest'; 'is of central importance'), announcing the main findings ('The main results are summarized as follows'; 'Our experiments show that'), or articulating the structure of the article ('The rest of the paper is laid out as follows'; 'The paper has the following structure'). The ways the moves and steps occurred in research paper introductions in the category 'Computer Science' were analyzed to identify the overall pattern in the field under consideration and check if the moves/steps follow the CARS model. Finally, the moves and steps in research paper introductions written in English by non-native (Russian) authors were compared to those generated by native writers.

Results

Table 2. Frequency of moves in introductions across the native and non-native corpora

Таблица 2. Частотность использования коммуникативных шагов в русскоязычном и англоязычном корпусах

Moves	Steps	NC*	NNC
Move 1	Establishing a research territory Step 1: Claiming importance, centrality, relevance	19 (95%)	14 (70%)
	Step 2: Reviewing previous literature in the area	20 (100%)	15 (75%)
Move 2	Establishing a niche Articulating a gap in the previous investigation or extending previous knowledge	20 (100%)	10 (50%)
Move 3	Occupying the niche Step 1: Articulating the purpose of the investigation	20 (100%)	19 (95%)
	Step 2: Listing research questions or hypotheses	0 (0%)	0 (0%)
	Step 3: Outlining principal findings	19 (95%)	7 (35%)
	Step 4: Describing the value of the investigation	14 (70%)	2 (10%)
	Step 5: Indicating the organization of the research paper	13 (65%)	5 (25%)
Total number of instances		125	72

*Notes: NC - native corpus; NNC - non-native corpus.

As illustrated in Table 2, almost all the papers in the native corpus follow the move-step arrangement of the CARS model (except the abovementioned second step in Move 3), with the maximum (100%) use of the obligatory steps, namely: Move 1 Step 2 (reviewing previous literature in the field), Move 2 (establishing a niche through the indication of a

The findings of the qualitative analysis show that research paper introductions generally follow the move-step structure of Swales' CARS model (Swales, 2012) with the exception of Step 2 in Move 3: none of the 43 papers selected for the study contained a list of research questions or hypotheses, which seems to be a specific feature of the rhetoric in Computer Science as a whole. Yet, the comparative analysis of how the moves and steps of the CARS model are linguistically realized in research paper introductions generated by Russian and Anglophone academic writers suggests that there are some cultural differences between the native and non-native corpora. The number of moves and steps in research article introductions within the native and non-native corpora is illustrated in Table 2.

gap in the previous literature or extension of previous knowledge), and Move 3 Step 2 (stating the purpose or nature of the investigation). Yet, the papers in the non-native (Russian) corpus tend to be less diverse regarding the strategies employed by the authors. Out of 20 papers written in English by Russian authors and published in Russian Q2-Q3 jour-

nals, only two papers (10%) articulate the value of the research, five (25%) briefly describe the structure of the paper, and seven (35%) announce the principal results in the introduction. Furthermore, not all the papers in the non-native corpus follow the obligatory steps in the CARS model: one non-native paper does not articulate the purpose or the subject; literature review on the topic is provided in 75% of non-native papers; a niche is established only in half (50%) of the papers written by Russian authors.

Even more important in this respect is to focus on the choice of lexical elements used in research paper introductions to signal various steps in the CARS model since a considerable disparity in lexical preferences is at times observed between the native and non-native corpora. This is especially true for such essential steps as claiming centrality, indicating a gap, and descriptively announcing the present research. In fact, in Russian academic discourse it is conventional to explicitly write about the relevance and novelty of the current investigation, i.e. to directly use the words 'relevance' and 'novelty' in research paper introductions. Thus, it is not surprising that the non-native corpus contains calques from the Russian language, for instance *'The relevance of research is due to the fact that...'*; *'The relevance of the proposed study lies in the need to...'*; *'The scientific novelty lies in the fact that...'*; *'The problem is particularly acute in...'*. In contrast, to show relevance, research paper introductions in the native corpus are normally built around such elements as 'recent' (*'a recent line of work'*, *'a number of recent papers'*, *'recent progress in'*, *'in recent years'*, *'in the last decades'*, *'over the past decades'*), 'many' or 'a number of' (*'most recent work has proposed...'*, *'has profoundly affected many areas of...'*, *'there have been a number of...'*, *'many recent studies have focused on...'*); novelty is normally articulated through gap indication, which is frequently expressed through making negation and contrast (*'it remains unclear, however'*, *'however these results are not sufficient for...'*, *'to the best of my knowledge, there has*

never been a broad empirical comparison of...'), as well as using words 'little' and 'few' (*'relatively little is known about...'*, *'little attention has been given to...'*, *'few attempts have been made to...'*). To make a descriptive announcement of their research, Russian authors sometimes use word-for-word translations from their native language: *'The object of this research is...'*; *'Research object: ...'*. On the contrary, native writers make use of a wide range of verbs as predicates to personal pronouns (*'we present'*, *'we discuss'*, *'we describe'*, *'we examine'*, *'we propose'*, *'we introduce'*, *'I focus on'*).

Discussion

As the results of the qualitative analysis show, all of the authors in the native corpus realize the necessity of establishing a niche in their introductions. This can be explained by the fact that the samples illustrating the native authors' writing were taken from top-tier journals (Q1 and Q2), which require rigorous criteria for publication. As for the non-native Russian corpus, 50% of the authors avoided establishing a niche in their introductions. Interestingly, this result is slightly different from Sheldon's (2011) study of research article introductions produced by Spanish authors or in Amnuai's (2021) analysis of scientific paper introductions written by Thai researchers. In their papers, approximately 77% of the authors in the corpora stated the niche of their research, so the number of introductions where the second move (establishing a niche) is omitted was considerably smaller than in the Russian corpus. Still, Sheldon (2011) argues that Spanish rhetorical patterns were transferred to English discourse and influenced the writing of research paper introductions in English. The researcher concludes that non-native authors 'are not fully acculturated in the English academic discourse needed for international publication' (p. 245).

The tendency to avoid the second move is observed in some other languages such as Swedish (Fredrickson and Swales, 1994) or Portuguese (Hirano, 2009), and this could appear challenging for non-native authors to submit their papers to highly ranked Anglo-

phone journals where stating the gap in previous studies is of great importance. In the way of evidence that supports the necessity to follow the CARS model to publish in a top-tier international journal in Computer Science, one paper written by non-native (Russian) authors and published in a Q1 American journal contains all the steps of the CARS model (with the exception of Step 2 Move 3, which seems unnecessary in this field). The same rhetorical structure is characteristic of two papers written by native English speakers and published in Q3 Russian journals. These findings suggest that the rhetorical arrangement of research paper introductions based on the CARS model is conventional in Anglophone journals in Computer Science. The awareness of the conventions of this field is essential in the development of professional competence in computer sciences (Aleshinskaya and Albatsha, 2020).

The tendency of Russian authors to omit the second move clearly demonstrates the importance of paying more attention to particular approaches to the presentation of research gaps as an essential way of the justification of the position expressed in the research being carried out (Lim, 2012). According to Chen and Li (2019), research gap strategies serve to emphasize the novelty and significance of research. Hence, it is essential to explore and describe the strategies of presenting research gaps so that beginning academic writers, and especially non-native writers, could learn about ways how the novelty of their research can be articulated in their research paper introductions. Among such strategies are, for example, to state the insufficiently developed topics in previous studies (e.g., their limitations and shortcomings), to offer solutions to the problems in other authors' works, to state the absence of investigations into the issue under consideration, to claim the contrast evidence (Arianto and Basthomi, 2021).

Another tendency of Russian authors to make use of fewer strategies in their introductions has also been found in existing studies. Thus, having investigated 54 research article introductions relating to applied linguistics,

Sheldon (2011) draws the conclusion that native authors are more diverse than non-native ones in strategies used to suggest topics. Similarly, Farnia and Barati (2017) argue that in applied linguistics native academic writers seem to employ a larger number of strategies than non-native academic writers do, especially when they aim to propose a topic, or establish a research niche, or briefly announce the present work. This probably reveals a serious problem in academic writing teaching, as most current resources are stated to simply discuss what needs to be included in this section, for instance, a problem statement, a research gap, the objective of the investigation (Perez et al., 2020). On the contrary, researchers, especially novice and non-native writers, should be provided with resources to write manuscripts properly, which would enhance their academic productivity.

Of interest is the observation made by Tikhonova et al. (2023) in their analysis of medical paper discussion sections written by Russian-language authors in English. According to their findings, Russian authors who aim to publish in international journals exhibit higher attention to the representation of rhetorical moves and steps that are conventional for the discussion section. On the other hand, those who aim to have their manuscripts published in Russian journals indexed in such international databases as Scopus tend to pay very little attention to employing all moves and steps characteristic of the discussion section. The scholars claim that it is apparently essential to systematize efforts to enhance non-native academic writers' literacy, because academic literacy enables non-native authors to effectively present the results of their investigations and reflect their respect for potential readers (Tikhonova et al., 2023).

Conclusion

The comparative study of the rhetorical structure of research paper introductions generated by native (English) and non-native (Russian) authors contributes to the existing knowledge of cross-cultural variation in academic writing. It also enables a clearer understanding of the rhetorical organization pat-

terns of research paper introductions, which are conventional in computer sciences. Being aware of the differences in using lexical and grammatical signals of various steps within the CARS model is sure to play a key role in enhancing scientific writing in English as a second language. Following the CARS model in writing a research paper introduction is one of essential ways to enhance academic writing skills and allow research papers written by non-native authors to find their way into highly ranked international scientific journals.

This study has some limitations connected with a relatively small research sample size. A larger sample would provide a more holistic view of the strategies employed in research paper introductions peculiar to the computer science field. In particular, it would enable a deeper understanding of the ways in which Russian authors try to comply with the requirements of highly ranked international journals located in English-speaking countries, and whether Anglophone authors always adhere to the conventional model of research paper introductions or sometimes allow divergence from the model when preparing their manuscripts for international journals located in Russia. The study would also benefit from adding a corpus of papers by Russian academic authors published in the English language in Russian journals that are not indexed in international databases like Scopus.

As a further direction of research, the analysis of the rhetorical organization of research paper introductions should be extended to include five corpora comprising introductions in papers written by native authors that are published in Scopus-indexed international and local journals, and those by non-native (Russian) authors that are published both in Scopus-indexed international and local journals and local journals not indexed in Scopus. Such an analysis would help clarify patterns in the rhetorical organization of research paper introductions in computer science written for academic journals of different levels and subsequently formulate practical recommendations for improving academic literacy

among novice authors whose native language is not English.

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