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Foreword

This special issue of the journal *Infotheca*, published jointly by the University Library “Svetozar Marković,” the Faculty of Philology of the University of Belgrade, and the Serbian Academic Library Association, marks a significant milestone: the centennial of the University Library “Svetozar Marković” — an institution that has served for a full century as one of the foremost pillars of academic, scientific, and cultural life in Serbia. Over the course of the past decades, the Library has evolved in step with developments in higher education, science, and librarianship, while steadfastly maintaining its core mission to provide reliable support to researchers, educators, students, and the broader academic community.

This thematic issue brings together papers that examine the Library’s activities and contemporary directions of development from a range of scholarly perspectives. The issue comprises three research articles, six professional papers, and two reviews; the common thread running through all contributions is a commitment to capturing the richness and multidimensional character of an institution that has shaped and accompanied the development of academic librarianship in Serbia over the course of a century.

The authors of the papers address diverse aspects of the Library’s work — from its analog and digital collections and services, to its educational and publishing activities, to questions of preserving and interpreting institutional heritage in the digital environment, with particular attention to textual corpora of Serbian literature and research in digital humanities within the framework of distant reading.

Special attention is devoted to the journal *Infotheca* itself: its history, development, and role in professional and scholarly communication in the field of librarianship and information sciences, as well as to a textometric and comparative analysis of the journal’s bilingual corpus, which in an innovative manner demonstrates the potential of contemporary methodological approaches in the study of specialized and academic communication. Such papers affirm the journal’s openness to interdisciplinary research and modern digital methods, as well as the Library’s sustained commitment to bridging tradition and innovation. In this sense, the present issue constitutes not merely a retrospective, but also a consideration of future directions in the development of libraries and scholarly journals in today’s information society.

By publishing this special issue, the editorial board of the journal *Infotheca* and the University Library “Svetozar Marković” wish to mark this

significant anniversary as a stimulus for new research, professional collaboration, and the continued advancement of library and information activities. We believe that the papers assembled in this issue will deepen understanding of the role of academic libraries in contemporary society and encourage new reflections on their place in the future of science, education, and culture.

The Editorial Board of *Infotheca*

Translated from Serbian:

Mina Dizdar

Fifteen Writers and Their Digital Imprints in Numbers, Images and Words

UDC 811.163.41'322.2

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ABSTRACT: In this paper we present the corpus 15AUTHORS which contains 49 works of fifteen authors that wrote in the Serbian language at the end of the 19th and the beginning of the 20th century. This corpus was derived from the SrpELTeC corpus built within the framework of the COST Action “Distant Reading for European Literary History.” We used existing annotations (sentences, phrases in foreign languages, part-of-speech (POS) tags, lemmas and named entities) and conducted additional analyses with open-code software Unitex and TXM, in order to reveal digital imprints left by the selected authors in their works.

KEYWORDS: literary corpus, textometry, corpus linguistics, distant reading, Serbian language, Unitex, TXM.

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1 Introduction

The research presented in this paper is based on the ELTeC corpus, specifically its Serbian part, SrpELTeC, which was developed within the framework of the COST Action “Distant Reading for European Literary History” (CA16204).¹ Goals and results of this project, as well as challenges involved in developing the Serbian part of the corpus are presented in previous studies (Trtovac, Milnović, and Krstev 2021; Krstev 2021a).

The ELTeC corpus has already been used in various linguistic, literary, ethnological and natural language processing research. We will mention only a few here.² The ELTeC collection, which comprises 12 complete subcollections of 100 novels each, provides an excellent basis for different multilingual

1. [European Literary Text Collection \(ELTeC\)](#)

2. [Detailed list](#)

and comparative studies. Topics of interest include titling practices in novels from the period covered by the corpus (Patras et al. 2021) and the reconsideration of the common thesis in literary history that the inner life of novel characters became the central focus of literary modernism, examined using computational methods (Radak et al. 2024). Byszuk et al. (2020) address the detection of direct speech in nine ELTeC subcollections using rule-based methods and transformer architecture. The study (Škorić et al. 2022) focuses on authorship attribution using stylometric methods based on parallel embeddings and deep learning.

Studies focusing on the Serbian language that used the SrpELTeC subcollection are also numerous. SrpELTeC has been used to compile a repertoire of simile rhetoric figures in old literary texts, which was subsequently tested on a collection of contemporary literary works (Krstev 2021b). Vitas (2022) demonstrates that a carefully prepared literary corpus can serve as a basis for studying various aspects of private life during a given time period. Nešić et al. (2022) present the results of the recognition of basic classes of named entities, their annotation and their linking to knowledge bases. The results of sentiment analysis conducted on Serbian novels from the late 19th and early 20th century are given in (Stanković, Košprdić, et al. 2022). Furthermore, a comparison of topic modeling methods, illustrated with examples from the same text collection, is given in (Mihajlov et al. 2024).

2 Corpus, methods and tools

The basic Serbian subcollection (SrpELTeC) contains 100 novels, each having at least 10,000 words, originally written in Serbian and first published between 1840 and 1920. The selection of novels for SrpELTeC was balanced as much as possible, following guidelines applied to all language subcollections developed within the COST Action. The time span had to be evenly covered (concerning the first editions), novels of various lengths had to be proportionally represented, and an equal number of male and female authors had to be included. Each collection was also designed to include well-known novels (representing the canon) and lesser-known novels published only once and forgotten. In addition, each collection should contain 9 to 11 authors represented by three novels each, while all other authors had to be presented by a single novel. The extended Serbian subcollection (SrpELTeC-ext) includes 20 additional novels that meet the same criteria. The SrpELTeC-108 collection comprises all novels from the basic SrpELTeC subcollection, along with eight novels from the SrpELTeC-ext subcollection.

In the basic SrpELTeC subcollection, eleven authors are represented by three novels each, while one author is represented by five novels. The extended SrpELTeC-108 subcollection comprises works of fifteen authors, each represented by at least three works. These authors are: Jakov Ignjatović (5), Vladan Đorđević (3), Đura Jakšić (3), Milan Đ. Milićević (3+2), Lazar Komarčić (3), Draga Gavrilović (3), Janko Veselinović (3), Pera Todorović (3), Čedomilj Mijatović (2+1), Steva Sremac (3), Svetolik Ranković (3), Borisav Stanković (2+1), Jelena Dimitrijević (3), Svetozar Ćorović (3), and Milutin Uskoković (2+1). The list of all these works is provided in Appendix 4. The 49 works by these fifteen authors, collected in the 15AUTHORS subcollection, serve as the basis for our digital research.

According to the agreement reached within the D-reading COST Action, the SrpELTeC corpus was prepared in accordance with the TEI Guidelines.³ This means that structural and textual elements such as chapters, paragraphs, highlighted passages (e.g., italics), foreign-language expressions, titles of artistic or professional works, and footnotes were annotated. The annotation was carried out by volunteer readers during the correction of texts obtained through optical character recognition. In addition, several layers of annotation were introduced automatically. Sentences were segmented, and each token was assigned a part-of-speech (POS) tag and a lemma. Furthermore, seven categories of named entities were annotated: PERS, ROLE, LOC, ORG, DEMO, EVENT, and WORK, the last of which was annotated manually by the readers. Further details on the tools used and the annotation results can be found in (Stanković, Krstev, et al. 2022).

The results presented in this paper were obtained by using existing annotations, as well as by conducting additional data searches and analyses with two open-source tools. The first one is Unitex (Paumier, Nakamura, and Voyatzi 2009), which uses electronic dictionaries to define complex queries and transformations based on finite-state transducers.⁴ We used this software in combination with electronic dictionaries for Serbian and a set of general and specialized transducers (Krstev 2008) to obtain the results presented in Sections 3.1, 3.2, 3.4, 3.9, 3.10, and 3.12. The second tool is TXM, which was used to generate various statistical outputs and to visualize the results (Pincemin, Heiden, and Mazuet 2022) (see Sections 3.3, 3.5, 3.6, 3.7, 3.8, 3.12, and 3.13).⁵ No tool can perform text-processing tasks “perfectly”; a certain degree of error and omission is unavoidable. This issue is not ad-

3. TEI Guidelines.

4. Unitex – corpus processing suite.

5. TXM – textometry platform.

dressed in the present paper. However, information on the performance of the tools used can be found in the cited literature.

3 Digital imprints

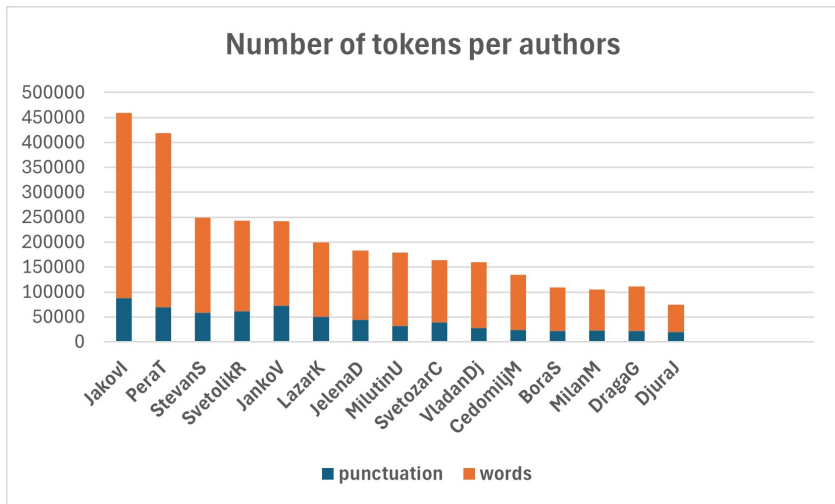


Figure 1. The length of writers' corpora measured by the number of tokens: punctuation and special characters, and words.

3.1 Corpus size

The chart shown in Figure 1 indicates that J. Ignjatović is the most represented author in the 15AUTHORS corpus, with his works accounting for 15.14% of the total corpus. The next most represented author is P. Todorović, whose works comprise 13.81% of the corpus. In contrast, M. Đ. Milićević and Đ. Jakšić are represented by the shortest works, contributing 3.45% and 2.47%, respectively. Overall, the corpus consists of 21.53% punctuation and special characters, compared to 78.47% words. The highest proportions of punctuation and special characters are found in the works of J. Veselinović (30.03%) and Đ. Jakšić (25.81%), whereas P. Todorović (16.56%) and

V. Đorđević (17.23%) use them considerably less. No firm conclusions can be drawn regarding individual authors' tendencies to produce longer or shorter works, as the selection of texts for the SrpELTeC corpus was guided by various criteria, as discussed in Section 2.

3.2 Sentence length

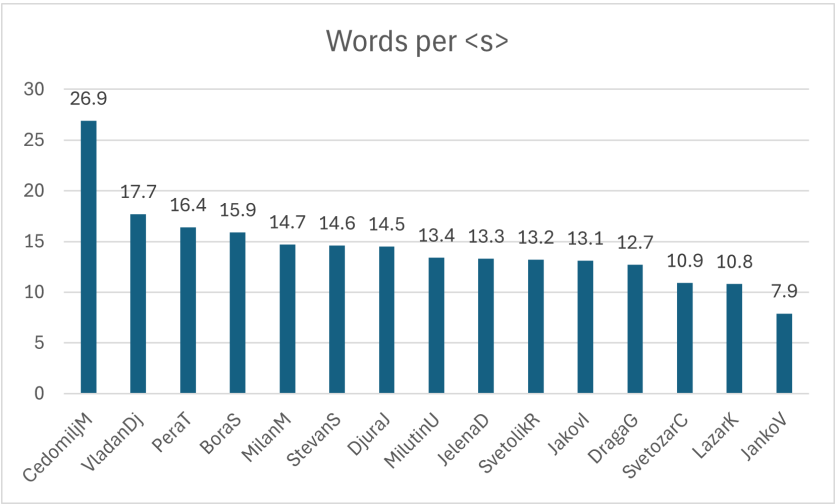


Figure 2. Sentence length measured by the number of words.

The average sentence length in the 15AUTHORS corpus is 13.4 words per sentence. Sentence length varies considerably across authors, ranging from very short sentences — an average of 7.9 words per sentence in the works of J. Veselinović — to notably long ones, with an average of 26.9 words per sentence in the works of Č. Mijatović. These two authors stand out in terms of sentence length. Among the remaining authors, the shortest sentences are found in the works of L. Komarčić (10.8 words per sentence), while the longest are observed in the works of V. Đorđević (17.7 words per sentence) (Figure 2). The average sentence length in the works of M. Uskoković is close to the overall corpus average.

3.3 Direct speech

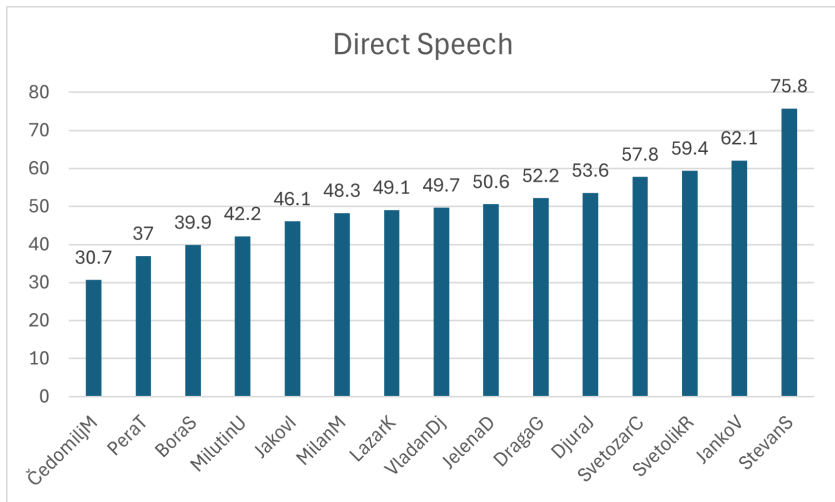


Figure 3. Percentage of paragraphs containing direct speech by author.

Some tools for the recognition and annotation of direct speech in the ELTeC corpus have already been developed, as mentioned in Section 1. In this study, however, our goal is not the precise identification of direct speech in the 15AUTHORS corpus, but rather an estimation of the proportion of paragraphs containing direct speech. We assume that each paragraph contains the speech of a single speaker and that direct speech appears at the beginning of the paragraph, marked by punctuation such as a hyphen or a quotation mark. An example of such a paragraph is given below:

— Farewell, farewell! — tells one to another — Good night.

Although this approach is not highly precise, it provides useful insight into how different authors employ direct speech.

The results indicate that direct speech is least frequently used by Č. Mijatović and P. Todorović, whereas it is most prevalent in the works of S. Sremac and J. Veselinović (Figure 3). It is also worth noting that Č. Mijatović and P. Todorović tend to use the longest sentences, while J. Veselinović uses the

shortest ones. The sentence length in the works of S. Sremac is close to the corpus average (Section 3.2).

3.4 Lexical parameters

The lexical parameters of the authors in the 15AUTHORS corpus are presented in Table 1, including the number of words (*forms*), the number of distinct words (*types*), and the number of distinct lemmas. All data shown in Table 1 were computed using the Unitex software, except for the number of lemmas, which was calculated using TXM, as Unitex does not support automatic lemmatization. Due to differences in tokenization between these two tools, the counts of forms, types, and lemmas are not directly comparable.⁶

author	forms	types	lemmas	<i>L</i>	hapax	hapax%
JakovI	371243	38387	17545	0.8053	20958	5.65
PeraT	349721	43165	1804	0.7765	23820	6.81
JankoV	169685	23020	10953	0.7754	12989	7.65
StevanS	191094	27323	14431	0.7735	16125	8.44
SvetolikR	181467	26038	12165	0.7646	14859	8.19
BoraS	87601	14251	6806	0.7620	8492	9.69
DragaG	88733	14590	7188	0.7531	8522	9.6
JelenaD	139444	20906	10501	0.7514	11554	8.29
LazarK	149847	23812	11493	0.7504	14025	9.36
CedomiljM	110162	18312	8336	0.7396	10475	9.51
VladanDj	132100	23235	11002	0.7326	14027	10.62
SvetozarC	124390	23894	9816	0.7193	14670	11.79
DjuraJ	55579	12249	6573	0.7026	7791	14.02
MilanM	82356	17935	9459	0.6929	11200	13.6
MilutinU	147418	26354	12180	0.6836	15705	10.65

Table 1. Lexical parameters of writers from the 15AUTHORS corpus.

6. The TXM platform relies on TreeTagger (Schmid 2013) for automatic part-of-speech tagging and lemmatization; its Serbian model is described in (Utvić 2011; Stanković, Škorić, and Šandrih Todorović 2022).

Lexical index L is computed according to (Smith 1973):

$$L = \frac{-\sum_X f_x \frac{X}{N} \log \frac{X}{N}}{\log N}$$

where N represents the text size measured by the number of words, while X denotes the number of words with frequency f_x . In this way, the distribution of vocabulary is captured while normalizing for text length, allowing comparisons between texts of different sizes. The formula can be better understood through two extreme cases. If a text consists of only one word repeated N times, then $X = N$ and $L = 0$. Conversely, if no word is repeated, then $X = 1$ and $f_x = N$, resulting in $L = 1$.

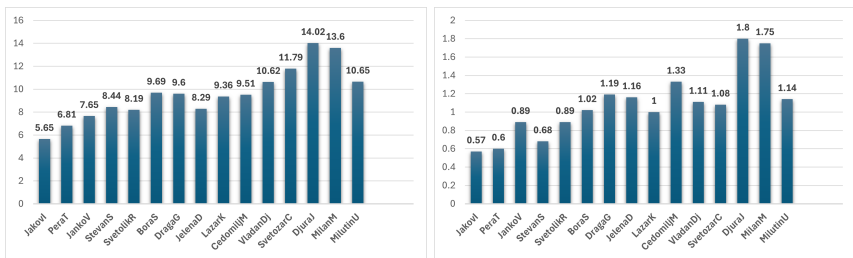


Figure 4. Percentage of word forms with frequency: one (left); greater than the median (right). Writers are sorted by the value of the index L , from highest to lowest.

Figure 4 indicates that the use of *hapax legomena* in a text is not directly connected with the value of L : the percentage of word forms with frequency one is highest in the works of Đ. Jakšić and M. Đ. Milićević (whose contribution to the size of the whole corpus is the lowest), while the percentage of these words in the works of J. Ignjatović and P. Todorović is the lowest (while their works contribute the most to the size of the corpus). This suggests that the index L is not entirely successful in neutralizing the length of the compared texts, and that a more accurate comparison could be obtained only by comparing samples of the same size.

If we arrange all words by frequency, from the lowest ($f = 1$) to the highest, the median corresponds to the frequency at which words with lower frequencies account for half of the text, while words with higher frequencies account for the other half. As shown in Figure 4, the percentage of words

with frequencies above the median is again highest in the works of Đ. Jakšić and M. Đ. Milićević, and lowest in the works of J. Ignjatović and P. Todorović. However, when considering all authors, there is no clear relationship between the percentage of *hapax legomena* and the proportion of words with frequencies above the median.

3.5 Frequency of word classes

Word classes are distributed in the 15AUTHORS corpus into 16 classes according to the guidelines of the *Universal Dependencies* project (Marneffe et al. 2021). The frequency of occurrences of these classes in the 15AUTHORS is as follows:

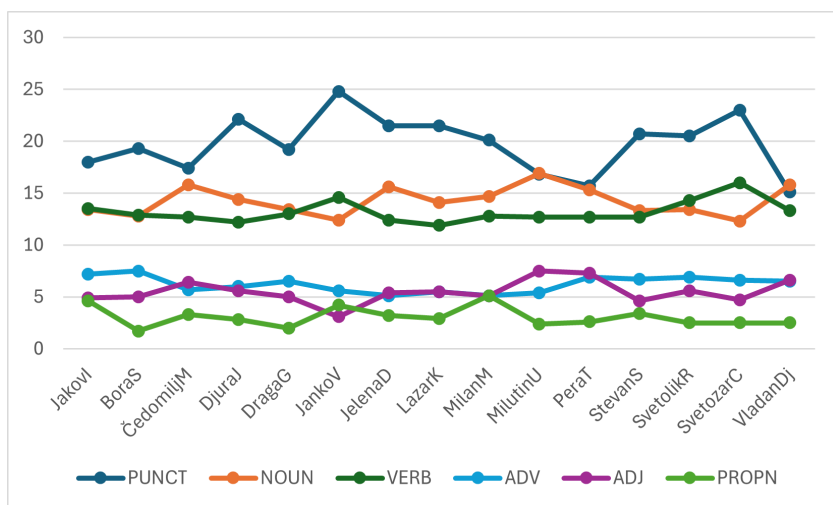


Figure 5. The participation of punctuation marks and meaningful words in the texts of individual authors.

- punctuation – PUNCT, $f = 567\,364$ (19.3%),
- nouns – NOUN, $f = 417\,261$ (14.2%);
- verbs – VERB, $f = 88\,330$ (13.2%);
- adpositions (prepositions) – ADP, $f = 188\,284$ (6.4%);

- adverbs – ADV, $f = 186\,921$ (6.4%);
- auxiliaries – AUX, $f = 179\,460$ (6.1%);
- coordinating conjunctions – CCONJ, $f = 177\,297$ (6.0%);
- adjectives – ADJ, $f = 162\,709$ (5.5%);
- pronouns – PRON, $f = 147\,878$ (5.0%);
- particles – PART, $f = 138\,947$ (4.7%);
- determiners – $f = 134\,734$ (4.6%);
- subordinating conjunctions – SCONJ, $f = 115\,004$ (3.9%);
- proper nouns – PROPN, $f = 93\,807$ (3.2%);
- numerals (cardinal) – NUM, $f = 22\,764$ (0.8%);
- interjections – INTJ, $f = 8\,953$ (0.3%);
- other (foreign words, abbreviations, etc.) – X, $f = 7\,969$ (0.3%).

Figures 5 and 6 show the percentage of occurrences of these classes by author. Punctuation marks, nouns, and verbs stand out clearly from all other word classes, being the most frequently used by all authors. The use of punctuation varies considerably: in the works of J. Veselinović, as many as 24.8% of all tokens are punctuation marks, while in the works of V. Đorđević and P. Todorović they account for just over 15% of tokens. The proportion of verbs varies less across authors—the lowest percentage is 11.9% (in the works of L. Komarčić), and the highest is 16.0% (in the works of S. Ćorović). M. Uskoković uses more nouns (16.9%), compared to an average of 14.2% across all authors.

Adverbs, adjectives, and proper nouns are used considerably less frequently than nouns and verbs. The use of adverbs is fairly consistent, close to the corpus average of 6.4%, with a few deviations: 7.5% in the works of B. Stanković, and 5.1% in the works of J. Dimitrijević and M. Đ. Milićević. In J. Veselinović’s works, adjectives account for only 3.1% of the text, compared to the overall corpus average of 5.5%. Higher-than-average use of adjectives is observed in the works of M. Uskoković (7.5%) and P. Todorović (7.3%). For proper nouns, the average is 3.2%; M. Đ. Milićević uses more (5.1%), while B. Stanković uses the fewest (1.7%).

Cardinal numbers, interjections, and “other” words are used considerably less frequently than other functional words, ranging from zero to 1.2%, which corresponds to the frequency of cardinal numbers in the works of Č. Mijatović. The use of other functional words varies among authors. For instance, the average frequency of nominal pronouns is 5%: P. Todorović and M. Đ. Milićević use them less frequently (4.3%), while J. Veselinović uses them more often (6.2%). S. Ranković uses fewer auxiliary verbs (4.3%) compared to the average (6.1%), whereas J. Ignjatović and D. Gavrilović use them more frequently (7.4%).

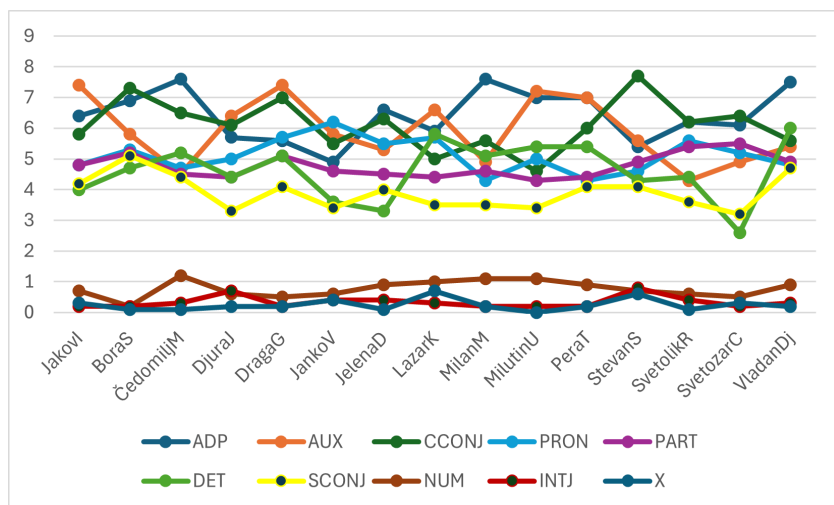


Figure 6. The participation of functional words in the texts of individual authors.

3.6 Nouns

The twenty most frequent nouns in the 15AUTHORS corpus, in the descending order of frequency, are: *ruka* ‘hand’, *kuća* ‘house’, *glava* ‘head’, *dan* ‘day’, *oči* ‘eyes’, *bog* ‘god’, *čov(j)ek* ‘man’, *ljudi* ‘men’, *put* ‘road’, *žena* ‘woman/wife’, *srce* ‘heart’, *r(ij)eč* ‘word’, *lice* ‘face’, *otac* ‘father’, *glas* ‘voice’, *godina* ‘year’, *majka* ‘mother’, *strana* ‘side’, *vreme* ‘time/weather’, and *sv(ij)et* ‘world’. Three of these nouns appear among the twenty most frequent nouns for all authors: *ruka* ‘hand’ (ranks 1–11), *dan* ‘day’ (ranks 1–12), and *oči* ‘eyes’ (ranks 1–15). The noun *vreme* ‘time/weather’ appears among the top twenty nouns for only four authors. In L. Komarčić’s list of the twenty most frequent nouns, sixteen also occur among the twenty most frequent nouns in the entire 15AUTHORS corpus, whereas in Č. Mijatović’s list, ten nouns are “new,” i.e., they do not appear among the twenty most frequent nouns in the corpus as a whole.

Most authors (11 in total) most frequently use a noun that belongs to the set of the twenty most frequent nouns in the 15AUTHORS corpus as a whole. Exceptions include Đ. Jakšić, whose most frequent noun is *gospodin* ‘mister/sir’, D. Gavrilović, whose most frequent noun is *ljubav* ‘love’, and P. Todorović and Č. Mijatović, who most frequently use the noun *knez* ‘prince’.

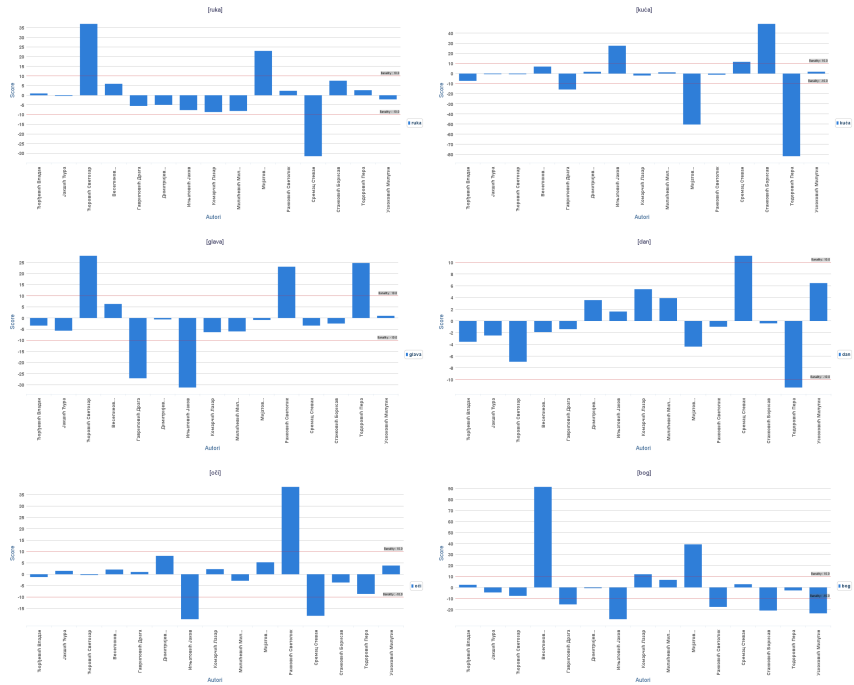


Figure 7. The specificity of use of the nouns *ruka* ‘hand’, *kuće* ‘house’, *glava* ‘head’, *dan* ‘day’, *oči* ‘eyes’, *bog* ‘god’ by 15 authors.

Two authors have as their second most frequent noun a word that does not appear among the twenty most frequent nouns in the 15AUTHORS corpus: *čiča* ‘old man/uncle’ in the works of Đ. Jakšić and *pop* ‘priest’ in the works of S. Sremac. Nouns that are frequent in individual authors’ lists but do not belong to the overall top twenty include *duša* ‘soul’ (appearing in the lists of six authors) and *zemlja* ‘land/country’ (in the lists of five authors). It is noteworthy that in the female author D. Gavrilović’s list of the twenty most frequent nouns, in addition to *ljubav* ‘love’, *srce* ‘heart’, and *duša* ‘soul’, there are also several nouns denoting family relations: *žena* ‘woman/wife’, *muž* ‘husband’, *d(ij)ete* ‘child’, *d(j)eca* ‘children’, and *sestra* ‘sister’. A similar pattern is observed in the works of J. Dimitrijević, the other female author, who, alongside *duša* ‘soul’ and *srce* ‘heart’, frequently uses *majka* ‘mother’, *otac* ‘father’, *sin* ‘son’, *kćer* ‘daughter’, and *hanuma* ‘khanum’. Among nouns

denoting emotions, only two appear in the top 20 lists: *ljubav* ‘love’ (used frequently by D. Gavrilović and M. Uskoković) and *strah* ‘fear’ (used by B. Stanković).

The *specificity* index enables the comparison of the use of selected linguistic units (words, phrases, constructions) across individual authors. This index reflects the degree of deviation from the expected frequency of a given unit in the works of an author and is computed on the basis of the following parameters: f — the number of occurrences of a selected unit in the works of a given author; F — the total number of occurrences of that unit in the corpus as a whole; t — the total number of units in the works of the given author; and T — the total number of units in the entire corpus. In order to compare the frequencies of linguistic units across corpus partitions of different sizes, normalization is required. A common approach is to calculate relative frequency as the ratio between the absolute frequency of a unit in a given partition and the size of that partition, which corresponds to a *normal distribution*. However, it has been observed that the distribution of linguistic units more closely follows a *hypergeometric distribution*. The probability that a selected unit occurs f times in a given author’s subcorpus (i.e., partition) is therefore:

$$Pr(X = f) = \frac{\binom{F}{f} \binom{T-F}{t-f}}{\binom{T}{t}}$$

Positive values of the specificity index indicate that a linguistic unit occurs more frequently than expected, whereas negative values indicate lower-than-expected frequency. Further details on the specificity index can be found in (Jaćimović 2019).

Specificity indices, as illustrated in Figure 7, show that the most frequent nouns — *ruka* ‘hand’, *kuća* ‘house’, *glava* ‘head’, *dan* ‘day’, *oči* ‘eyes’, and *bog* ‘god’ — occur within expected ranges in the works of V. Đorđević, Đ. Jakšić, J. Dimitrijević, L. Komarčić, and M. Đ. Milićević. The only notable deviation concerns the noun *bog* ‘god’ in the works of J. Veselinović and M. Uskoković: the former uses it considerably more often than expected, while the latter uses it considerably less. S. Ćorović uses the nouns *ruka* ‘hand’ and *glava* ‘head’, and S. Ranković *glava* ‘head’ and *oči* ‘eyes’, significantly above expected levels. In contrast, in the works of D. Gavrilović, *kuća* ‘house’, *glava* ‘head’, and *bog* ‘god’ occur considerably below expectation. In Č. Mijatović’s works, *ruka* ‘hand’ and *bog* ‘god’ occur more often than expected, whereas *kuća* ‘house’ occurs less frequently. In S. Sremac’s works, *dan* ‘day’ occurs more often, while *ruka* ‘hand’ and *oči* ‘eyes’ occur less often than expected.

In B. Stanković's works, *kuća* 'house' occurs above expected levels and *bog* 'god' below them, whereas in P. Todorović's works, *glava* 'head' occurs more often, and *kuća* 'house' and *dan* 'day' less often than expected. The greatest deviations are observed in the works of J. Ignjatović: *kuća* 'house' occurs more often than expected, while *glava* 'head', *oči* 'eyes', and *bog* 'god' occur less often.

3.7 Verbs

The twenty most frequent verbs in the 15AUTHORS corpus, listed in the descending order of frequency, are: *moći* 'be able', *reći* 'say', *znati* 'know', *vid(j)eti* 'see', *imati* 'have', *doći* 'come', *kazati* 'tell', *ići* 'go', *zvedamu* 'watch', *govoriti* 'speak', *misлити* 'think', *čuti* 'hear', *moramu* 'have to', *početi* 'begin', *dati* 'give', *trebati* 'need', *uzeti* 'take', *ostati* 'stay', *nemati* 'not have', and *otići* 'leave'. Five of these verbs rank among the twenty most frequent verbs for all authors: *moći* (ranks 1–5), *znati* (1–6), *vid(j)eti* (1–11), *imati* (2–11), and *doći* (2–14). The verb *reći* 'say' appears among the top twenty verbs for all authors (ranks 1–9), except for B. Stanković. The set of the twenty most frequent verbs in the works of J. Ignjatović nearly coincides with the overall set, with the only exception being *zvedamu* 'watch', which is absent. The smallest number of verbs from the above list — exactly sixteen — appears in the works of five authors: J. Veselinović, Č. Mijatović, B. Stanković, M. Uskoković, and S. Ćorović.

The most frequent verb used by each of the 15 authors appears in the list of the twenty most frequent verbs in the corpus as a whole, with the exception of S. Sremac, whose most frequent verb is *velim* 'say'. This verb ranks 21st in the overall corpus. Verbs that are frequent in the works of individual authors but do not belong to the overall top twenty include *pogledati* 'take a look' (attested in eight authors' works), as well as *odgovoriti* 'answer', *pitati* 'ask', and *ustati* 'stand up' (each attested in five authors' works). It is also worth noting that both the overall top twenty list and the top twenty lists of individual authors include verbs derived by prefixation, such as *gledati* 'watch' and *pogledati* 'take a look', *govoriti* 'speak' and *odgovoriti* 'answer', as well as *pitati*, *upitati* 'ask', and *zapitati* 'wonder'. In addition, aspectual verb pairs are present, including *osetiti* / *osećati* 'feel', *stati* / *stajati* 'stand', and *doći* / *dolaziti* 'come'.

No verb denoting emotion appears in the overall top twenty list. However, the verb *voleti* 'love' is among the twenty most frequent verbs in the works of D. Gavrilović (rank 10), J. Dimitrijević (rank 9) — both female authors

— and M. Uskoković (rank 5). In addition, D. Gavrilović's list also includes *ljubiti* 'love/kiss' (rank 11). The verb *osećati* 'feel' appears among the top twenty verbs in the works of B. Stanković (rank 12) and M. Uskoković (rank 13), while B. Stanković's list also contains its aspectual counterpart *osetiti* (rank 19). The top twenty list of J. Dimitrijević includes the verb *plakati* 'cry' in the final position.

3.8 Adjectives

The twenty most frequent adjectives in the 15AUTHORS corpus, listed in the descending order of frequency, are: *drugi* 'second/other', *velik* 'big', *star* 'old', *dobar* 'good', *l(ij)ep* 'beautiful', *mlad* 'young', *ceo/cijel* 'whole/entire', *prvi* 'first', *crn* 'black', *nov* 'new', *mali* 'small', *pun* 'full/plump', *beo/bijel* 'white', *živ* 'alive/vivid', *isti* 'same', *srpski* 'Serbian', *po(s/š)(l/lj)ednji* 'last', *turski* 'Turkish', *sre(ć/t)an* 'happy', and *čitav* 'whole/entire'. Possessive adjectives derived from proper names (e.g. *Kočin* 'belonging to Koča' and *Darinčin* 'belonging to Darinka') were excluded from the top twenty lists of individual authors. As a result, five of the above adjectives appear among the top twenty adjectives for all authors: *drugi*, *velik*, *star*, *l(ij)ep*, and *mlad*. In addition, three adjectives occur among the top twenty for all but one author: *dobar* (ranked 27th in the works of B. Stanković), *prvi* (25th in the works of Đ. Jakšić), and *mali* (25th in the works of P. Todorović). The adjective *čitav* 'whole/entire' appears in the top twenty lists of only three authors; however, in the works of S. Ćorović it ranks as high as third, in contrast to its 20th position in the whole corpus.

The most frequent adjective used by each of the 15 authors appears in the list of the twenty most frequent adjectives in the corpus as a whole. For the majority of authors—eleven in total—this adjective is *drugi* 'second/other', which occupies the top position in the overall list. Adjectives that are frequent in the works of individual authors but do not belong to the overall top twenty include *dug* 'long' (attested in six authors' works), as well as *strašan* 'horrible/scary', *težak* 'heavy', *veseo* 'cheerful', and *ženski* 'female' (each attested in five authors' works). The adjectives *crn* 'black' and *beo/bijel* 'white', which are among the twenty most frequent adjectives in the corpus overall, appear in the top twenty lists of most individual authors — specifically, nine of them. Neither adjective appears in the lists of J. Ignjatović and D. Gavrilović; only *crn* 'black' appears in the lists of P. Todorović, S. Ranković, and S. Ćorović; while only *beo/bijel* 'white' appears in S. Sremac's list.

Two demonyms appear among the twenty most frequent adjectives in the 15AUTHORS corpus: *srpski* ‘Serbian’ (rank 16) and *turski* ‘Turkish’ (rank 18). Both adjectives are included in the top twenty lists of only two authors, J. Ignjatović and P. Todorović; in the latter’s list, *balkanski* ‘related to Balkan’ also appears, ranked 20th. The adjective *srpski* ‘Serbian’, but not *turski* ‘Turkish’, occurs in the top twenty lists of M. Đ. Milićević, L. Komarčić, and Č. Mijatović. Conversely, *turski* ‘Turkish’, but not *srpski* ‘Serbian’, appears in the lists of J. Veselinović and J. Dimitrijević; the latter’s list additionally includes the demonyms *francuski* ‘French’ and *evropski* ‘European’.

Other colors, apart from the adjectives *crn* ‘black’ and *beo/bijel* ‘white’, do not appear in the top twenty lists of individual authors, with the exception of Č. Mijatović’s list, which includes *crven* ‘red’ and *zelen* ‘green’, as well as *srebrn* ‘silver’ and *zlatan* ‘golden’, which can also denote colors (see Section 3.9). Adjectives that appear in the top twenty lists of specific authors but not necessarily in the overall top twenty may reflect the particular style or thematic focus of those authors. For example:

- V. Đorđević’s list includes *strašan* ‘awesome’, *сильан* ‘powerful’, *divan* ‘wonderful’, *cjajan* ‘brilliant’, and *красан* ‘beautiful’.
- Đ. Jakšić’s list contains *sirot* ‘poor’, *bled* ‘pale’, *gladan* ‘hungry’, *sam* ‘alone’, *nesrećan* ‘unhappy’, and *tužan* ‘sad’.
- D. Gavrilović’s list features *sirot* ‘poor’, *bogat* ‘rich’, *valjan* ‘worthy’, *čist* ‘clean/pure’, *veseo* ‘cheerful’, and *pošten* ‘honest’.
- S. Ćorović’s list includes *širok* ‘wide’, *golem* ‘big’, *dug* ‘long’, *tanak* ‘thin’, *cuman* ‘tiny’, *debeo* ‘thick’, and *jak* ‘strong’.

3.9 Adjectives denoting colors

A specific marker used in Serbian electronic dictionaries for adjectives denoting colors allows us to examine their use in the works of fifteen selected authors. A total of 3,057 occurrences of these adjectives were retrieved from the 15AUTHORS corpus, representing 109 different lemmas. The adjectives *crn* ‘black’ and *beo/bijel* ‘white’ were not taken into account. Other commonly used color terms, in the descending order of frequency, include: *crven* ‘red’, *zelen* ‘green’, *zlatan* ‘golden’, *plav* ‘blue’, *rumen* ‘light red’, *srebrn* ‘silver’, *žut* ‘yellow’, *siv* ‘gray’, *modar* ‘dark blue’, *ružičast* ‘pink’, *smed* ‘brown’, *sur* ‘lead gray’, *beličast* ‘whitish’, *žućkast* ‘yellowish’, *rid* ‘russet’, *zelenkast* ‘greenish’, *ljubičast* ‘purple’, *crvenkast* ‘reddish’, *plavetan*, *plavičast* ‘bluish’. We did not disambiguate senses, so adjectives such as *zlatan* ‘golden’ and *srebrn* ‘silver’ may refer to material rather than color.

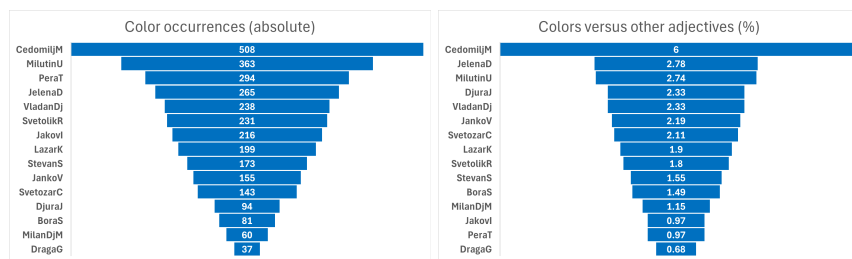


Figure 8. The use of adjectives denoting colors by individual authors.

In absolute terms, Č. Mijatović uses the highest number of color adjectives (508), as well as the greatest number of different ones (35). D. Gavrilović uses these adjectives the least — 37 occurrences and only 13 different (the same number of different is also found in the works of M. Đ. Milićević) (Figure 8, left). When compared with the total number of adjectives used by each author, the proportion of color adjectives is highest in Č. Mijatović's works and lowest in D. Gavrilović's works (Figure 8, right).

Among 109 different adjectives denoting colors, there are 17 adjectives that indicate that something is a bit of a certain color or tends towards that color, and they occur in various forms: *beličast* 'whitish', *žu(t/ć)kast* 'yellowish', *zagasitorumenkast* 'dark reddish', *zelenkast* 'greenish', *zlatkast* 'a bit golden', *morast* 'darkish', *mrkajast* 'darkish', *otvorenozelenkast* (light greenish', *plavetnikast*, *plavičast*, *plav(k/ć)ast*, *plavuš(k)ast* 'bluish', *purpurast* 'purplish', *siv(k)ast* 'grayish', *srebrnkast* 'a bit silver', *crvenkast* 'reddish', *crnkast* 'blackish'.

We identified eleven adjectives of Turkish origin in the 15AUTHORS corpus: *alev*, *alen*, *alov* 'bright red', *duvez* 'dark red', *karpus* 'watermelon-colored', *kremzli* 'a type of red', *maven* 'clear blue', *mor* 'purple', *pembe* 'pink', and *skrl(a/e)tan* 'bright red'. It is interesting to note that the adjective *alev* and its variants occur twelve times in the 15AUTHORS corpus, but only twice in the expression *aleva paprika* 'cayenne pepper', namely in M. Uskoković's Čedomir Ilić and Đ. Jakšić's Čiča Tima. All other occurrences refer to garments — *čarape* 'socks', *šalvare* 'a type of women's trousers', *jagluk* 'kerchief', *libade* 'a type of women's jacket', and *fes* 'fez hat'.⁷

7. A notable difference from present-day usage: in the *SrpKor21* corpus, the adjective *alev* occurs 976 times modifying a noun, and that noun is always *paprika* 'pepper'.

Ten indeclinable adjectives, typically of foreign origin, appear in several variants: *bra(o/u)n* ‘brown’, *violet* ‘violet’, *grao* ‘gray’, *đuvez*, *zejtini* ‘olive (colored)’, *karpus*, *kremzli*, *mor*, *pembe*, and *roz(a/e)* ‘pink’.

Among the retrieved adjectives denoting colors, 31 are compounds. Ten of these refer to combinations of colors: *beličastosrebrn* ‘white-silver’, *žučkastozelen* ‘yellowish-green’, *zelenkastoplavetan* ‘greenish-blue’, *zelenožut* ‘green-yellow’, *plavobeo* ‘blue-white’, *plavosiv* ‘blue-gray’, *sivoplav* ‘gray-blue’, *crvenkastosiv* ‘reddish-gray’, *crnožut* ‘black-yellow’, and *čivitastomodar* ‘indigo blue’. Color modification is attested in 19 adjectives. These include *bledo-* ‘pale-’ (-*žut* ‘-yellow’, -*zelen* ‘-green’, -*ljubičast* ‘-purple’, -*plav* ‘-blue’, -*rumen* ‘-bright red’), *zagasitorumenkast* ‘dull red’, *zatvorenožut* ‘dark yellow’, *mrko-* ‘dark-’ (-*žut* ‘-yellow’, -*siv* ‘-gray’), *mutnoplav* ‘cloudy blue’, *otvoreno-* ‘clear-’ (-*zelenkast* ‘-greenish’, -*ljubičast* ‘-purple’), *polu-* ‘half-’ (-*zelen* ‘-green’, -*zlatan* ‘golden’), *snežnobeo* ‘snow white’, and *tamno-* ‘dark-’ (-*zelen* ‘-green’, -*plav* ‘-blue’, -*siv* ‘-gray’, -*crven* ‘-red’). In the remaining two cases, color functions as a modifier of another adjective: *žučkastobled* ‘yellowish pale’ and *rumenosjajan* ‘bright red’.

3.10 The rhetorical figure of simile

In our previous work (Krstev 2021b; Krstev, Stanković, and Marković 2023), we described a tool for the recognition and annotation of the rhetorical figure of simile in Serbian texts, based on a formal description of these figures, electronic dictionaries, and finite-state transducers. Using this tool, we identified 837 instances of simile in the 15AUTHORS corpus, of which 521 are adjectival and 315 verbal.

Among the 301 distinct adjectival similes, the most frequent one is *beo kao sneg* ‘white as snow’, occurring 30 times. It is followed by *bled kao smrt* ‘pale as death’ (25 occurrences), *hladan kao led* ‘cold as ice’ (15), *bled kao krpa* ‘pale as a rag’ (10), *beo kao mleko* ‘white as milk’ (9), *mlad kao kaplja* ‘young as a drop’ (8), and *crven kao krv* ‘red as blood’ (7). The similes *dobar kao dan* ‘good as day’, *žut kao vosak* ‘yellow as wax’, *ljut kao ris* ‘angry as a lynx’, and *mek kao pamuk* ‘soft as cotton’ each occur six times in the corpus. In total, 223 adjectival similes appear only once. The most frequently used adjectives in adjectival similes are *beo* ‘white’ and *crn* ‘black’, each occurring in 12 similes. They are followed by *bled* ‘pale’, *crven* ‘red’, and *rumen* ‘bright red’, each appearing in 10 similes, and *čist* ‘clean/pure’, which appears in nine. The nouns *anđeo* ‘angel’, *jagnje* ‘lamb’, *ptica* ‘bird’, and *sunce* ‘sun’ are used as a base for comparison in five similes each. The nouns *vatra* ‘fire’,

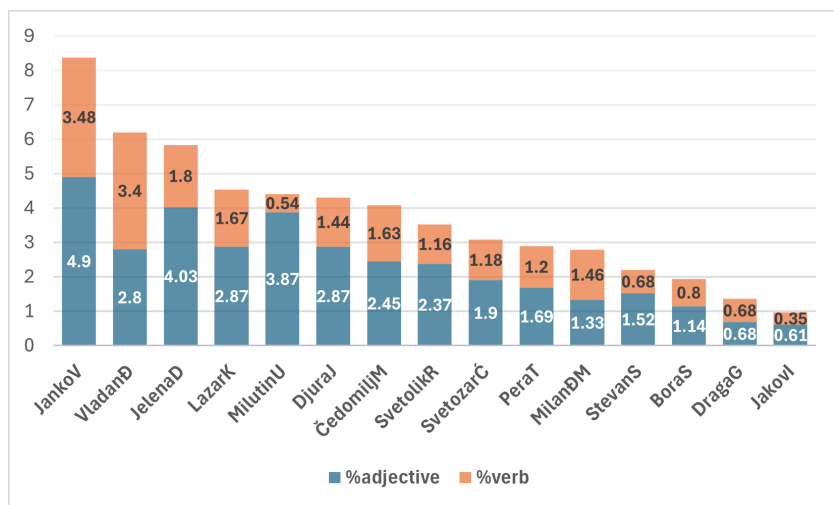


Figure 9. Relative frequency of adjectival and verbal similes in individual authors' works.

dan 'day', *žeravica* 'ember', *zemlja* 'land/soil', *nebo* 'sky', and *smrt* 'death' each occur as vehicles in four similes.

Among the 164 distinct verbal similes, the most frequent one is *drhtati kao prut* 'tremble like a stick', occurring 20 times. It is followed by *plakati kao dete* 'cry like a child' (13 occurrences); *zaspali kao zaklan* 'fall asleep as if slaughtered' and *ciknuti kao zmija* 'shriek like a snake', each with 8 occurrences; *viti (se) kao crv* 'wriggle like a worm' and *prebledeti kao krpa* 'turn pale as a rag', each with 7 occurrences; *slušati kao dete* 'obey like a child' (6); and *smejati (se) kao lud* 'laugh like a madman' (5). In total, 99 verbal similes occur only once in the corpus. With regard to verbs used in verbal similes, the most frequent is *stajati* 'stand', which appears in five different similes. It is followed by *živeti* 'live' and *izgledati* 'look (like)', each occurring in four similes. The following verbs appear in three similes each: *viti se* 'wriggle', *zaspali* 'fall asleep', *jurnuti* 'rush', *padati* 'fall', *plakati* 'cry', *sejati* 'sow', *skočiti* 'jump', and *spavati* 'sleep'. As for the nouns used, *dete* 'child' occurs in nine verbal similes; *zmija* 'snake' and *crv* 'worm' in six each; and *put* 'road' and *strela* 'arrow' in five similes each.

The largest number of similes in absolute terms — 142 in total — was retrieved from the works of J. Veselinović. This author also exhibits the highest

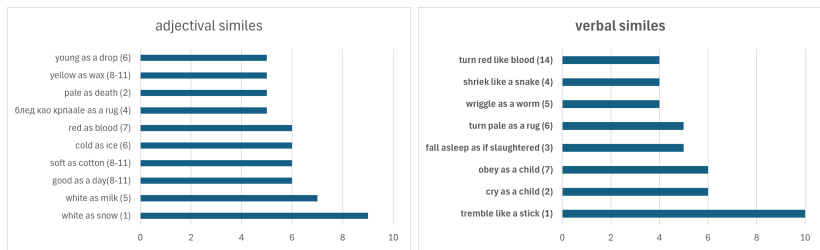


Figure 10. Similes that appear in the works of most authors (in brackets is the rank of these expressions by absolute frequency in the corpus).

relative frequency⁸, as shown in Figure 9. In contrast, only 12 similes were identified in the works of D. Gavrilović, while the lowest relative frequency is observed in the works of J. Ignjatović. Furthermore, both the absolute frequencies of adjectival (83) and verbal similes (59), as well as their relative frequencies, are highest in J. Veselinović’s works. Some authors show a clear preference for adjectival over verbal similes (J. Dimitrijević, and especially M. Uskoković), whereas V. Đorđević uses considerably more verbal than adjectival similes.

The most frequent adjectival simile, *beo kao sneg* ‘white as snow’, is used by nine authors. It is followed by *beo kao mleko* ‘white as milk’, which appears in the works of seven authors (see Figure 10, left). The most frequent verbal simile, *drhtati kao prut* ‘tremble like a stick’, is used by ten authors. It is followed by *plakati kao dete* ‘cry like a child’ and *slušati kao dete* ‘obey like a child’, each used by six authors (see Figure 10, right).

3.11 The use of foreign languages

Volunteers who proofread and corrected scanned and OCR-processed texts annotated segments in foreign languages using the XML tags `<foreign>` and `</foreign>`, assigning a two-letter language code to the `xml:lang` attribute. As most volunteers were not specialists in the history of the Serbian language, they were instructed to use the Old Church Slavonic code “cu” for all variants of Serbian not written in Vuk’s Cyrillic alphabet. Occasionally, texts contained segments in foreign languages such as Turkish or German,

8. The relative frequency was calculated as the number of similes per 10,000 running words.

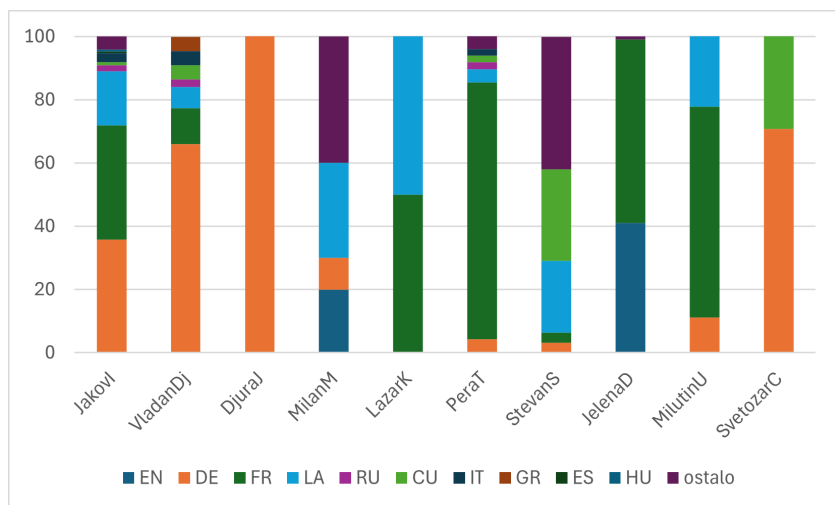


Figure 11. Use of different languages by authors expressed as a percentage of the total number of segments in a foreign language.

but written in Cyrillic and adapted to pronunciation (e.g., *мајн грүс*, from the German ‘Meine Grüße’). In our analysis, all such instances were classified as “other.” While repetition of foreign-language phrases is generally not expected, the French phrase “Mon Dieu” appeared 17 times (always in J. Dimitrijević’s novel *Nove*), and “corpus delicti” appeared four times (in S. Sremac’s novels *Pop Ćira i pop Spira* and *Ivkova slava*).

We used these tags to analyze the use of foreign languages in the 15AUTHORS corpus. Our findings show that five authors — D. Gavrilović, J. Veselinović, S. Ranković, Č. Mijatović, and B. Stanković — did not use foreign languages in their works. However, this does not allow us to conclude whether these authors were familiar with foreign languages or not; a notable example is Č. Mijatović.⁹

Some authors frequently used foreign languages — 291 occurrences were annotated in the works of J. Ignjatović and 112 in those of J. Dimitrijević — while others used them only rarely, with just one occurrence in Đ. Jakšić’s works and two in those of L. Komarčić. The remaining authors used foreign languages to varying extents: P. Todorović (48 occurrences), V. Đorđević

9. Čedomilj Mijatović on Wikipedia.

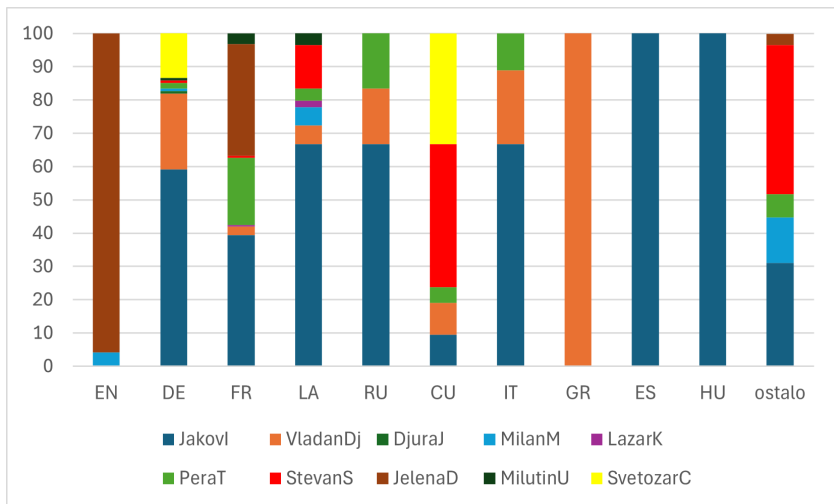


Figure 12. Language use by different authors expressed as a percentage of the number of segments in that language.

(44), S. Sremac (31), S. Ćorović (24), M. Đ. Milićević (10), and M. Uskoković (9). As shown in Figure 11, some authors incorporated segments in multiple languages. J. Ignjatović used all languages identified in the 15AUTHORS corpus except English and Greek; V. Đorđević used all except English, Spanish, and Hungarian; and P. Todorović used all except English, Greek, Spanish, and Hungarian. By contrast, J. Dimitrijević used only English and French. German appears in the works of eight authors, while French is used by six.

As shown in Figure 12, English appears only in the works of J. Dimitrijević, apart from two segments in M. Đ. Milićević’s works that were erroneously annotated. In contrast, German, Latin, and French were used by several authors. Russian appears in the works of three authors, although only six instances were identified in total. The figure also indicates that S. Sremac and J. Ignjatović more frequently employed foreign-language segments written in Cyrillic script according to pronunciation than other authors.

3.12 People’s roles

As noted in Section 1, the SrpELTeC corpus, as well as its subset the 15AUTHORS, includes automatic annotation of seven classes of named entities. One

of these classes refers to roles of people appearing in novels (ROLE), whether they are real or fictional. Serbian electronic morphological dictionaries, in which such roles are associated with appropriate semantic markers, made it possible to classify all roles identified in the corpus into those denoting professions, positions in society or organizations, and titles or forms of address. In addition, these e-dictionaries enabled a further distinction between roles referring to men and those referring to women. Table 2 presents the twenty most frequent roles identified in the 15AUTHORS corpus, classified according to these criteria. The data indicate that professions, positions, and titles referring to men are used far more frequently than those referring to women, confirming preliminary findings reported in (Stanković, Krstev, and Vitas 2024).

prof/M	<i>F</i>	prof/F	<i>F</i>	poz/M	<i>F</i>	pos/F	<i>F</i>	title/M	<i>F</i>	title/F	<i>F</i>
priest	1892	maid	157	vizier	806	landlady	173	prince	2254	misses	1163
teacher	676	woman teacher	147	hajduk	589	wife if priest	159	mister	1693	Mrs	498
doctor	558	nun	48	boss	519	wife of notary	24	Mr.	1423	miss	293
serf	523	woman cook	46	father	403	girl pupil	18	duke	800	miss	289
peasant	481	woman milliner	40	pupil	356	prioress	15	pasha	739	khanum	244
monk	476	woman cook	33	minister	295	clerk	12	captain	686	khanum	207
servant	400	woman server	31	chief	251	overseer	10	despot	605	madam	185
soldier	280	maid	28	president	225			abbot	587	ma'am	145
clerk	260	cook	28	bishop	201			czar	478	misses	142
merchant	253	peasant woman	28	hodja	121			uncle	400	czarina	141
cop	236	maid	26	colonel	119			sultan	352	aunt	131
coachman	166	midwife	25	supervisor	97			aga	330	misses	125
officer	156	danseuse	24	deputy	93			general	262	princess	89
doctor	145	teacher	22	governor	77			count	260	pashinitza	78
professor	138	woman cook	21	peasant	60			bey	247	frau	75
craftsman	134	barmaid	19	adjutant	57			bey	227	young frau	59
lawyer	121	governess	19	nobleman	57			king	223	madam	56
archpriest	119	nanny	14	secretary	56			mullah	187	gracious	55
clerk	116	maid	14	president	54			uncle	152	countess	48
guard	103	danseuse	12	manager	53			knight	106	captain's wife	37

Table 2. English translation of the most frequent professions, positions and titles of men and women in the 15AUTHORS corpus. The Serbian roles as identified in the corpus are given in the Appendix.

To establish specificity of the use of nouns across the six classes, we selected those occurring in the corpus with a frequency greater than 10. The results are presented in Figure 13. It can be observed that professions referring to men (top row, left) occur less frequently than expected — that is, relative to their distribution in the overall corpus — in the works of J. Dimitrijević

the works of Č. Mijatović, and less frequently in those of M. Uskoković, J. Dimitrijević, and B. Stanković. There is also considerable deviation from expected frequencies in the use of titles referring to women (bottom row, right) across most authors: they are used more frequently by J. Dimitrijević, J. Ignjatović, and S. Sremac, and less frequently by P. Todorović, S. Ranković, S. Ćorović, J. Veselinović, B. Stanković, and M. Đ. Milićević.

From these observations, it can be concluded that roles referring to women, as well as other designations of women, are used significantly less frequently in the works of P. Todorović, and considerably more frequently in those of J. Ignjatović. In the works of B. Stanković and M. Uskoković, neither male nor female designations appear to play a significant role, as their frequencies are generally at or below expected levels across all categories. In contrast, in V. Đorđević's works, nouns from all categories consistently fall within the expected range.

3.13 Correspondence analysis

Correspondence analysis is widely used in the analysis of textual data. It is specifically designed for contingency tables, such as those that cross-tabulate texts and words. It can be applied to word forms, lemmas, or part-of-speech tags within a corpus. In textual data analysis, correspondence analysis is commonly used for visualization through two-dimensional factorial maps.

TXM, which we used for processing, builds lexical tables in which the rows represent texts by specific authors and the columns represent selected words, while the corresponding cells contain their frequencies. Correspondence analysis reorganizes these data to facilitate visualization and provide clearer insight into their underlying structure. First, the center of gravity of the data cloud is calculated, relative to which the dispersion of the data is measured. Then, the principal axes of dispersion are determined, and the coordinates of the points are computed with respect to these axes. In a two-dimensional representation, the first two axes — those that account for the greatest dispersion — are displayed. The points in the plane derive from both sets of data, namely rows (authors) and columns (words). These axes have no intrinsic meaning; therefore, the positions of the points should be interpreted only in relation to one another.

We replicated the experiment presented in (Lavrentiev et al. 2021) by cross-tabulating authors with the 200 most frequent tokens from the 15AUTHORS corpus. The results are shown in Figure 14. During the data preparation, we normalized various quotation marks by merging them into a single

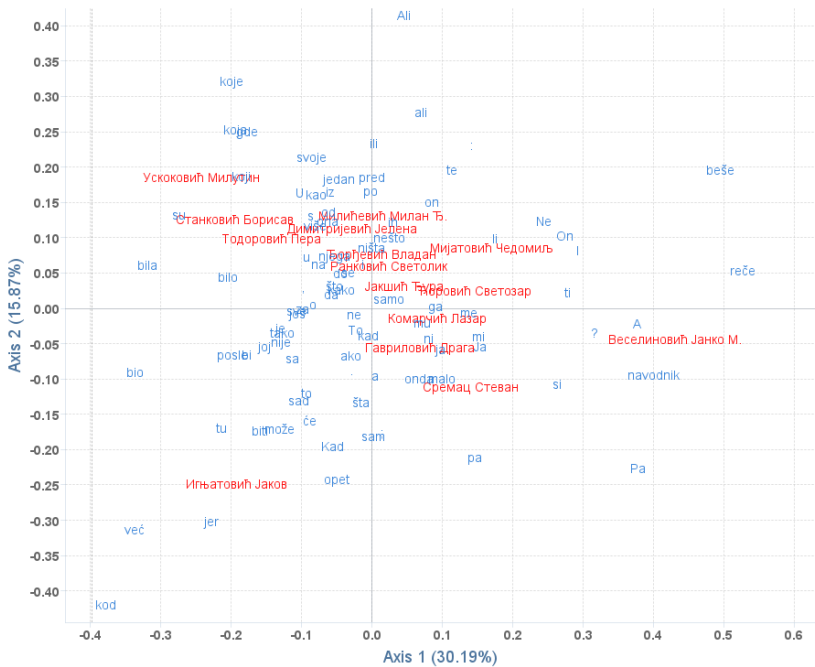


Figure 14. Correspondence analysis of authors crossed with the 200 most frequent tokens.

token—*наводник* ('quotation mark'). The figure shows that J. Veselinović is clearly separated from the other authors, while his relative proximity to S. Sremac, and to the point representing *наводник*, is consistent with the findings from Section 3.3, indicating that these two authors use direct speech more frequently than others. It can also be observed that J. Ignjatović is distinctly separated from all other authors.

A somewhat different pattern emerges when authors are cross-tabulated with the 100 most frequent nouns, verbs, and adjectives from the 15AUTHORS corpus (Figure 15). P. Todorović and Č. Mijatović are clearly separated from the other authors, as are J. Veselinović and S. Sremac, whose proximity was also observed in Figure 14. Also, M. Uskoković, D. Gavrilović, and J. Dimitrijević appear very close in this diagram; the lemma *žena* 'woman' serves as a key element linking them.

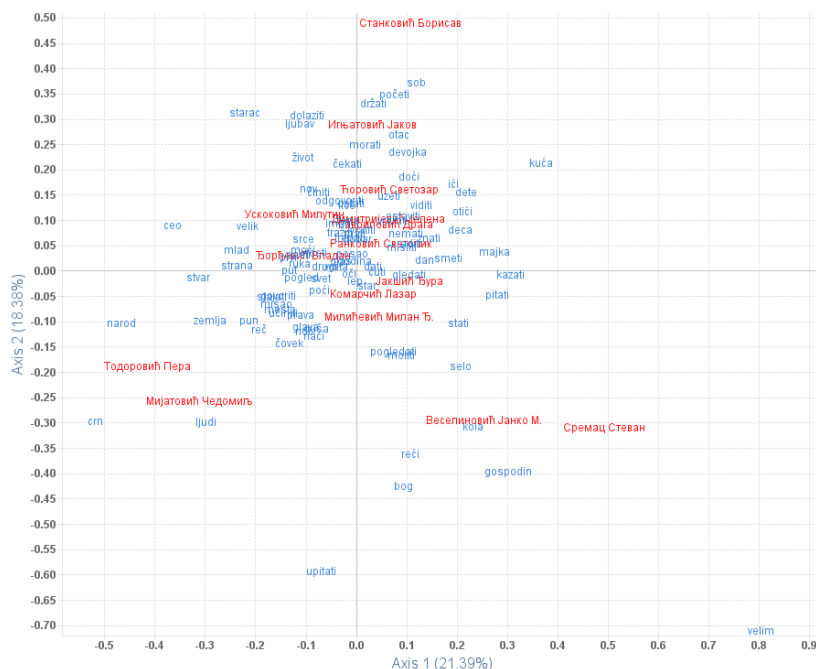


Figure 15. Correspondence analysis of authors crossed with the 100 most frequent lemmas (nouns, verbs and adjectives).

4 Conclusions

The aim of this paper is neither to evaluate the literary merits of the selected authors, nor to contrast our findings with the judgments of literary critics and readers. Rather, our goal is to present the digital imprints that authors leave in their works and to explain how we identified these imprints, which may serve as a starting point for further philological and computational research.

In our future research, we will focus on expanding our corpus. We have already compiled a collection of works by the same fifteen authors, including not only novels, but also short stories, travelogues, and memoirs. This expanded dataset will enable comparisons of digital imprints across different literary genres. Certain experiments should be repeated using balanced

samples, particularly those related to lexical richness (Section 3.4) and correspondence analysis (Section 3.13). For a more in-depth examination of individual authors' vocabularies, it would be beneficial to perform sense disambiguation. For example, is the noun *srce* 'heart', the second most frequent noun in the works of D. Gavrilović and V. Đorđević, used by these authors in the same sense?

The digital imprints presented here, as well as many others yet to be identified, can be used for the (semi-)automatic classification of selected works according to genre, themes, authors' attitudes, and other features. Such classifications could, in turn, support contrastive analyses of digital imprints across genres and other characteristics.

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Works included in 15AUTHORS corpus

1. Игњатовић, Јаков (1822–1889):
 - *Ђурађ Бранковић : историческиј роман* [Đurađ Branković : a historical novel], 1859;
 - *Једна женидба : слика из живота* [A wedding: pictures from life], 1862;
 - *Милан Наранджић* [Milan Narandžić], 1863;
 - *Васа Решпект* [Vasa Rešpekt], 1875;
 - *Патница : роман* [The Suffering Women : a novel], 1888.
2. Ђорђевић, Владан (1844–1930):
 - *Кочина крајина : историјски роман* [Koča's frontier: a historical novel], 1863;
 - *Гмунденско језеро : путничка новела* [Gmunden lake: a travel novel], 1869;

- *У фронт : приповетка из живота једног бившег краља* [To the front : a short story from the life of a former king], 1913.
- 3. Јакшић, Ђура (1832–1878):
 - *Селаци : приповетка из сеоског живота, из године 1857* [Peasants : a short story from rural life, from the year 1857.], 1874;
 - *Сирота Банаћанка* [The poor woman from Banat], 1875;
 - *Чича Тима : приповетка из учитељског живота* [Uncle Tima : a short story from a teacher's life], 1876.
- 4. Милићевић, Милан Ђ. (1831–1908);
 - *Потурченица Лејла : (црте из ратова за слободу)* [Turkified Lejla : (sketches from the wars for freedom)], 1879;
 - *Јурмуса и Фатима или Турска сила сама себе једе: прича о ослобођењу шест округа 1832-1834* [Jurmusa and Fatima or Turkish empire eats itself : the story of the liberation of six districts 1832-1834], 1879;
 - *Хајдуци : биљешке с пута по Рујну* [Hajduks : notes from a travel across Rujno], 1879;
 - *Десет пара: прича из живота у вароши* [Ten cents : a story from life in the town], 1881;
 - *Омер Челебија : приповијетка из живота српскога народа* [Omer Čelebija : a short story from the life of the Serbian people], 1886.
- 5. Комарчић, Лазар (1833–1909):
 - *Драгоцена огрлица : прича у своје време* [Precious necklace : story in its time], 1880;
 - *Мој кочијаш : слике 1883 године* [My coachman : images from the year 1883], 1887;
 - *Један разорен ум* [A ruined mind], 1893.
- 6. Гавриловић, Драга (1854–1917):
 - *Из учитељичког живота* [From a teacher's life], 1884;
 - *Бабадевојка* [Old maid], 1887;
 - *Девојачки роман* [A maiden novel], 1889.
- 7. Веселиновић, Јанко М. (1862–1905);
 - *Селанка : приповетка из сеоског живота* [Peasant woman: a story from rural life], 1888;
 - *Борци : роман из сеоског живота* [Fighters: a novel from rural life], 1889;
 - *Хајдук Станко : историјски роман* [Hajduk Stanko: a historical novel], 1896.
- 8. Тодоровић, Пера (1852–1907):

- *Силазак с престола : роман / написао Карио Амурели* [Descent from the throne : a novel/written by Kario Amureli], 1889;
 - *Београдске тајне : историски роман из српске прошлости с краја прошлог века!* [Belgrade secrets : a historical novel from the Serbian past, from the end of the last century!], 1892;
 - *Смрт Карађорђева : историски роман из недавне прошлости* [Death of Karađorđe : a historical novel from the recent past], 1983.
9. Мијатовић, Чедомиљ (1842–1932):
- *Иконија везирова мајка : приповетка из XVII века* [Ikonija, vizier's mother: a short story from 17th century], 1891;
 - *Рајко од Расине: приповетка с краја XVII века* [Rajko from Rasina : a short story from the end of 17th century], 1892;
 - *Кнез Градоје од Орлова Града : приповетка из времена боја на Косову* [Prince Gradoje of Eagle City : a short story from the time of the battle of Kosovo], 1899.
10. Сремац, Стеван (1855–1906):
- *Пон Ћира и пон Спире : приповетка* [Father Ćira and father Spira : a short story], 1894;
 - *Ивкова слава : приповетка* [Ivko's patron saint's day : a short story], 1895;
 - *Зона Замфирова : приповетка* [Zamfire's Zona : a short story], 1907.
11. Ранковић, Светолик (1863–1899):
- *Горски цар : роман* [Forest emperor : a novel], 1897;
 - *Сеоска учитељица : роман* [Village teacher : a novel], 1899;
 - *Порушени идеали : роман* [Broken ideals : a novel], 1900.
12. Станковић, Борисав (1876–1927):
- *Увела ружа* [Withered rose], 1899;
 - *Нечиста крв* [Impure blood], 1901;
 - *Покојникова жена* [The deceased's wife], 1902.
13. Димитријевић, Јелена (1862–1945):
- *Јул-Марикина приказња : приповетка* [Jul-Marikina's narrative: a short story], 1901;
 - *Фати-султан* [Fati-Sultan], 1907;
 - *Нове : роман* [New ones: a novel], 1912.
14. Ђоровић, Светозар (1875–1919):
- *Женидба Пере Карантана* [Marriage of Pera Karantan], 1905;
 - *Јарани : приповетка* [Buddies : a story], 1913;
 - *У ћелијама* [In the cells], 1919.
15. Ускоковић, Милутин (1884–1915):
- *Дошљаци : роман* [Newcomers : a novel], 1910;
 - *Потрошене речи* [Spent words], 1911;
 - *Чедомир Илић : роман* [Čedomir Ilić: a novel], 1914.

Roles of people in the 15AUTHORS corpus as identified in texts (in Serbian)

проф/м	<i>F</i>	проф/ж	<i>F</i>	поз/м	<i>F</i>	поз/ж	<i>F</i>	тл/м	<i>F</i>	тл/ж	<i>F</i>
поп	1892	слушкиња	157	везир	806	газдарница	173	кнез	2254	госпођа	1163
учитељ	676	учитељица	147	хајдук	589	попадија	159	господин	1693	гђа	498
доктор	558	калуђерица	48	газда	519	натарошевица	24	г .	1423	госпођица	293
кмет	523	кухарица	46	отац	403	ученица	18	војвода	800	фрајла	289
сељак	481	машамода	40	ђак	356	приорка	15	паша	739	ханума	244
калуђер	476	ашчика	33	министар	295	службеница	12	капетан	686	ханум	207
слуга	400	редара	31	начелник	251	надзорница	10	деспот	605	мадама	185
војник	280	измећарка	28	председник	225			игуман	587	баба	145
писар	260	куварица	28	владика	201			цар	478	госпоја	142
трговац	253	сељанка	28	хоџа	121			чича	400	царица	141
пандур	236	собарица	26	пуковник	119			султан	352	тетка	131
кочијаш	166	бабица	25	старешина	97			ага	330	госпа	125
официр	156	чочек	24	посланик	93			ђенерал	262	кнегиња	89
лекар	145	учитељка	22	намесник	77			гроф	260	пашиница	78
професор	138	куварка	21	паор	60			беј	247	фрау	75
мајстор	134	бирташица	19	ађутант	57			бег	227	фрајлица	59
адвокат	121	гувернанта	19	великаш	57			краљ	223	мадам	56
прота	119	дадиља	14	секретар	56			мула	187	милостива	55
чиновник	116	служавка	14	преседник	54			чика	152	грофица	48
стражар	103	играчица	12	управитељ	53			витез	106	капетаница	37

Textometric and Comparative Analysis of the Bilingual Corpus of the Journal *Infotheca*

UDC 811.163.41'322.2:811.111'322.2

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ABSTRACT: This paper presents a textometric and comparative analysis of the bilingual corpus of the scientific journal *Infotheca*, which comprises parallel texts in Serbian and English. The corpus was extracted from the digital library *Bibliša*, with metadata linked to Wikidata. Particular attention is given to the analysis of the Serbian and English subcorpora using textometric methods, including frequency analysis, keyword analysis, collocation analysis, and topic modeling. Following the individual analyses, a comparative analysis was conducted with the aim of identifying differences and similarities in the lexical characteristics of the two languages. The results show that, although the texts are translation equivalents, there are notable differences in term distribution, indicating the influence of linguistic and scientific conventions. The paper contributes to the development of methodologies for analyzing bilingual corpora in the fields of digital humanities and language technologies.

KEYWORDS: bilingual corpus, textometrics, *Infotheca*, parallel texts, comparative analysis, Wikidata, digital libraries.

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1 Introduction

Bilingual corpora play a significant role in contemporary linguistics and digital humanities, as they enable systematic comparison of linguistic structures, vocabulary, and language patterns across different languages. As parallel collections of texts, they represent a valuable resource for studying translation

strategies, terminology, and linguistic variation. In the context of language technologies, bilingual corpora serve as a foundation for the development and evaluation of tools such as machine translation, automatic annotation, and language modeling. At the same time, in digital humanities research, they facilitate a deeper understanding of cultural and scientific developments through multilingual sources, bridging quantitative methods with interpretative approaches.

The journal *Infoteka* is a relevant and reliable source of data for analysis in the fields of library science, information science, and language technologies. As a bilingual scientific journal, it includes papers in both Serbian and English, enabling the construction of a parallel corpus suitable for comparative research. Structured metadata and the availability of full-text articles further enhance its usability in textometric and corpus-based analyses, making it a valuable resource within digital humanities research.

Stanković et al. (2012) presented the *Bibliša* system, a tool designed to enhance the search of large collections of TMX (Translation Memory eXchange) documents generated through the parallelization of bilingual texts from multilingual digital libraries. Its functionality was tested on a collection of TMX documents derived from bilingual articles of the journal *Infoteka*. The continuous development of the system has introduced new capabilities, transforming the platform into a repository of parallel texts from various collections. It should be emphasized that *Infoteka* was the first collection integrated into Bibliša and remains the one that is regularly updated with new content. Specifically, upon the publication of an issue in its online version on the OJS platform¹, the articles are parallelized, enriched with metadata, and subsequently integrated into Bibliša and the Wikidata knowledge base (Stanković and Davidović 2021; Andonovski 2026).

The textometric approach has long been applied as an effective method for corpus analysis across various fields of the humanities and social sciences. By combining lexicometric and statistical methods with advanced corpus technologies, textometry enables non-linear, both quantitative and qualitative analysis of digital textual resources.

The TXM software platform (Heiden 2010) provides a comprehensive environment for textometric analysis, supporting a wide range of statistical computations and graphical visualizations of results² (Pincemin, Heiden, and Mazuet 2022).

1. <http://infoteka.bg.ac.rs/ojs/>

2. TXM - textometric platform

The SrpELTeC corpus has served as a testbed for various textometric studies (Jaćimović 2019; Krstev 2021; Stanković, Krstev, and Vitas 2024), and, following successful applications to literary texts, the focus has shifted toward the analysis of scientific texts. In this paper, the potential of the textometric approach is illustrated within the TXM environment through the analysis of the bilingual corpus of the journal *Infotheca*. Particular attention is devoted to the extraction and comparison of the Serbian and English subcorpora, as well as to the application of various textometric methods, including frequency analysis, specificity analysis, collocation analysis, and temporal progression. The obtained results are further interpreted through appropriate visualizations, enabling a clearer understanding of developmental trends and the thematic structure of the corpus.

The remainder of the paper is organized as follows: Section 2 presents the corpus development, while Section 3 provides the frequency analysis of nouns, verbs, adjectives, and multiword terms of the adjective-noun type. The textometric analysis is presented in Section 4, which includes the analysis of progression and topic specificity across periods. Topic modeling is discussed in Section 5, followed by the discussion in Section 6 and the conclusion in Section 7.

2 Corpus Development

Digital objects within the *Bibliša* system are described using structured metadata tailored to the representation of scientific journals and their contents (Stanković et al. 2012). These metadata include information about individual journal issues as well as the articles they contain. At the issue level, basic bibliographic data are recorded, such as the identification number, volume, issue number, month, and year of publication.

At the article level, metadata are organized bilingually, in Serbian and English, and include information about authors, title, article type, page range, abstract, keywords, and the availability of full text, with the option of recording translator information where applicable. Such structured metadata enable systematic representation, retrieval, and the analysis of the bilingual corpus (Stanković, Obradović, and Trtovac 2012; Stanković et al. 2016).

The *Bibliša* database is implemented within the MongoDB³ environment, enabling flexible data management and organization. The system supports

3. <https://www.mongodb.com/>

data export in various formats, such as TXT and XML, with the option to select different levels of detail.

For the purposes of this analysis, a subset of metadata was extracted, including the article identifier, issue number, year of publication, title, and information about the first author. In addition, textual versions of the articles in Serbian and English were used, allowing for both individual and comparative analysis.

After extraction, the corpora SRINFOTEKA and ENINFOTEKA were imported into the TXM environment, within which integrated models for morphosyntactic annotation and lemmatization were applied. For the automatic identification of part-of-speech categories and lemmas, TXM relies on the TreeTagger tool⁴ (Schmid 1994), which is a widely used standard in corpus processing and supports tagging across multiple languages.

For Serbian, models adapted to the language and aligned with the Universal Dependencies (UD) tagset⁵ were used, whose training and description are provided in (Utvić 2011; Stanković, Škorić, and Šandrih Todorović 2022). This approach enables consistent and standardized annotation of part-of-speech categories, which is particularly important for subsequent textometric analysis. For English, the Penn Treebank tagset⁶ was employed, one of the most widely used standards for part-of-speech annotation in English. It provides fine-grained grammatical distinctions and is broadly applied in corpus linguistics and natural language processing.

Given that different tagsets were used for Serbian and English (UD and Penn Treebank), it was necessary to harmonize them to enable direct comparative analysis. To this end, Penn Treebank tags were mapped to the corresponding categories of the UD tagset, which represents a universal standard for morphosyntactic annotation. The mapping process relied on existing conversion schemes and linguistic correspondences between the two systems, with adjustments in cases where a one-to-one mapping was not possible. This normalization enabled a consistent view of part-of-speech categories across both subcorpora and a more reliable comparison of their grammatical characteristics.

The subcorpora each consist of 196 articles and 30,062 aligned segments (mostly sentences). The English subcorpus ENINFOTEKA contains 871,253 tokens, while the Serbian subcorpus SRINFOTEKA contains 775,669 tokens,

4. <https://www.cis.uni-muenchen.de/~schmid/tools/TreeTagger/>

5. <https://universaldependencies.org/u/pos/>

6. <https://cis.uni-muenchen.de/~schmid/tools/TreeTagger/data/Penn-Treebank-Tagset.pdf>

making the English subcorpus approximately 12% larger in terms of token count.

When considering only words (excluding punctuation), SRINFOTEKA contains 653,215 words, whereas ENINFOTEKA contains 751,185, meaning that the English subcorpus is about 15% larger. In terms of distinct tokens, SRINFOTEKA has 68,631, while ENINFOTEKA has 40,358, indicating that Serbian has approximately 70% more distinct tokens, primarily due to its richer inflectional morphology. However, the number of distinct lemmas is also higher in SRINFOTEKA by about 16%, with 36,640 lemmas compared to 31,373 in ENINFOTEKA, despite the English corpus being slightly larger overall.

Lexical richness can be measured in various ways. One of the basic measures is the Type–Token Ratio (TTR), which represents the ratio between the number of distinct words (types) and the total number of tokens. Since it is dependent on corpus size, comparisons are most appropriate for corpora of the same or similar size. For SRINFOTEKA, this ratio is 0.09, while for ENINFOTEKA it is 0.05, indicating greater lexical richness in the Serbian subcorpus. Another measure, Root TTR, represents the ratio between the number of distinct words and the square root of the total number of tokens. For SRINFOTEKA, this value is 77.93, while for ENINFOTEKA it is 43.24, further confirming the higher lexical diversity of the Serbian subcorpus.

The chart in Figure 1 presents the distribution of parts of speech according to UD categories (UPOS) in the Serbian (sr) and English (en) subcorpora, revealing both similarities and clear differences. The NOUN category is dominant in both languages, with a slightly higher frequency in the Serbian corpus, indicating a somewhat greater nominal density. Similarly, punctuation (PUNCT) is highly represented and relatively balanced across the two subcorpora, reflecting the structural characteristics of scientific discourse.

Significant differences can be observed in certain grammatical categories. In the English corpus, determiners (DET) and adpositions (ADP) are considerably more frequent, which is consistent with the analytic nature of the English language. In contrast, Serbian shows lower frequency of these categories, as syntactic relations are often expressed morphologically, primarily through case inflection.

Verbs (VERB) are slightly more frequent in English, which may indicate a higher degree of explicitness in predicate structure, while adjectives (ADJ) and adverbs (ADV) are relatively balanced across both corpora. Conjunctions (CCONJ, SCONJ) exhibit moderate differences, with English showing a greater tendency toward their use.

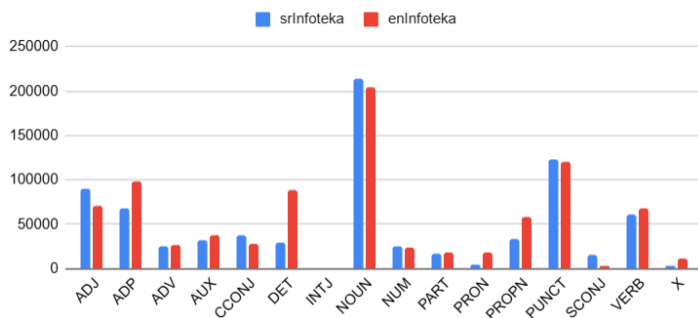


Figure 1. Number of tokens by part-of-speech categories in the Serbian and English subcorpora.

A particularly notable difference is the higher frequency of proper nouns (PROPN) in the English corpus, which may be attributed to differences in naming or translation conventions. Overall, the observed differences reflect the typological characteristics of Serbian (inflectional) and English (analytic) languages, as well as the specific features of scientific style in both.

It can be concluded that, although the INFOTHECA corpus consists of parallel texts, differences in categories such as DET, VERB, and ADP reflect underlying typological and stylistic distinctions between Serbian and English.

3 Frequency Analysis

3.1 Noun Frequencies

The analysis of noun frequencies in the parallel INFOTHECA corpus was conducted using appropriate CQL queries for the English and Serbian subcorpora. In the English part of the corpus, using the query `[enpos="NN.*"]`, a total of 204,262 noun occurrences were identified, comprising 16,396 distinct forms and 12,392 lemmas.

Figure 2 presents the distribution of the most frequent nouns in the English and Serbian subcorpora. In the English corpus, the most frequent nouns include *library*, *language*, *text*, *information*, and *system*, indicating the dominance of terminology related to library science, language technologies, and text processing. In addition, nouns such as *corpus*, *project*, *user*, *word*, and *document* frequently occur, reflecting the technological and user-oriented aspects of the analyzed texts.

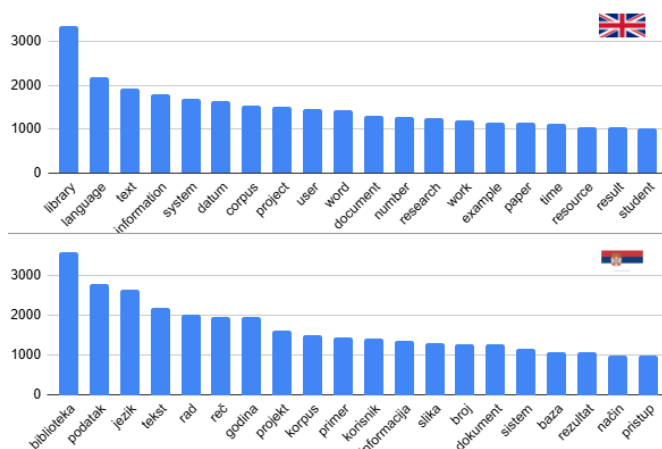


Figure 2. Twenty most frequent nouns in the subcorpora.

In the Serbian subcorpus, 214,129 noun occurrences were recorded, comprising 24,996 distinct forms and 13,583 lemmas. The most frequent nouns include *biblioteka*, *podatak*, *jezik*, *tekst*, and *rad*, indicating a similar thematic core to that of the English part of the corpus. Among the frequently occurring nouns are also *reč*, *godina*, *projekt*, *korpus*, *primer*, and *korisnik*, as well as *informacija*, *slika*, *broj*, *dokument*, *sistem*, *baza*, *rezultat*, *način*, and *pristup*.

The comparison reveals a high degree of overlap in the key terms across the two subcorpora, which is expected for parallel texts. However, differences in the distribution of certain lexemes can also be observed. The English corpus shows a slightly higher concentration of technically oriented terms, while the Serbian corpus encompasses a broader range of more general and context-dependent nouns. These differences may be attributed both to language-specific characteristics and to varying translation and stylistic choices.

3.2 Verb Frequencies

In the Serbian subcorpus, using the query [srpos="VERB"], a total of 61,121 verb occurrences were identified, comprising 11,272 distinct forms and 3,982 lemmas. In the English subcorpus, using the query [enpos="VV.*"], 67,891 verb occurrences were found, with 5,433 distinct forms and 2,328 lemmas. The results indicate a greater diversity of forms in Serbian.

Figure 3 shows the distribution of the most frequent verbs in the English and Serbian subcorpora. In both languages, general, high-frequency verbs dominate, reflecting their broad use in scientific discourse. In the English corpus, the most frequent verb is *use*, which appears significantly more often than others, followed by verbs such as *do*, *make*, *include*, and *create*. These verbs reflect a characteristic feature of English scientific style, emphasizing the explicit description of procedures and methods.

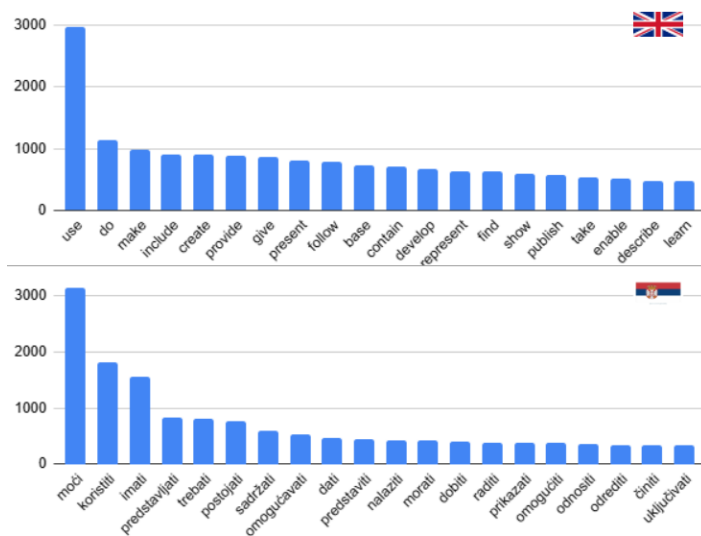


Figure 3. Twenty most frequent verbs in the subcorpora.

In the Serbian corpus, the most frequent verb is *moći* ('can'), indicating a more frequent use of modal constructions and the expression of possibility. It is followed by verbs such as *koristiti* ('use'), *imati* ('have'), *predstavljati* ('represent'), and *trebati* ('need/should'), which are also typical of academic style.

The comparison highlights differences in discourse strategies: English tends toward more direct and action-oriented expression, while Serbian more frequently employs modal and descriptive constructions. These differences may be attributed to typological characteristics of the languages, as well as to translation choices within the parallel corpus.

3.3 Adjective Frequencies

In the English subcorpus, using the query [enpos="JJ.*"], a total of 70,582 adjective occurrences were identified, comprising 6,259 distinct forms and 5,400 lemmas. In the Serbian subcorpus, using the query [srpos="ADJ"], 89,363 adjective occurrences were found, with 20,537 distinct forms and 9,153 lemmas. These results also indicate a significantly greater diversity of forms in Serbian.

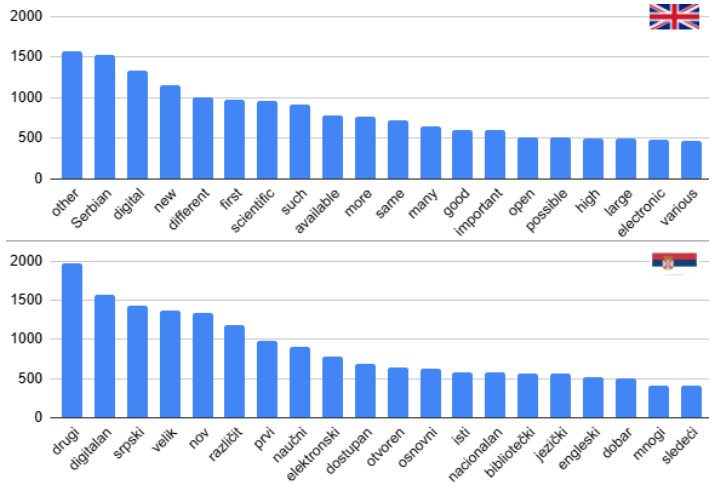


Figure 4. Twenty most frequent adjectives in the subcorpora.

Figure 4 shows the distribution of the most frequent adjectives in the English and Serbian subcorpora. In the English part, general and highly frequent adjectives such as *other*, *Serbian*, *digital*, *new*, and *different* dominate, reflecting their broad use in scientific discourse. In particular, *Serbian* and *digital* stand out, indicating the thematic focus of the corpus on the Serbian language, digital resources, and related processes. Among the frequently occurring adjectives are also *scientific*, *such*, *available*, *same*, and *many*, while adjectives such as *important*, *possible*, *large*, and *various* reflect a tendency toward generalization and evaluative expression in academic style.

The Serbian subcorpus exhibits a similar pattern, with the dominance of adjectives such as *drugi* ('other'), *digitalan* ('digital'), *srpski* ('Serbian'), *veliki* ('large'), and *nov* ('new'), with *digitalan* and *srpski* again indicat-

ing the thematic orientation of the corpus. Among the frequently occurring adjectives are *različit* ('different'), *prvi* ('first'), *naučni* ('scientific'), *elektronski* ('electronic'), and *dostupan* ('available'), which contribute to more precise description and classification of concepts. Domain-specific and stylistic features are further shaped by adjectives such as *otvoren* ('open'), *osnovni* ('basic'), *isti* ('same'), *nacionalan* ('national'), *bibliotečki* ('library-related'), and *jezički* ('linguistic'), while *dobar* ('good'), *mnogi* ('many'), and *sledeći* ('following') indicate elements of evaluation and textual organization.

Overall, both subcorpora are characterized by a combination of general and domain-relevant adjectives, which is typical of scientific discourse, with a high degree of thematic alignment between English and Serbian. This distribution confirms that adjectives in the corpus primarily serve the function of qualifying and specifying concepts.

3.4 Frequencies of Adjective–Noun Combinations

Among multiword terms, the most frequent pattern consists of an adjective followed by a noun, which plays a significant role in the specification and refinement of concepts. In the English subcorpus, the analysis of adjective–noun collocations using the query [enpos="JJ.*"] [enpos="NN.*"] identified a total of 47,813 occurrences. These collocations comprise 26,731 distinct forms and 23,901 lemmas. The results indicate a high diversity of adjective–noun combinations, reflecting the richness of nominal phrases in English scientific discourse.

Figure 5 (top) presents the distribution of the most frequent domain-specific terms in the analyzed corpus. It can be observed that terms such as *digital library*, *Serbian language*, and *scientific research* dominate, indicating a clear thematic orientation toward digital libraries, language resources, and scientific research. Notably frequent are also terms such as *natural language*, *open access*, and *cultural heritage*, which reflect the broader context of applying language technologies within digital humanities. Among the frequent expressions are also *metadata*, *digital object*, *personal name*, and *foreign language*, highlighting the importance of data structuring and multilingualism in the corpus. The presence of terms such as *parallel corpus*, *social medium*, and *high education* further confirms the interdisciplinary nature of the analyzed texts.

Figure 5 (bottom) presents the distribution of the most frequent adjective–noun collocations in the Serbian subcorpus. The dominance of combinations such as *srpski jezik* ('Serbian language'), *univerzitetska biblioteka*

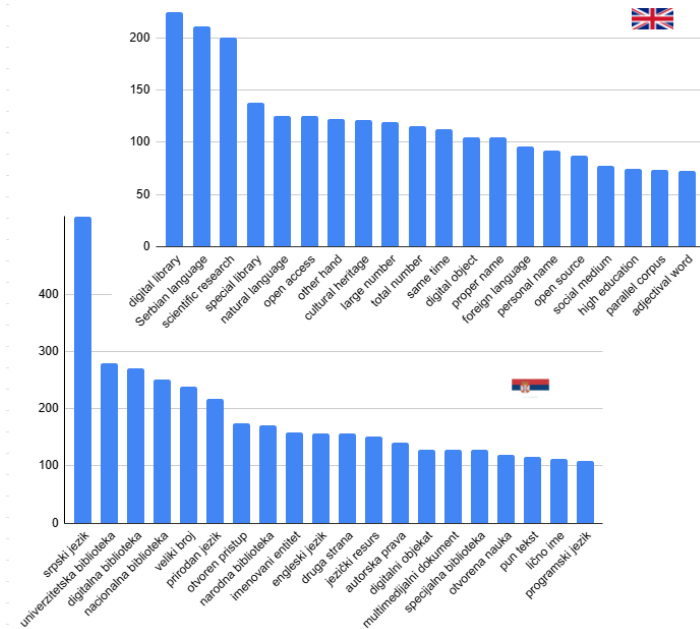


Figure 5. Twenty most frequent adjective–noun combinations.

(‘university library’), *digitalna biblioteka* (‘digital library’), and *nacionalna biblioteka* (‘national library’) can be observed, indicating a clear thematic orientation of the corpus toward language, library science, and digital resources.

Among the frequent collocations are also *veliki broj* (‘large number’), *prirodan jezik* (‘natural language’), *otvoren pristup* (‘open access’), *narodna biblioteka* (‘public library’), and *imenovani entitet* (‘named entity’), reflecting key concepts in the fields of natural language processing and information management. The presence of collocations such as *engleski jezik* (‘English language’), *druga strana* (‘other side’), *jezički resurs* (‘language resource’), and *autorska prava* (‘copyright’) points to the multilingual and legal context of the analyzed texts. Furthermore, collocations such as *digitalni objekat* (‘digital object’), *multimedijski dokument* (‘multimedia document’), *specijalna biblioteka* (‘special library’), *otvorena nauka* (‘open science’), *pun tekst* (‘full text’), *lično ime* (‘personal name’), and *programski jezik* (‘programming language’) confirm the interdisciplinary nature of the corpus. Overall,

the distribution of adjective–noun combinations shows that the Serbian sub-corpus is characterized by a rich and thematically coherent use of nominal phrases, which play a key role in the precise naming and specification of concepts in scientific discourse.

A significant difference in frequency can be observed for the term *srpski jezik* (536) and its translation equivalent *Serbian language* (211). This is because in English texts the noun *language* is often omitted, as it is implicitly understood. This can be seen in Figure 6, which presents concordances from the parallel INFOTEKA corpus obtained via the Noske platform⁷ - NoSketch Engine (Kilgarriff et al. 2014).

	Bikes_en
<S> Uz podršku stručnjaka iz Evropske unije za programski paket izabran je slovenački COBISS, koji je bio prisutan u ovim bibliotekama od početka automatizacije, a kao jedini u tom trenutku sveobuhvatan i potpuno završen programski paket za biblioteke koji ima interfejs na srpskom jeziku i čiji je odnos kvaliteta / cena bio prihvatljiv za Srbiju. </S> <S> Projekat se odvijao na 3 nivoa : 1. retrospektivna katalogizacija doktorskih disertacija 2. retrospektivna katalogizacija frekventnog fonda 3. retrospektivna katalogizacija signatura K i K1 (književnost na srpskom jeziku). </S> <S> Budući da su signaturama K i K1 označena književna dela na srpskom jeziku smatralo se da je ova grupa od ukupno 5.745 publikacija najpogodnija za otpočinjanje kompletne retrospektivne katalogizacije nefrekventnog fonda. </S> <S> Razmišljalo se da se u nastavku projekta radi na unosu starog dela fonda na srpskom jeziku, označenog slovnim signaturama. </S> <S> Druga vrsta problema nastajala je prilikom pokušaja da se pronade odgovarajući termin za pojavu koja ili ne postoji u srpskom jeziku ili je klasifikovana na drugi način. </S> <S> Ipak, učestalost ili pojavljivanje i nepojavljivanje među rezultatima u nekim situacijama nisu mogli biti od presudnog značaja zbog još uvek nedovoljnog broja online lingvističkih tekstova na srpskom jeziku. </S> <S> Konkretno, bavila sam se prilagođavanjem onih delova Prinstonskog wordneta (RWN) za srpski jezik koji pripadaju domenu biologije, a prema SUMO ontologiji povezani su sa sledećim ontološkim kategorijama : Cell - ćelija , Genetics - genetika , Virus - virusi , Bacterium - bakterije , Microorganism - mikroorganizmi , ScienceFields - naučne oblasti. </S>	<S> By support of the EU experts , Slovenian COBISS was selected as the software package , because it was the package which was already present in these libraries from the beginning of the electronic data processing , and it was the only library software with already built-in interfaces and HELP in Serbian language that could be applied immediately and at an affordable price. </S> <S> The Project was conducted on three levels : 1. Retrospective cataloguing of doctoral dissertations 2. Retrospective cataloguing of frequently used holdings 3. Retrospective cataloguing of K and K1 call numbers (literature in Serbian language). </S> <S> Since K and K1 signatures designate literature in Serbian language , this group out of 5.745 publications , was considered as the most convenient for initialization of entire non - frequently used collection retrospective cataloguing . </S> <S> Recording of old part of holdings in Serbian language , designated by literal call numbers was also considered in terms of continuing the Project. </S> <S> Another kind of problem occurred in the attempt to find an adequate term for the phenomenon that either does not exist in Serbian or is classified in a different way. </S> <S> However , in some situations the frequencies and occurrence or non-occurrence of some terms in Google results could not be decisive , as linguistic texts in Serbian are still scarce. </S> <S> More precisely , I worked on the Serbian adaptation for those parts of the Princeton wordnet that belong to the domain of biology and , according to the SUMO , are connected to the following ontological categories : Cell , Genetics , Virus , Bacterium , Microorganism , ScienceFields. </S>

Figure 6. Concordances of the INFOTEKA subcorpus on the Noske platform.

In English, noun–noun constructions are frequently used where Serbian employs adjective–noun structures. This is illustrated by the case of *univerzitetske biblioteke* (‘university libraries’), which ranks highly in the Serbian corpus but does not appear as such in English, where it is realized as a noun–noun construction (*university library*). A similar pattern can be observed in other examples: *jezičke tehnologije* – *language technology*, *maternji*

7. <https://noske.jerteh.rs/> - an instance of the NoSketch Engine system maintained by the Language Resources and Technologies Society JeRTeh

jezik – mother tongue, *zdravstvena zaštita* – health care, and *obrazovni proces* – education process.

Overall, the distribution of terms shows that the corpus integrates topics from the fields of language technologies, library science, digital resources, and education, with a strong emphasis on natural language processing and digital content management.

4 Textometric Analysis

4.1 Progression

Progression in TXM represents the distribution and change in the frequency of selected linguistic units along a text or across a given corpus, enabling insight into their dynamics and development over time or within the structure of a document. Figure 7 shows the temporal progression of the terms *model*, *corpus*, and *dictionary/lexicon* in the Serbian subcorpus. It can be observed that the term *corpus* (blue line) has the highest overall frequency and exhibits a continuous increase throughout the entire period, with more pronounced growth around 2012, 2019, and from 2024 onward, indicating sustained interest in corpora and their use in research. The term *dictionary/lexicon* (green line) shows a stable and moderate increase, with a somewhat earlier rise compared to the other observed terms, and notable growth in 2024, reflecting the traditionally strong presence of lexical topics. However, its growth is more gradual and less dynamic compared to *corpus*. In contrast, the term *model* (red line) exhibits slower growth in the earlier period, followed by a noticeable acceleration in later stages, which may be associated with the development of modern machine learning methods and language models.

Overall, the progression indicates a shift in focus toward corpus-based and model-driven approaches, reflecting broader trends in the field of language technologies.

Figure 8 presents the temporal progression of selected concepts in the Serbian subcorpus, illustrating the development of thematic areas over the period covered by the corpus. Three groups of concepts were analyzed: *otvoren pristup/nauka* ('open access/science'), *jezički/leksički/lingvistički resurs* ('language/lexical/linguistic resource'), and *digitalan objekat/nauka* ('digital object/library').

It can be observed that digital objects and libraries (green line) exhibit a relatively stable growth in the period 2011–2023, with a sharp increase in 2017, reflecting the gradual digitization and development of digital library

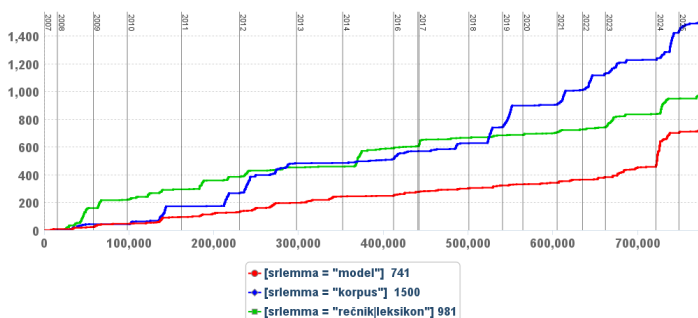


Figure 7. Progression of concepts related to language resources.

infrastructures. In 2023, a thematic issue of the journal was dedicated to the *eNauka* (‘eScience’) system, a publicly accessible information system that became operational in the first quarter of 2023.

Mentions of language resources (blue line) show noticeable peaks in 2008, 2012, and 2023, followed by further growth, indicating a strengthening interest in language technologies and resources in recent scientific discourse. In contrast, open science (red line) shows an initial increase in 2011, followed by more intensive growth only from 2018 onward. This trend reflects the expansion of open science initiatives and the increasing relevance of open access policies within the scientific community.

Overall, the progression indicates a clear development of infrastructural topics, language resources, and open science, with each of the observed categories reflecting different phases in the evolution of the digital scientific environment.

4.2 Topic Specificity by Periods

Specificity in TXM is a statistical measure that indicates the extent to which a given linguistic unit is overrepresented or underrepresented in a selected subset compared to a reference corpus, enabling the identification of characteristic terms for a given context or period (Heiden 2010). Figure 9 presents the specificity of selected terms (*korpus*, *rečnik*, *model*, *digitalizacija*, *anotacija*) across four time periods (2007–2025), with values expressed relative to the corpus average.

In the first period (2007–2011), dictionaries are mentioned more frequently than the corpus average, while other terms, particularly *digitalizacija*

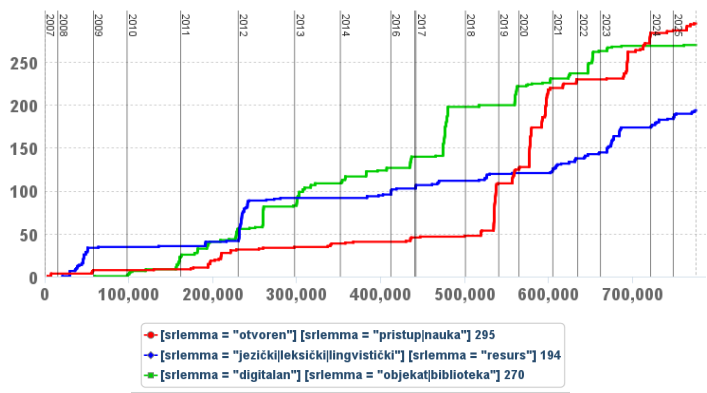


Figure 8. Progression of selected research topics.

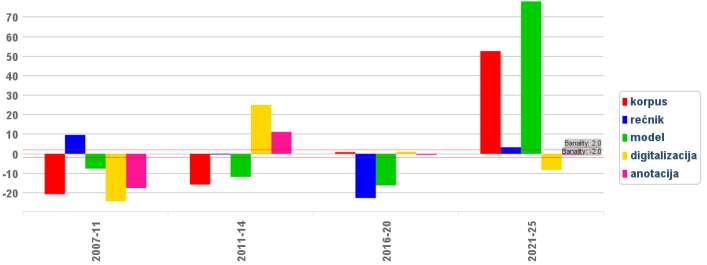


Figure 9. Specificity of selected research topics.

and *korpus*, show negative specificity, indicating their relatively low presence during this period. In the period 2011–2014, an increase in the specificity of *digitalizacija* and *anotacija* can be observed, reflecting a growing interest in digital resources and text processing. The period 2016–2020 is characterized by relative stabilization, with most terms showing values close to the average, while *rečnik* ('dictionary') and *model* exhibit negative specificity. For this period, notably positive specificity is observed for adjectives such as *normativan* ('normative'), *terminološki* ('terminological'), and *otvoren* ('open'), as well as for nouns such as *repozitorijum* ('repository') and *sintagma* ('syntagm').

The most pronounced changes occur in the period 2021–2025, where *model* and *korpus* ('corpus') show a strong increase in specificity, indicating the dominance of corpus creation and the use of language models. Notably,

these two terms attain positive specificity only in the final period. At the same time, *digitalizacija* ('digitalization') declines in importance, suggesting that it has become an underlying infrastructure rather than a central research topic.

Figure 10 presents the change in specificity of verb groups describing research activities across four time periods. In the early period (2007–2010), all groups exhibit negative or low specificity, indicating their limited presence. In the period 2011–2014, an increase in specificity can be observed for the group *kreirati-razvijati* ('create-develop'), as well as a moderate rise for *unaprediti-automatizovati* ('improve-automate'), while other groups remain less prominent. During the period 2016–2020, a decline in specificity is observed for most groups, particularly *unaprediti-automatizovati*, suggesting a temporary decrease in their relevance. The most significant changes occur in the period 2021–2025, where the group *obučavati* ('train') shows a strong increase in specificity, while *evaluirati-analizirati* ('evaluate-analyze') also rises, indicating a growing emphasis on describing language models and analytical approaches. These results reflect a shift from development and infrastructural activities toward methods based on machine learning and evaluation.

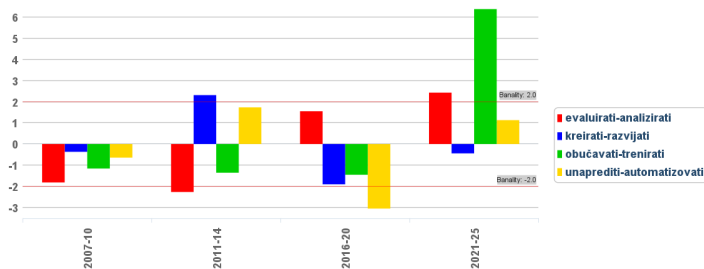


Figure 10. Specificity of selected research activities.

Overall, the results reveal a clear developmental trajectory: from an early phase focused on lexicography, through a phase of digitization and annotation, to a contemporary period dominated by corpus-based and model-driven approaches.

4.3 Comparison of Progression and Specificity

The comparison of progression and specificity for the terms *model.** and *katalog.** ('catalog.*') using the same CQL query reveals a clear shift in thematic focus over time.

The specificity analysis shows that the term *katalog.** ('catalog.*') is positively specific in the early period (2007–2010), indicating its relative prominence compared to the corpus average (Figure 11). In subsequent periods, its specificity declines and stabilizes around the average, followed by a decrease in the final period (2021–2025), suggesting that this concept is losing its central role in the discourse. In contrast, *model.** exhibits negative specificity in earlier phases but shows a markedly strong increase in the final period, indicating its growing thematic importance in the contemporary corpus and current research trends.

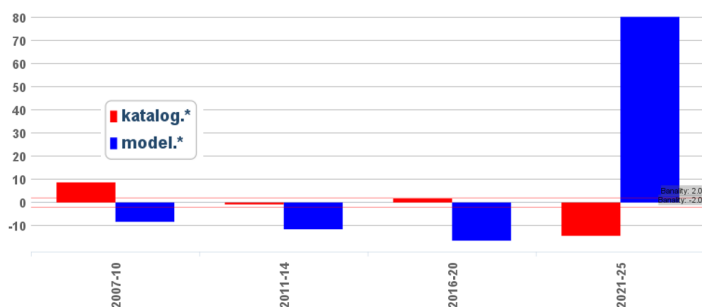


Figure 11. Specificity of selected research concepts.

This finding is consistent with the progression analysis, which shows that *model* exhibits relatively moderate and gradual growth until around 2023, followed by a sharp increase in frequency (Figure 12). In contrast, *katalog* ('catalog') and related terms (*katalogizacija* ('cataloging'), *katalogizator* ('cataloguer')) display a stable but moderate increase without significant peaks up to 2021, after which they effectively stagnate (i.e., they occur very rarely), indicating a continuous but progressively less dominant role.

A combined consideration of these two aspects allows for a clearer interpretation: while progression reflects the absolute growth in the usage of terms, specificity analysis reveals their relative importance within the corpus. In this sense, although *katalog.** remains present throughout the entire

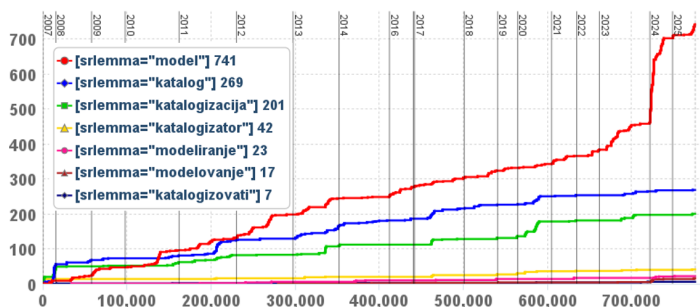


Figure 12. Progression of selected research concepts.

period, its relative importance declines due to the rapid growth of the term *model*.*. This trend reflects a broader shift from traditional library and cataloging topics toward contemporary approaches based on models and machine learning.

5 Topic Modeling

Topic modeling was conducted on the English subcorpus of the journal, resulting in the identification of six thematic clusters that reflect different aspects of the analyzed corpus (Table 1). The topic modeling procedure, based on Latent Dirichlet Allocation (LDA), involves several key steps: text preprocessing, including cleaning, tokenization, and lemmatization, as well as the removal of stop words. The LDA model is then trained on the prepared data to extract latent topics within the corpus.

The first topic encompasses concepts related to library systems, scientific research, and digital infrastructure, while the second focuses on corpus linguistics and language resources, including text processing and translation. The third topic is associated with lexicographic aspects, such as dictionaries, word forms, and usage examples. The fourth topic relates to digital libraries and software projects, including platforms such as *Europeana*. The fifth topic covers the educational context, with a focus on students, teaching, and learning in digital environments. The sixth topic connects corpus and linguistic analyses with bibliographic and authorship aspects, including citation practices and text structure. The extracted topics point to the interdisciplinary nature of the corpus, and consequently of the journal itself, which integrates library science, language technologies, education, and digital humanities.

Topic	Keywords
Topic 1	library, system, data, research, scientific, user, university, digital, national, science
Topic 2	corpus, language, word, text, resource, serbian, model, used, document, translation
Topic 3	name, language, serbian, word, dictionary, example, used, form, figure, text
Topic 4	digital, library, project, software, material, europeana, data, computer, user, page
Topic 5	student, text, language, document, course, learning, school, web, programming, figure
Topic 6	word, language, serbian, citation, used, data, corpus, author, noun, number

Table 1. Topics extracted from the ENINFOTEKA subcorpus.

The obtained results were further analyzed and interpreted using various visualizations, such as interactive topic displays, word clouds, and charts showing the distribution of topics across documents. Figure 13 presents the number of papers per topic, where one dominant topic is automatically assigned to each document using the LDA model.

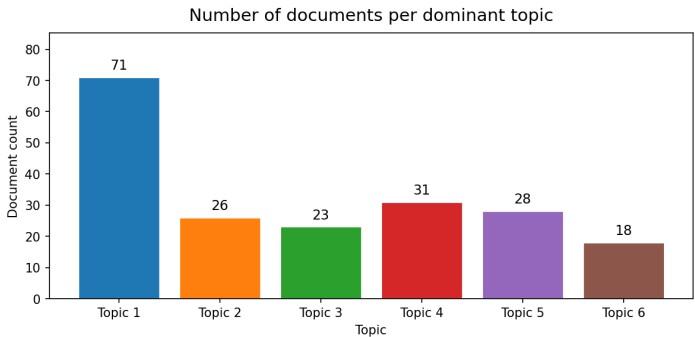


Figure 13. Distribution of papers across topics.

Figure 14 shows an interactive visualization of topic modeling results using the pyLDavis tool (Sievert and Shirley 2014). The left panel represents the Intertopic Distance Map, obtained through multidimensional scaling,

where each circle corresponds to a topic. The size of each circle indicates the relative prevalence of the topic in the corpus, while the distance between circles reflects the degree of similarity between topics. It can be observed that some topics are closely related and partially overlapping, whereas others are more clearly separated.

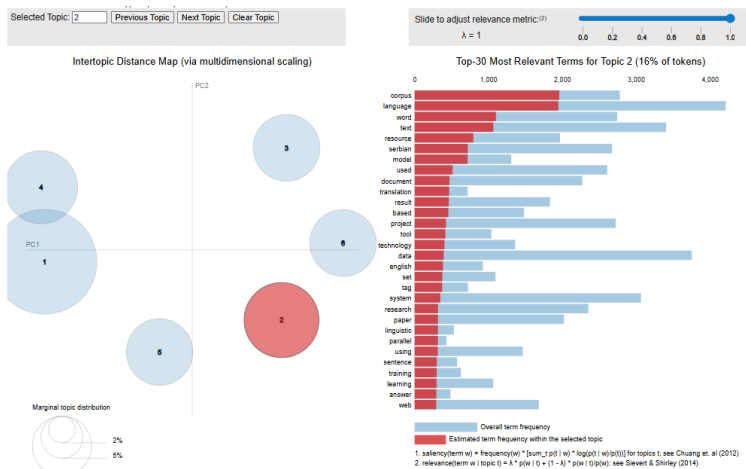


Figure 14. Interactive exploration of topics in the corpus.

The right panel displays the most relevant terms for the selected topic (Topic 2), which covers approximately 16% of the entire corpus. Among the key terms are *corpus*, *language*, *word*, *text*, *resource*, *Serbian*, and *model*, indicating that this topic is associated with corpus linguistics and language resources. The blue bars represent the overall frequency of terms in the corpus, while the red bars indicate their relevance within the selected topic (Sievert and Shirley 2014). More importantly, the red bars do not reflect only the absolute frequency of a word, but rather its relevance within the given topic, i.e., the estimated frequency of that word in documents associated with the topic. In other words, they show how characteristic a word is for the selected topic, rather than for the corpus as a whole. A term may be relevant to multiple topics, but with varying degrees of importance. Such visualizations facilitate the interpretation of topic structures and their characteristic vocabulary.

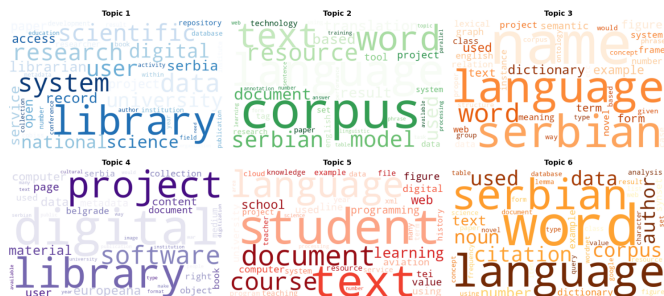


Figure 15. Word clouds by topic.

6 Discussion

The results of the textometric analysis of the bilingual INFOTEKA corpus reveal a high degree of thematic and lexical alignment between the Serbian and English subcorpora, which is expected given their parallel nature. At the level of frequency analysis, both subcorpora share a common core of concepts related to library science, language resources, and digital technologies, confirming the thematic consistency of the corpus.

However, the observed differences in the distribution of part-of-speech categories and lexical units point to the influence of typological characteristics of the languages. English, as an analytic language, exhibits a higher use of functional words, while Serbian, as an inflectional language, demonstrates greater morphological diversity, reflected in a higher number of distinct forms and a greater degree of lexical richness. The analysis of adjective–noun combinations indicates the stability of domain-specific terminology in both languages, with the presence of key concepts such as *digital library*, *natural language*, and *open access*, as well as their Serbian equivalents. At the same time, certain differences arise from translation conventions, such as the omission of the noun *language* in English.

The textometric analysis of temporal progression and specificity indicates a clear developmental trajectory of thematic interests. The early period is characterized by the dominance of lexicographic and library-related topics,

followed by a phase focused on digitization and annotation, while the contemporary period is marked by a strong increase in corpus-based approaches and language models. This trend is particularly evident in the analysis of the terms *model.** and *katalog.**, which demonstrates a shift in focus from traditional library activities toward modern methods based on machine learning.

The results of topic modeling further confirm the interdisciplinary nature of the corpus, which integrates the fields of library science, language technologies, education, and digital humanities. The identified topics show that the corpus is not thematically homogeneous, but rather encompasses multiple related yet distinct research directions.

7 Conclusion

This paper presented a textometric and comparative analysis of the bilingual INFOTEKA corpus, with the aim of examining the lexical, structural, and thematic characteristics of the Serbian and English subcorpora. By applying a range of methods, including frequency analysis, collocation analysis, temporal progression, specificity analysis, and topic modeling, comprehensive insights into the corpus were obtained.

The analysis has shown that, although the texts are parallel, there are differences influenced by the typological properties of the languages. The Serbian subcorpus is characterized by greater morphological and lexical diversity, while English demonstrates higher structural explicitness. At the same time, thematic analysis indicates a strong development of language technologies, with a shift in focus toward corpus-based approaches and language models in the contemporary period.

The results confirm that bilingual corpora represent a valuable resource for linguistic and interdisciplinary research, enabling both quantitative and qualitative analysis. A particular contribution of this study lies in the application of textometric methods to a domain-specific corpus, as well as in the integration of multiple analytical approaches.

Future research directions include the expansion of the corpus and the application of additional text processing and semantic analysis methods, in order to achieve a deeper understanding of the structure and evolution of scientific discourse.

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Librarians and Open Knowledge: Contribution to Education in the Domain of Open Science

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ABSTRACT: This paper examines the role of librarian education in the field of Open Science, with particular focus on Citizen Science (CS) and Open Educational Resources (OER). The theoretical section presents the fundamental concepts of open science, its key principles, and the regulatory framework in Serbia, as well as the importance of libraries as intermediaries in its implementation. Special attention is devoted to the role of librarians in promoting citizen science and in the development and dissemination of OER. The empirical portion of the study analyzes the outcomes of two accredited professional development programs for librarians conducted between 2023 and 2026. A comparative analysis reveals an increase in participants' awareness of open science, as well as differences in educational outcomes depending on the topic and prior knowledge of participants. The results indicate a high level of participant satisfaction and underscore the significance of such programs for developing competencies and strengthening the role of libraries in the contemporary scientific and educational environment.

KEYWORDS: Open Science; Citizen Science (CS); Open Educational Resources (OER); librarians; professional development; accredited seminars.

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1 Introduction: Open Science

Open science represents an approach in which scientific processes and results are made accessible to the general public, with the aim of promoting transparency, collaboration, and innovation. It encompasses open access to publications, research data, software, and research infrastructure, as well as the development of the competencies necessary for implementing these principles. According to the Open Scholarship Initiative (OSI), open science is a fragmented and dynamic phenomenon, grounded in diverse interpretations of the concept of “openness” and varying practices across scientific disciplines (Hampson et al. 2020). OSI specifically emphasizes the need to involve researchers, librarians, and information scientists in the formulation of open science policies, so that research outputs become more accessible and visible to the public. Hampson and his research associates note that open science entails a practice in which others are able to collaborate and contribute to research, and in which research data, laboratory notes, and other elements of the research process are freely available under conditions that permit their reuse, sharing, and the replication of research along with its underlying data and methods.

The Organization for Economic Co-operation and Development (OECD) defines open science as enabling public access to the results of publicly funded research, with minimal restrictions. This approach promotes greater efficiency and transparency in scientific processes, better alignment with societal challenges, and the transformation of science through the application of digital tools and its engagement with the broader community (Banović 2020, 51).

UNESCO’s recommendations establish that open science is grounded in several key principles that enable greater accessibility and transparency of scholarly work: Open Access, Open Research Data, Open Methods and Open-Source Software, Open Peer Review, Citizen Science, Open Educational Resources (OER), and Open Science Infrastructure (UNESCO 2021).

2 The State of Open Science in Serbia

Based on research conducted within the CeOS_SE project¹, it can be concluded that the state of open science in Serbia is relatively favorable compared to the region and to many European countries (Dakić and Trtovac

1. CeOS_SE Project – Citizen-Enhanced Open Science in Southeastern Europe Higher Education Knowledge Hubs

2023). A pivotal step was the adoption of the Law on Science and Research in 2019, which explicitly affirms a commitment to the principles of open science, identifying as one of its fundamental tenets “the conduct of scientific research in accordance with the principles of open science” (Република Србија, Министарство просвете, науке и технолошког развоја 2024). The law emphasizes that research is to be conducted with the aim of increasing the quality and visibility of scientific work, drawing on open access to publications and data and on appropriate research infrastructure.

This normative framework builds upon the “Open Science Platform” of 2018, which defines the national open access policy and introduces the obligation to publish research results funded by the Ministry of Science under the green open access model – Green OA (Република Србија, Министарство просвете, науке и технолошког развоја 2018).

The Ministry has established the Open Science Team in Serbia (TONuS) and launched the National Open Science Portal,² while all public universities have adopted regulations or platforms for managing institutional repositories and publishing results in open access. As a result, Serbia’s progress in implementing European open science principles has been positively assessed in the European Commission’s report, and what was once considered a utopian vision is increasingly becoming a reality of scientific communication (Smederevac et al. 2020, 33).

Further progress was achieved in 2024 with the adoption of Platform 2.0, which expands the concept of open science to encompass data management, transparent use of software and infrastructure, the application of persistent identifiers, and the development of competencies and evaluation systems (Република Србија, Министарство науке, иновација и технолошког развоја 2024).

Although this framework clearly establishes priorities in the field of open science, Platform 2.0 does not sufficiently elaborate on the role of citizen science and open educational resources. Their significance is therefore especially underscored, particularly in the context of education, where professional development programs enable librarians in both academic and public libraries to gain insight into their role in advancing transparency, knowledge accessibility, and the broader community’s engagement in the scientific process.

2. National Open Science Portal

3 Citizen Science

Citizen science represents a practical expression of the principles of open science, as it actively engages citizens in various phases of the research process (Cavalier and Kennedy 2016) — from data collection, co-design, and analysis, to dissemination and collaborative knowledge creation — thereby promoting scientific literacy and community participation. Its effective implementation requires appropriate policies, including sustainable funding and institutional capacities that enable the ethical and meaningful participation of citizens (Hecker et al. 2018). In this context, libraries and higher education institutions play an important role as intermediaries and as providers of support for participatory research (Ignat, Cavalier, and Nickerson 2019).

Citizen science encompasses varying levels of citizen involvement, ranging from informing the public about scientific events to direct participation in the research process through observation, data collection, and data processing. This form of scientific engagement has historically been associated primarily with the natural sciences, but in recent times, with the recognition of the importance of involving citizens in research, it has increasingly been applied in the social and technical sciences as well (Banović, Bradić-Martinović, and Nedović 2021).

According to the European Commission, citizen science is one of the eight pillars of open science (European Commission), as it connects scientific research with societal needs and fosters the development of innovation through collaboration between scientists and citizens. In the Western Balkans region, its integration presents additional challenges shaped by specific social and institutional circumstances, post-socialist legacies, economic transitions, and infrastructural inequalities — necessitating alignment with European frameworks while accounting for local context.

4 The Role of Librarians in Citizen Science

Citizen science is increasingly becoming an integral component of library activities, positioning libraries as spaces for gathering, collaboration, and learning that connect the scientific community and citizens. Academic libraries play an important role in educating librarians, researchers, and the broader public about the principles of citizen science, as well as in fostering collaboration with the research community and public libraries. Their role encompasses the promotion of citizen science and its results, thereby contributing to the greater visibility and understanding of this approach.

Libraries should, above all, develop skills for participation in citizen science projects through training sessions and courses that familiarize students and researchers with their foundations, possibilities, and applications. They also need to build collections of protocols, forms, and educational materials produced within citizen science projects, in accordance with the FAIR principles. Libraries can likewise provide infrastructure—including IT support, servers, institutional repositories, and spaces for workshops and meetings—and serve as sites for data collection and processing. Libraries may also participate in project evaluation, particularly in the assessment of data quality and educational outcomes. Finally, libraries play an important role in communicating and promoting collections and results generated through citizen science projects (Ayris 2018, 18–19).

For the successful engagement of citizens and researchers, close collaboration between academic and public libraries is essential, particularly through the organization of workshops, the exchange of good practice examples, and collaborative work on projects (Дакић and Тртовац 2023). In this process, academic librarians serve a significant intermediary function by connecting various stakeholders, supporting the development of citizen science-based initiatives, and contributing to the strengthening of institutional capacities for their implementation.

University libraries, as structural components of the open science ecosystem, are well-positioned to serve as drivers of its development. They raise awareness of the importance of open science, provide training, open research resources to innovative approaches, and develop institutional policies and infrastructure — which is why they are recognized as pioneers and champions of open science (Ayris 2018). Simultaneously, they contribute to broader European initiatives, including the development of the digital space for open science.

By participating in citizen science projects, libraries transcend the role of intermediaries in information access and become active participants in collaborative networks among scientists, local communities, and institutions, thereby contributing to higher-quality research and education. In the literature, libraries — including non-academic ones — are viewed as important intellectual centers connecting professional and amateur researchers, with particular emphasis on the development of Web 2.0 (Gmiterek 2026, 3).

Overall, academic libraries function as key actors in the development of citizen science, serving as mediators between citizens and the scientific community. Their role in education, networking, and support for collabora-

tive projects, enables libraries to become important centers of innovation, knowledge, and social collaboration.

5 The State and Prospects of Citizen Science in Serbia

The term “citizen science” is not the only designation used in the Serbian academic and library community to refer to this type of activity. This approach to science is also termed “science for citizens,” “citizens in science,” or “volunteer science” (Banović, Bradić-Martinović, and Nedović 2021, 592). “Volunteer science” is the term employed by Smederevac and colleagues (Smederevac et al. 2020, 113–114), while the Centre for the Promotion of Science uses the concept in a more specific context—“civic scientific research”—in its Guide (Кенир et al. 2024, 3). In the international literature, the term “participatory science” is increasingly being used, as it more explicitly foregrounds citizen engagement (Soacha-Godoy et al. 2025).

Serbia has established itself as a regional leader in integrating citizen science within the framework of open science, aligning its policies with the guidelines of the European Commission and initiatives such as the European Open Science Cloud.³ The adoption of the Open Science Platform (2018) and the Open Science Platform 2.0 (2024), as well as the Law on Science and Research, have affirmed a commitment to transparency, open access, and public participation in scientific research. Furthermore, the introduction of dedicated budget lines by the Ministry of Science, Technological Development and Innovation starting in 2023 demonstrates sustained institutional support for the development of citizen science (Dakić and Trtovac 2025).

This progress was facilitated by key milestones such as the signing of the Berlin Declaration, the establishment of open access repositories at academic institutions, and the integration of open science principles into research funding systems. The Centre for the Promotion of Science has also played a significant role, having funded 17 citizen science projects through public calls in 2023 and 2024, enabling active citizen participation in research.

In addition to the Centre for the Promotion of Science, the University Library “Svetozar Marković” is another key institutional actor, playing an important role in the education of librarians and researchers in the field of open and citizen science and in positioning libraries as hubs of citizen sci-

3. European Open Science Cloud (EOSC)

ence. The establishment of the Serbian Reproducibility Network⁴ in 2025 further underscores the strengthening of this field and the growing orientation toward open and inclusive scientific practice.

As a result of these initiatives, citizen science in Serbia has become a visible and valued component of the research ecosystem, fostering collaboration among citizens, scientists, and institutions and establishing a foundation for its continued development.

6 Open Education

Education is one of the key drivers of social development; however, traditional models often restrict access to knowledge due to high costs, geographic barriers, and insufficient inclusivity. The development of the internet and digital technologies has opened space for new approaches to education, among which Open Educational Resources (OER) occupy a particularly prominent position.

Open Educational Resources are freely available teaching and educational materials that can be freely used, adapted, and shared. Their significance lies in the expansion of access to quality education, encouraging new teaching approaches, and supporting the professional development of educators. Through international collaboration and a range of initiatives, they represent an important instrument for building an accessible, inclusive, and sustainable educational system.

7 Open Educational Resources

The concept of Open Educational Resources emerged in the early 2000s, as a response to limited access to educational materials, and the term was first introduced in 2002 through the UNESCO initiative. Today, it constitutes a global movement promoting knowledge accessibility, collaboration, and innovation in education. By definition, OER are educational and research materials that are in the public domain or published under open licenses, allowing for their free use, adaptation, and sharing (UNESCO). They are characterized by openness, accessibility, and reusability, and encompass diverse types of content — from textbooks and scholarly papers to multimedia and interactive materials. To promote their wider adoption,

4. Serbian Reproducibility Network

UNESCO has issued recommendations emphasizing the importance of open licenses, quality assurance, and the development of appropriate technological infrastructure (UNESCO 2019).

The most widely used open licenses are Creative Commons (CC) licenses, which allow authors to retain copyright while permitting the use, sharing, and modification of works under specific conditions (BY, NC, SA, ND), whereas CC0 denotes completely unrestricted use (Creative Commons, 2025). When publishing open educational resources, it is important to specify the applicable license, obtain author consent, and indicate the terms of use (Гажин et al. 2022, 14). OER are grounded in the so-called “5R” permissions: retain, reuse, revise, remix, and redistribute. Due to restrictions on modification, the ND license is not recommended, while CC BY and CC BY-SA are the most widely employed in practice (Wiley and Hilton Iii 2018, 134–135).

Open Educational Resources contribute to greater knowledge accessibility, instructional flexibility, and cost reduction; however, their implementation continues to face challenges such as insufficient awareness, the need for quality assurance, and limited institutional and technological support. Their application worldwide confirms their significance in improving access to knowledge and developing innovative educational models. Numerous initiatives — such as OpenStax,⁵ the Open Research Library,⁶ DOAB,⁷ and OpenAIRE⁸ — provide free access to textbooks, scholarly publications, and other educational resources. These examples demonstrate the potential of OER to substantially advance education by making it more accessible, inclusive, and responsive to contemporary needs. Through international collaboration and the support of various initiatives, OER are gradually becoming an important component of educational systems worldwide.

8 Libraries as Drivers and Supporters of Open Education

Open education, as an important segment of open science, is grounded in the principles of transparency, inclusivity, and collaboration, enabling broad

5. OpenStax

6. Open Research Library

7. DOAB

8. OpenAIRE

knowledge accessibility and the development of contemporary teaching practices. In this context, librarians play a significant role as intermediaries between sources and users, owing to their expertise in information management and support for the academic community (Bueno-de-la-Fuente, Robertson, and Boon 2012).

Their role is reflected in curating and providing access to open educational resources, offering education on copyright and open licenses, fostering collaboration among teachers, researchers, and students, and supporting the development of innovative digital platforms. In this way, libraries contribute to the development of digital literacy and to the broader dissemination of open educational practices (Дакић, 2022[шт. 2025]).

Significant support for librarians in the area of open education is provided by LIBER (Ligue des bibliothèques européennes de recherche) through its Working Group on Educational Resources, whose goal is to strengthen access to, creation of, and use of open educational resources in academic libraries (LIBER). A similar role is fulfilled by the European Network of Open Education Librarians (ENOEL), which brings together professionals to share experiences, develop resources, and implement UNESCO's OER recommendations (SPARC EUROPE). The collaboration of these organizations contributes to strengthening the role of libraries and to their more active participation in international open education initiatives.

9 The Application and Development of Open Educational Resources in Serbia

In Serbian practice, the term *otvoreni obrazovni izvori* (open educational resources) is used alongside related terms such as *otvoreni obrazovni sadržaji* (open educational content) (Nikolić 2015) and *otvoreni obrazovni resursi* (open educational materials) (Пантић 2017, 56–57) (Matijašević-Obradović, Brkanlić, and Vučurević 2017, 1–2). This terminological inconsistency presents a notable challenge in surveying the Serbian-language literature on this subject.

Open Educational Resources are gaining prominence in Serbia; however, their creation and distribution have yet to be adequately regulated by law. The Institute for Education Quality and Evaluation has underscored the need to introduce a legal framework, ensure quality control, and develop a national platform that would facilitate access to these resources (Гајин et al. 2022).

Although the concept of open educational resources in higher education in Serbia has not been fully developed, interest in the topic is growing. The Education Development Strategy through 2020⁹ provides a foundation for their application, yet actual practice lags behind the stated objectives. The distribution of open educational resources is handled primarily by educational institutions through the portals BAEKTEL and petlja.org (Obradović et al. 2020), but the number of available platforms remains insufficient, necessitating a broader expansion of OER availability and promotion within the country.

In addition to the above, it is necessary to identify financing models and incentives for authors, as well as to secure technical, informational, organizational, and policy support for open education projects. It is unrealistic to expect that the same financing and mandatory deposit model applied to scientific papers in projects supported by the Ministry of Science and the European Commission would be extended to university textbooks. Beyond authors foregoing a portion of their potential income, a significant challenge is posed by publisher resistance in the effort to protect financial interests (Pačić 2022, 46–47).

The University Library “Svetozar Marković” in Belgrade actively contributes to the development of open educational resources. Since 2025, its representative has served as co-chair of the LIBER Working Group on Educational Resources, facilitating the transfer of European knowledge and practices into the national context. Two librarians are also members of ENOEL, where they participate in the exchange of experiences, the development of guidelines, and the promotion of open education, contributing to the formulation of strategies aligned with European standards.

Based on the foregoing, it can be concluded that teachers, students, librarians, faculty administrations, and the relevant state institutions in Serbia must collectively harness the potential of open educational resources and the available technical infrastructure in order to realize open education in practice (48).

10 Librarian Education in the Context of Open Science

As part of the initiative to promote open science within continuing professional development programs, the University Library “Svetozar Marković”

9. The Education Development Strategy through 2020

has engaged in the education of library and information professionals and has accredited a series of programs. Among the longest-running are “Copyright in Library and Information Practice,” implemented in the period 2015–2025, and “Wiki Librarian” (2014–2025). In addition, the following seminars were successfully conducted: “Communication on the Internet: Open Science in the Service of Society” (2019–2021), “Internet Resources for a Better Society: Open Science – Documents and Sources” (2019), “Author Profiles for e-Science: Opening, Maintaining, Connecting” (2024–2025), as well as “Citizen Science: Librarians as a Link Between Science and Citizens” (2023–2025) and “From Shelves to Screens: Librarians and the Future of Open Educational Resources” (2025–2026) — the latter two conceived and successfully implemented by the authors of this paper.

The seminar “Citizen Science: Librarians as a Link Between Science and Citizens” was developed as a direct outcome of the successfully completed European project “Citizen-Enhanced Open Science in Southeastern Europe Higher Education Knowledge Hubs (CeOS_SE).” The project was designed with the aim of raising awareness of open and citizen science and improving existing practices in Southeastern Europe. Funded through the Erasmus+ program and coordinated by LIBER (2022–2024), its primary objectives were to develop open science policies, educate researchers and students, and promote citizen science in academic and public libraries, while encouraging the active participation of citizens in scientific research. The University Library “Svetozar Marković” actively participated in this project and produced guidelines for the implementation of citizen science as an important segment of open science in the Balkan countries.¹⁰

The seminar is structured so that the theoretical component explains the concept, development, and significance of citizen science, while the practical component, in the form of a workshop, highlights examples of good practice and motivates participants to apply the acquired knowledge, design their own projects, and develop activities aligned with the needs of their institutions and communities. A total of 11 program cycles were implemented, attended by more than 500 librarians. For librarians in higher education libraries, this seminar is of particular significance as it enables the acquisition of knowledge and skills necessary for supporting researchers in the design and implementation of citizen science projects.

Building on the growing importance of open educational resources, the authors of this paper designed and accredited a professional development

10. Citizen-Enhanced Open Science in Southeastern Europe Higher Education Knowledge Hubs (CeOS_SE)

program titled “From Shelves to Screens: Librarians and the Future of Open Educational Resources” for 2025. The seminar’s objective is to familiarize librarians with the key concepts and principles of OER, including the “5R permissions,” and to equip them to create, organize, and promote these resources. The program also incorporates examples of good practice from national and international contexts, enabling librarians to effectively apply and promote OER within the institutions and communities in which they operate.

Although the seminar was developed in early 2025, its implementation did not begin until September due to specific social circumstances. The limited time frame did not allow for the inclusion of all interested parties; however, the training was successfully conducted in Belgrade and Niš for librarians from the network of academic libraries (93 participants), as well as in Kraljevo, Čačak, Smederevo, and Pirot for librarians from public and school libraries (143 participants).

11 Comparative Analysis of the Effects of Educational Programs in Open Science

Both courses are evaluated through an electronic survey, which serves as an important instrument for assessing quality and informing the improvement of future programs. Upon completion of each instructional cycle, participants receive an email invitation to anonymously complete a questionnaire containing carefully designed questions. The questions address the assessment of course content, presentation methods, the relevance of topics, as well as general impressions and suggestions for improvement. The Google Forms application was used to develop and distribute the surveys, enabling straightforward creation and efficient data collection. The system automatically organizes data in tabular form, facilitating analysis and systematization. This approach allows for the rapid acquisition of reliable data relevant to assessing course effectiveness and planning further program development.

Based on the collected responses, valuable findings were obtained that provide insight into the level of awareness, interest, and application of open science principles in Serbia. These findings constitute an important foundation for the further development of educational activities, as well as for a better understanding of the development and adoption of the open science concept within the academic and research community. An analysis of the results reveals discernible progress in participants’ level of awareness across the observed periods and between the different seminars. Among participants

in the first, older seminar on citizen science, an almost even distribution of responses is observed: 52.4% of respondents were familiar with the concept, while 47.6% had no prior knowledge (Fig. 1). These results indicate that during the period 2023–2024, the concept of open science remained insufficiently integrated into the broader professional community.

Conversely, results obtained from the seminar on open educational resources, conducted in 2025, indicate a significantly higher level of prior familiarity (71.9%) (Fig. 2). An increase of nearly 20% highlights the growing awareness and visibility of the open science concept within a relatively short period. This difference may be attributed to temporal factors—namely, the more intensive promotion of open science principles through various projects and initiatives. Additionally, the subject matter of the second seminar is thematically closely aligned with open science, which likely attracted participants who already had some prior knowledge or interest in this area.

Да ли сте пре овог курса били упознати са концептом Отворене науке?
168 responses

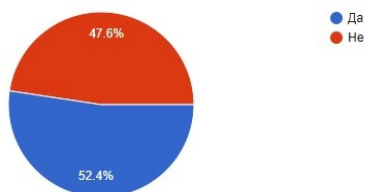


Figure 1. The concept of open science within a citizen science seminar

Further analysis reveals that both citizen science and open educational resources remain relatively new and insufficiently recognized concepts among library professionals. The low percentage of respondents familiar with the concept of citizen science (36.3%) indicates that this concept is in an early stage of recognition and is not sufficiently represented in professional discourse and practice (Fig. 3). This finding implies the need for additional activities aimed at its promotion and dissemination to potential users. On the

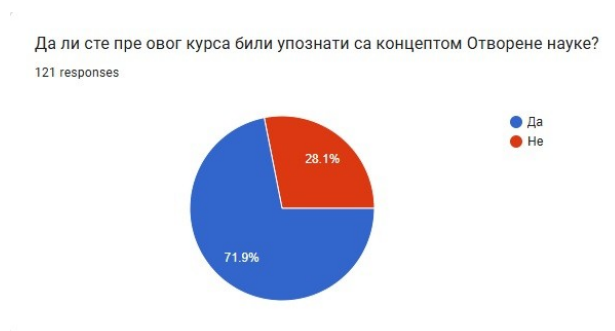


Figure 2. The concept of open science within a seminar on open educational resources

other hand, a somewhat higher percentage of respondents familiar with the term open educational resources (58.7%) suggests a higher level of awareness, yet one still insufficient to conclude that the concept is widely established (Fig. 4). Although the difference relative to citizen science is significant, the fact that more than 40% of respondents were unfamiliar with this term confirms that this field also requires educational outreach and greater visibility.

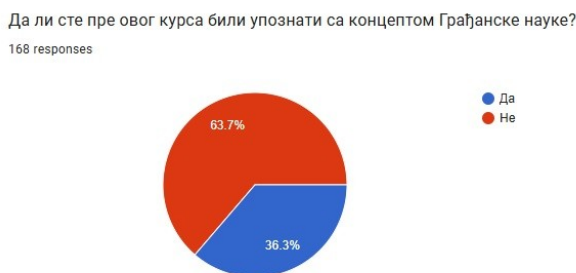


Figure 3. Citizen science: understanding of the concept

A comparative review of the results confirms that open educational resources are somewhat more familiar and accessible to respondents, likely

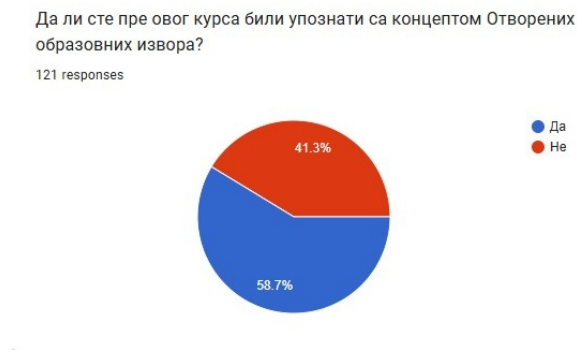


Figure 4. Open educational resources: understanding of the concept

due to their more direct applicability in educational contexts. Nevertheless, both concepts retain an innovative character, which justifies their inclusion in professional development programs. At the same time, a certain discrepancy was observed between respondents' formal knowledge of the concept of citizen science and the actual practice of their libraries. While respondents do not always recognize the term itself, numerous examples indicate that libraries are already implementing activities that fall within this domain. Projects such as the "Digital Herbarium" or initiatives focused on the conservation of the Great Bustard demonstrate the involvement of diverse social actors—from students, teachers, and local associations to international volunteers—which constitutes one of the defining characteristics of citizen science. Similarly, activities such as digital literacy programs for senior citizens or collaboration with researchers in linguistics, ethnology, and local history suggest that libraries already function as spaces for knowledge exchange and for the engagement of citizens in various forms of research work. Of particular significance is the finding that all respondents (100%) agree that libraries can serve as an appropriate intermediary between citizens and researchers. This result reflects a high level of recognition of libraries as mediators and as potential institutional leaders in citizen science activities. Furthermore, the fact that 84.6% of respondents expressed a willingness to actively engage in such initiatives indicates strong motivation and openness to further involvement.

Quantitative data indicate that 95.3% of respondents rated the course as useful, which unequivocally confirms that the program effectively addressed the needs of the target group. Such a high percentage of positive evaluations testifies to a well-conceived content framework, an appropriate selection of subject matter, and an effective mode of delivery.

Qualitative analysis of participant comments largely underscores the practical value of the program, the opportunities for collaboration, and the significance of practice-based examples (e.g., “The course was genuinely well-designed; it provided useful information, facilitated the exchange of experiences with colleagues, and above all, it is commendable that it is rich in practical examples, whether domestic or international” or “The workshop was very useful and creative. The information provided opens up unlimited possibilities for collaboration and for connecting citizens through the library with scientific work, as well as with other forms of human creation”). Participants particularly emphasize the expertise and approach of the instructors, as well as the interactive nature of the instruction, which signals a successful combination of theoretical and practical approaches (e.g., “The seminar presenters are approachable, positive, and engaged in interaction with the attending librarians, and hold attention through interesting practical examples. They deserve all praise.” or “An excellent topic was chosen for the course, as its educational function — and consequently its practical value — is indisputable. Highest praise for the instructors: an exceptional level of knowledge and preparedness, a skillful combination of essential information and presentation techniques that sustain participants’ attention, and a warm and approachable rapport with attendees. The highest marks in every respect!”). Participants also recognize the broader social significance of the topic, highlighting the potential for applying the acquired knowledge not only in libraries but also in the educational system, particularly through collaboration with primary and secondary schools. This suggests that the course may have a long-term impact and contribute to strengthening cross-sector collaboration.

In the area of open educational resources, although a relatively small percentage of respondents (18.9%) currently organizes activities related to open education, the results demonstrate that the promotion of such activities encourages librarians’ interest in more actively engaging with and using OER. As many as 95.9% of respondents consider the library to be an appropriate service provider for teachers seeking and using open educational resources, while 68.8% express a willingness to engage in activities in this area.

Respondents most frequently identify teachers as the key actors in the creation of OER (85.2%), which suggests a perception that educators are the primary developers of educational content. A high percentage of respondents also recognizes librarians (79.5%) and researchers (71.3%) as significant participants in this process, confirming the growing role of libraries and the scientific community in the development and promotion of open educational resources. Approximately half of respondents believe that students (50.8%) can also actively contribute to the creation of OER, while a smaller proportion identified school-age students (26.2%) as potential contributors (Fig. 5).

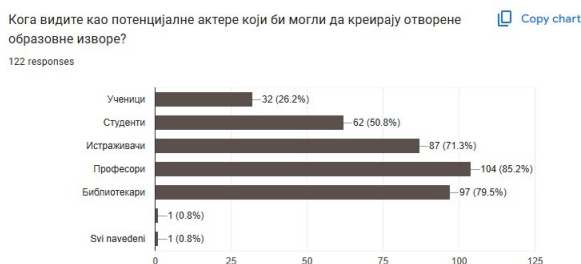


Figure 5. Potential participants in the development of open educational resources

The results also reflect a highly positive evaluation of the course by participants, both in terms of its usefulness and the quality of implementation, and relevance of the subject matter. Quantitative indicators reveal that the majority of respondents (57.5%) find the course useful in every respect, attesting to its broad applicability in a professional context. Approximately 36.7% of participants rate the course as excellent and indicate their intention to apply the acquired knowledge in their future work, underscoring its practical value and the immediate applicability of the content. A very small percentage of respondents (5.8%) expressed certain reservations regarding practical application, while it is particularly noteworthy that no participant rated the course as unnecessary. This distribution of responses unequivocally suggests a high degree of acceptance and program success.

Qualitative analysis of comments is consistent with these findings. Participants emphasize the professionalism and inspirational quality of the instruc-

tors, as well as the consistently high quality of their seminars, as evidenced by participants' expressed willingness to attend future programs. The importance of newly acquired knowledge is underscored, along with expectations of its application — implying a long-term impact of the course. Some comments reflect the perception of the topic as innovative and promising for the development of library practice, reinforcing the significance of such educational initiatives. Participants also describe the course as informative, content-rich, and dynamic, with the capacity to hold attention and stimulate interest, thereby demonstrating a successful integration of theoretical and practical approaches in its delivery.

A comparative analysis of results from both seminars reveals clear differences in perceptions of the quantity of newly acquired knowledge, which can be linked to varying levels of prior familiarity with the respective topics. In the citizen science seminar, the largest proportion of respondents (45.5%) reported acquiring 50–80% new information, while as many as 24.6% considered themselves to have acquired 90–100% new knowledge (Fig. 6). Conversely, in the OER seminar, although the 50–80% category also predominated (50.8%), the proportion of respondents who reported the highest level of new knowledge acquisition (90–100%) was considerably smaller (16.4%). Examining the lower categories, the results further demonstrate that in the OER seminar, a somewhat higher proportion of respondents fell within the 30–50% range (25.4%, compared to 23.4% in the citizen science seminar), as well as within the lowest category of 10–30% (7.4%, compared to a significantly smaller share in the citizen science seminar). This suggests that a portion of participants already possessed some degree of prior knowledge in the area of open educational resources (Fig. 7).

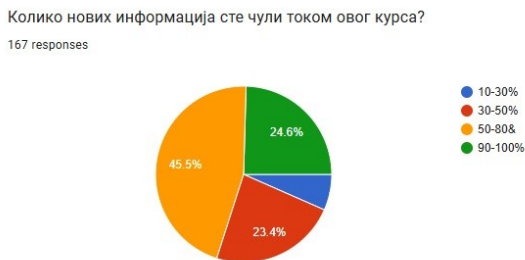


Figure 6. Knowledge acquired about citizen science

Колико нових информација сте чули током овог курса?

122 responses

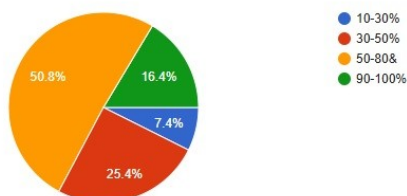


Figure 7. Knowledge acquired about open educational resources

Taken together, it can be concluded that the citizen science seminar had a more pronounced effect in terms of the acquisition of entirely new knowledge, as evidenced by the greater proportion of responses in the highest category (90–100%). In contrast, the OER seminar contributed more to the extension and deepening of pre-existing knowledge, as reflected in the greater representation of intermediate categories. These results are consistent with the previous findings on participants' levels of awareness: citizen science is a less familiar concept, and the course therefore has a stronger introductory effect on the topic, whereas open educational resources are already partially present in professional practice, meaning the course serves a predominantly knowledge-building function.

The outcomes of the conducted educational programs indicate that professional development programs for librarians in the field of open science have a significant impact on raising the level of awareness, developing competencies, and strengthening the professional role of librarians. Clear progress was observed in participants' knowledge of the open science concept, as well as greater readiness to actively engage in activities related to citizen science and open educational resources. At the same time, the results indicate that these concepts remain insufficiently represented in professional practice, highlighting the need for continuous education, greater visibility, and systemic support. Of particular significance is the fact that librarians recognize their role as intermediaries between researchers, educators, and the broader community, which creates space for further strengthening of cross-sector collaboration. The high level of participant satisfaction and the expressed motivation to apply the acquired knowledge confirm the relevance and effectiveness of

such programs. Accordingly, the further development and enhancement of educational initiatives represent an important step toward the broader application of open science principles in library and information practice and in society as a whole.

12 Conclusion

Open science represents a significant direction in the development of the contemporary scientific and educational system. Its goal is to expand knowledge accessibility, ensure research transparency, and engage the broader social community. In this context, libraries and librarians are assuming an increasingly important role as intermediaries between researchers, educators, and citizens, as well as drivers of transformation toward a more open and inclusive approach to knowledge. Citizen science and open educational resources are of particular significance as practical mechanisms for implementing open science principles across diverse social and educational contexts.

Although these concepts are largely well-developed internationally and supported by numerous initiatives and infrastructural frameworks, their implementation in Serbia is progressing slowly. A lack of systemic regulation, a limited number of platforms, and lower visibility of these practices highlight the need for a more systematic approach to their advancement. On the other hand, growing professional interest and the role of libraries in promoting and applying open science principles offer considerable potential for further development.

The empirical findings of this paper support the conclusion that professional development programs play a crucial role in raising the level of awareness, developing competencies, and stimulating librarians' participation in open science domains. The comparative analysis demonstrates that different thematic approaches yield different educational effects — ranging from the introduction of entirely new knowledge to its deepening and practical application. At the same time, strong motivation among librarians to engage in citizen science activities and to develop open educational resources was observed.

Viewed in its entirety, libraries hold considerable promise for becoming one of the key institutional drivers of open science implementation; however, fully realizing this potential requires the development of national strategies and the continuous improvement of library professionals' competencies. The development of these initiatives would contribute to the advancement of library and information practice and, more importantly, to the construction

of a more open, accessible, and inclusive knowledge system as a broader societal objective.

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Infotheca: Journal for Digital Humanities - 2000-2026 -

UDC 050:02(497.11)INFOTEKA

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ABSTRACT: *Infotheca*, Journal for Digital Humanities, is a multidisciplinary journal which publishes original papers that are subject to review by the members of an international Editorial Board. It started publishing in 2000 as *Infotheca: Journal for Informatics and Librarianship*, and until today was transformed in many ways that are going to be presented in this paper. From issue 1/2 in 2007, the subtitle has been changed into *Journal for Librarianship and Informatics*, and from issue 1 in 2014, into *Journal for Digital Humanities*. *Infotheca* is published biannually in Open Access, it is bilingual (papers are published in Serbian and English), and covers topics such as librarianship, informatics and digital humanities. Thus, it became an excellent language resource for various types of research.

KEYWORDS: scientific journals, scientific publishing, *Infotheca*, University Library „Svetozar Marković“, library and information science, digital humanities, computer linguistics, COBISS, Biblisha, Wikidata

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1 Introduction

Infotheca is a multidisciplinary journal in digital humanities which publishes original papers that are subject to review by the members of an international Editorial Board. It also publishes reviews of events and publications in this scientific field. The journal is in Open Access, which means that all content is available free of charge to the user or institutions. It is the copyright holder of published articles, under the conditions defined in Creative Commons

license Attribution-NonCommercial-NoDerivs (CC BY-NC-ND)¹, and users are allowed to read, download, copy, distribute, print, search, or add links to the full texts of the articles in this journal without asking for permission. Content of the journal is published bilingually (in Serbian and English), biannually, and the publisher is the University Library “Svetozar Marković,” in cooperation with the Faculty of Philology of the University of Belgrade² and the Serbian Academic Library Association (SALA)³. In its 26 years of existence, 25 volumes, 39 issues and nearly 600 papers have been published.

From its inception until today, *Infotheca* has been changed in different ways that have affected its profile. The changes concerned not only the structure and quality of the journal and published papers, but also the scientific community that publishes its research results there, which over time has become significantly broader than at the beginning. The last ten years were especially challenging for the editorial team because the journal was changed step by step, following technological innovations in scientific publishing. In addition, all significant changes in the scientific journal categorization process in the Republic of Serbia, in accordance with European and global scientific publishing policies, have largely shaped the quality of *Infotheca*. In accordance with that, the editorial team makes great efforts to fulfill the criteria from the Rulebook on Categorization and Ranking of Scientific Journals⁴. Until 2024, the Journal was categorized as M53, and according to the List of Categorized Scientific Journals of Domestic Publishers for 2025⁵, the categorization is now M52. This is a great success, considering that the journal ranks high in the category of domestic scientific journals for electronics, telecommunications and information technology.

For 26 years, *Infotheca* has undergone various changes (more in Section 2), and today it is completely online and in Open Access, with online editing and publishing system (more in Section 3), it is part of different databases such as the COBISS catalogue (more in Section 4), Bibliša (more in Subsection 5.2), Wikidata (more in Subsection 5.3), Wikipedia. Also, it is an important digital language resource in various research areas, such as computational linguistics (more in Section 5).

1. Attribution-NonCommercial-NoDerivs (CC BY-NC-ND)

2. University of Belgrade, Faculty of Philology

3. Serbian Academic Library Association

4. Rulebook on Categorization and Ranking of Scientific Journals

5. List of Categorized Scientific Journals of Domestic Publishers for 2025. Accessed 9. 2. 2026.

2 *Infotheca* – Historical Overview

From 1995 to 2000, the Serbian Academic Library Association (SALA) had been published *Information of the Serbian Academic Library Association* (ISALA), an information bulletin for librarians, documentalists, information specialists and other professionals in libraries and INDOC (information and documentation) centers and other units within the universities of Belgrade, Niš and Novi Sad. The bulletin was launched with the aim of providing important information to library and information experts in higher education and research institutions. It was published quarterly, in A4 format, in Serbian, and the editor-in-chief was Milena Matić, the head of the Supervision Department at the University Library “Svetozar Marković”.

Interest in publishing papers in ISALA was great, not only in the field of library and information science, but also in the whole scientific research community of university libraries in Serbia. However, the regular sections of the paper did not have the capacity to publish such an increased volume of information, as it had not been designed for that purpose. Also, the need arose to provide more space for scientific and professional articles. Thus, at the Conference “Theoretical Aspects of Scientific Information in the 21st Century and the Real Possibilities of Our Libraries” held within the Sixth Assembly of the SALA, ISALA Editorial Board, together with the SALA Executive Board decided that ISALA should be transformed into *Infotheca: Journal for Informatics and Librarianship*. The goal of the new journal was to publish: original papers about the application of information technology in librarianship, scientific information in general, the impact of informatics on the modern development of academic and special libraries, as well as new knowledge in information and library science. The first issue was published in September 2000, and the journal has been published regularly ever since. Until the first issue for the year 2014, the publisher was only the SALA; from that issue onward, the University Library “Svetozar Marković” and the Faculty of Philology of the University of Belgrade, also joined as publishers. The first change of the subtitle, into *Journal for Librarianship and Informatics*, occurred in issue 1/2 (2007). At the same time, as the journal started to be published in English (in a printed volume in reverse), the title in English on the back cover was determined, as well as the subtitle in issue 1 (2012).

Over time, *Infotheca* began to publish papers from the broader field of digital humanities, so, from the first issue for the year 2014, the subtitle was changed into *Journal for Digital Humanities*. *Infotheca* became the first and

only scientific journal in the Republic of Serbia with this title, and the only one that exclusively publishes papers in this scientific field.

2.1 Editors-in-chief

From the inception in 2000 until issue 1/2 in 2007, the editor-in-chief was Dušan Surla, professor at the Faculty of Sciences at the University of Novi Sad. For the next 16 years (until the first issue in 2023), the editor-in-chief was Cvetana Krstev, professor of Computer Science in the Department of Library and Information Science at the Faculty of Philology of the University of Belgrade, and also a member of the Language Resources and Technologies Society (JeRTeh)⁶. From the second issue in 2023, editors-in-chief have been Ranka Stanković, professor at the of Applied Mathematics and Informatics at the Faculty of Mining and Geology of the University of Belgrade, and Dr. Aleksandra Trtovac, library advisor in the Cataloging Department at the University Library “Svetozar Marković”.

As digital humanities is a „transdisciplinary scientific area... a heterogeneous field of research between IT, cultural studies and humanities in general“ (Pajxept 2014, 22), i.e. a multidisciplinary scientific field which encompasses the use of digital resources in the humanities, it is changing the way scientific work is conducted. As noted in (*The Digital Humanities Manifesto 2.0* 2026; Вранеш 2014) “universities are called upon to shape natively digital models of scholarly discourse for the newly emergent public spheres of the present era”. In this context, the articles published in *Infotheca* are also multidisciplinary, which was the main reason for appointing two editors-in-chief from different, but related scientific research fields.

The implementation of the open source software for editing and publishing journals in Open Access, Open Journal System (OJS)⁷ (more in Section 3), and the transition of the entire journal editorial policy to this software from issue 1/2 (2016), created the need for an editor of the online edition. From the beginning, it has been Dr. Jelena Andonovski, library advisor in the Cataloging Department at the University Library “Svetozar Marković”, with occasional assistance from her colleague Ivana Gavrilović, a librarian advisor in the Department for Digitization and Cultural Presentation at the Library.

6. Language Resources and Technologies Society

7. Open Journal System (OJS)

2.2 Publication Frequency, Language and Article Categorization

Although it can be concluded that *Infotheca* journal was published continuously for two and a half decades, the dynamics were diverse. In the first decade, it was published once a year as a double issue, except in 2000 and 2003, when two independent issues were published. In the next year, 2004, a double issue and a special issue were published, and in 2005, issue 3. From 2010 to 2014, it was regularly published twice a year. A milestone was 2015, when an open source and free software for the management of peer-reviewed academic journals, Open Journal System (OJS), was implemented (more in Section 3). As the editorial team needed some time to adapt to this change, the journal was not published this year. Since a double issue in 2016, the journal has continued to come out regularly and is entirely edited using this software. Until 2025, *Infotheca* has been published regularly, but not always twice a year. In 2020, a double issue (1/2) was published, in 2022 and 2024, one issue each, while in 2025, a double issue was also published (1/2).

Regarding the journal language, papers are published entirely bilingually, in Serbian and English. At the very beginning, papers were mostly published only in Serbian, with a title and abstract in English, as mandatory data. Until 2004, some papers categorized as “review paper” or “professional paper” were published in Serbian and English, or the authors themselves requested that their papers be published in both languages. Papers by foreign authors were always published bilingually, as in the case of the paper *Academic research in Serbia and available database resources* by Sam Brooks in issue 2, in 2003. A similar case was for the translation of foreign documents, such as the *IFLA Internet Manifesto*, published in the same issue, and with papers on projects such as TEMPUS. The first fully bilingual issue was a special issue published in 2004⁸, dedicated to the results of the first completed TEMPUS project in Serbia. Since then, some papers by Serbian authors have begun to be published bilingually, and this has become the established practice since issue 1, in 2011. Until today, the exception was the second issue in 2019, and the second issue in 2021, which were special and published only in English.

It is important to point out that, from its inception until today, every article has included a UDC number as mandatory metadata, while the papers have been grouped into categories in the table of contents (Communications, Publications, Professional meetings, Articles, News etc.). Within the papers themselves, the categorization was not explicitly mentioned, unless it was a “review paper” or “professional paper”, and even then, not consistently. The

8. Vol. 5, special issue (2004)

relevant category was indicated with the appearance of the first paper in each issue. Since 2009, when the *Act on Scientific Journal Editing*⁹ entered into force, the criteria for journal editing have become significantly stricter, and the articles' categorization has become mandatory metadata. So, from the first issue in 2010, it has been indicated at the beginning of each paper in *Infotheca*.

2.3 Format and Design

Initially, *Infotheca* was published in A4 format. With issue 1/2 in 2007, the format was changed to B5, and from issue 1/2 (2016) to A5, which is still in use. Until 2007, text of the papers published bilingually was printed in double columns, with Serbian and English versions in parallel. Since 2007, when the English version was established, papers have been printed in double columns, but the English version is printed in reverse, with a separate cover page. With the format change in 2016, the English version has continued to be published in reverse, but, due to the reduced format and impracticality, the text is no longer printed in double columns.

In addition to the format change, the design was also changed with issue 2 (2013). From the beginning of the journal, publishing and page layout design were done using the software *Indesign*. Since Prof. Cvetana Krstev became editor-in-chief, this job was done by Vanja Radulović from the University of Belgrade Information Center (IC), and at that time, a master's student at the Department of Library and Information Science at the Faculty of Philology, University of Belgrade. After her, for a very short period (until 2018), this job was done by Nataša Matović, a graphic editor at the University Library "Svetozar Marković".

Since the first issue for the year 2018, $\LaTeX$ has been used for publishing and page layout design. Because of that, the journal design was changed and prepared according to the LLNCS.CLS document format. The class LLNCS is an extension of the standard $\LaTeX$ *article* class¹⁰, which Springer¹¹ has adapted for the purpose of preparing papers for submission to the conference

9. Ministry of Science and Technological Development has adopted the *Act on Scientific Journal Editing* (110-00-17/2009-01, from 9 July 2009) with the aim of helping editorial teams get better quality and improve domestic scientific periodicals, thereby enabling greater inclusion of journals in the scientific information system, both domestically and internationally. Accessed 1 April 2026,

10. $\LaTeX$ class *article*

11. Springer

proceedings series *Lecture Notes in Computer Science (LNCS)*.¹² Style files as templates and example articles are preloaded into Overleaf¹³, allowing authors to create LNCS-formatted documents prior to paper submission. Overleaf is an open-source online collaborative L^AT_EX editor that enables online editing and page layout design of the paper before submission. It is necessary that all authors and journal collaborators (editors, reviewers, copyeditors, proofreaders, editorial board members, and technical editors) have an account created on the platform. All changes to one paper, including reviewers' remarks and comments, author corrections, and editorial revisions, can be made in a single document from which the final version is produced and published.

Based on this approach, Prof. Cvetana Krstev assisted Branislava Šandrih, at that time Assistant Professor of Computer Science in the Department of Library and Information Science at the Faculty of Philology, University of Belgrade, in adapting the Springer LLNCS.CLS document format for *Infotheca*, using Springer guidelines¹⁴. The adapted document class, with templates and article examples, was uploaded to Overleaf. So, since issue 1 (2018), authors familiar with L^AT_EX who wish to prepare their papers in Overleaf before submission can use these templates. While most of the authors are ready for this step, because many journals use it, many reviewers and copyeditors are still hesitant; therefore, it will be necessary for the *Infotheca* editorial team to pay more attention to their training in the future.

In addition to changes in the design of *Infotheca*, the cover design introduced in issue 1/2 (2007) and is still in use today, was also created by Vanja Radulović.

3 Online Edition

In the early years, *Infotheca* had only a printed edition. But in 2004, during the first TEMPUS project in Serbia, the website of the University Library “Svetozar Marković” was created. As the headquarters of the SALA, *Infotheca*'s only publisher at the time, was located in the Library, this moment was used to create the journal's website as well. Since then, it has been published online as well. Also, it was assigned the ISSN number not only for the printed (1450-9687), but also for the online edition (2217-9461).

12. [Lecture Notes Computer Science \(LNCS\)](#)

13. [Overleaf](#)

14. [Instructions for Using Springer's llncs Class for Computer Science Proceedings Papers](#)

At the end of 2011, a new website of the University Library was created, including a new *Infotheca* website, hosted on the new domain *infoteka.bg.ac.rs*. In 2014/2015, another website was created on the domain *infoteka.unilib.bg.ac.rs*. In addition to the website, in 2015 the open source software for editing and publishing journals in Open Access, Open Journal System (OJS), was implemented. OJS is a free software for the management of peer-reviewed academic journals, created by the Public Knowledge Project¹⁵, and released under the GNU General Public License¹⁶. It enables the whole issue to be prepared and published online in one system. In other words, the entire researcher-to-reader workflow for submission, peer review, copyediting and production is done in the OJS, where the final issue is published. The system operates through sending email notifications in every step, so editors and collaborators must be registered users, with their own accounts. Another advantage of the OJS is that published articles and issues are fully indexed in global discovery services like Google Scholar, Crossref, DOAJ, and many others, and references can be downloaded in various citation formats: ABNT, APA, BibTeX, CBE, EndNote - EndNote format (Macintosh & Windows), MLA, ProCite - RIS format (Macintosh & Windows), RefWorks, Reference Manager - RIS format (Windows only), Turabian, etc. The electronic issue 1/2 (2016) of *Infotheca* was the first fully prepared and published issue using OJS, but it was also posted on the existing website. The editorial team, as well as collaborators (authors, reviewers, copyeditors, proofreaders, technical editors), needed some time to get used to this editorial system; therefore, the issues up to 2019 were published simultaneously on the OJS and the journal's website. Since 2020, the online edition has been available only on the OJS. Over time, the entire *Infotheca* archive was transferred into the OJS, and the old website was officially shut down in 2024.

According to the Rules of Procedure and the Manner of Evaluation and Quantitative Presentation of Scientific Research Results of Researchers, DOI (Digital Object Identifier)¹⁷ became mandatory metadata for articles in scientific journal online editions, which meant that articles in *Infotheca* were

15. Public Knowledge Project

16. GNU General Public License

17. A digital object identifier (DOI) is a string of alphanumeric characters used to uniquely identify electronic documents. DOI is a permanent, and thus more reliable method of referring to an electronic document than the URL. It was introduced to solve the problems of URI addresses of electronic documents, such as the existence of multiple different addresses for the same e-document, address unreliability, and the

required to have DOI identifiers. The linking of article metadata, DOI identifiers, and web locations (URL), that is DOI numbers registration, is done via the service CrossRef¹⁸. Since the University Library's publishing activity is not extensive enough to justify a direct agreement with the CrossRef agency, the Faculty of Philology of the University of Belgrade, as one of the Infotheca's publishers and an institution which already had a contract with the agency, assumed responsibility for DOI registration for Infotheca. The journal thus became part of the repository doiFil of the/ Faculty of Philology, University of Belgrade.¹⁹ Since then, when one issue is ready for publication, *Infotheca's* online editor prepares metadata required for DOI registration and sends it to the DOI editor at the Faculty of Philology (Miloš Utvić, Assistant Professor at the Department for Library and Information Science) for the review and registration. For the registration, editor prepares the following metadata: title, author(s) name(s), ORCID²⁰, journal title, ISSN, eISSN, year, volume, issue, pages, language, article number in the issue, DOI number, DOI URL and the full-text URL. After registration, the DOI structure is: *10.18485/infotheca.year.volume.issue.article_number_in_the_issue*. Since issue 1/2 (2016), the DOI identifiers have been assigned to all scientific and professional papers in English and thanks to that, the papers, their authors, and *Infotheca* itself, have become "visible" to the professionals and scientific community, which significantly contributes to its international recognition (Milinković 2016, 76).

4 *Infotheca* in COBISS

Infotheca, like every publication published in the Republic of Serbia, has its own bibliographic record in the COBISS catalogue. A bibliographic record is a metadata set about library resources that contains data elements necessary for identifying and retrieving a resource, as well as additional supporting information, presented in a standardized bibliographic format. Regarding journals and serials in general, in addition to basic metadata (ISSN number, frequency, title, editor-in-chief, inception, publisher, important notes on the serial, link to the online edition record if available, etc.) and the signature

like. In 2012, the International Organization for Standards (ISO) adopted the ISO 26324:2012 standard, which defines the DOI identifier system.

18. CrossRef

19. doiFil / Faculty of Philology, University of Belgrade

20. From the second issue in 2023, ORCID number is mandatory metadata with the author(s) name, email and affiliation.

mark, the number of published issues is also significant. COBISS also enables the creation of analytical records for all published articles in one journal, which are linked to the journal's record.

Regarding *Infotheca*, there are two COBISS records. The first one is for the printed edition (ID 166890503)²¹ with the following metadata: source type (continuous source), record type (printed source), bibliographic level (serial publication), ISSN number (1450-9687), language, country of publication, frequency, title and intellectual responsibility (journal title, editor-in-chief), publisher, important notes about the journal, link to the preceeding publication (regarding *Infotheca*, link is connected to the COBISS record for ISALA – ID 103379463²² via title and ISSN number), link to the other edition in other medium (link is connected to the COBISS record for the online edition via title and ISSN number), parallel title (English title in *Infotheca*), UDC number and the journal's URL. In addition to this metadata, *Infotheca*'s COBISS record also has a signature mark *M Č 1046*. As it is a serial publication, signature marks are also assigned to individual issues, including metadata such as year, volume and issue. After this work is done, all issues have signature marks in the form *M Č 1046/year* (for example, *M Č 1046/2010*).

The corresponding record exists for the online edition (ID 192501004)²³, with the following metadata: source type (continuous source), record type (online source), bibliographic level (serial publication), ISSN number (2217-9461), language, country of publication, frequency, metadata about the online source, title and intellectual responsibility (journal title, editor-in-chief), publisher, online source characteristics, important notes about the online source, other edition in the other medium (link is connected to the COBISS record for the printed edition via title and ISSN number), parallel title (English title in *Infotheca*), UDC number and URL.

In addition to the record for the *Infotheca* itself, COBISS also contains analytic records for a certain number of papers published in it. At the time of writing the paper, the shared cataloging system included analytic records for 381 papers published in *Infotheca*, of which 238 are in the local COBISS catalogue (University Library catalogue). Papers are described using the following metadata: record type (textual, printed or online source)²⁴,

21. Permanent link <https://plus-legacy.cobiss.net/cobiss/sr/sr/bib/166890503>

22. Permanent link <https://plus.cobiss.net/cobiss/sr/sr/data/cobib/103379463>

23. Permanent link <https://plus-legacy.cobiss.net/cobiss/sr/sr/bib/192501004>

24. This metadata depends on whether the analytical record is created for an article published in print or electronic edition of a journal.

bibliographic level (analytical level (component part)), material typology (original scientific paper, review paper, professional paper, review), journal ISSN number (using this metadata, analytic record is connected to the journal's bibliographic record, in this case, with one of *Infotheca's* records)²⁵, language, country of publication, title and intellectual responsibility (article title, author(s) name(s)), physical description (pages, illustration data if applicable, volume, issue and year), notes, parallel title, subject headings, UDC, author(s) metadata (linked to the records in the CONOR database), and full-text URL.

Processed articles from *Infotheca* can be retrieved from COBISS in two ways. One is by using advanced search and creating a search query „HI=166890503 OR SN=1450-9687“ or „HI=192501004 OR SN=2217-9461“. The other way is to find record for the journal itself via title or COBISS ID number, accessing the list of all linked analytical records - "component parts". In addition to searching and metadata display with access to full texts, it is also possible to export metadata from COBISS in various formats, one of which is XML. However, detailed information retrieval, such as full-text search or metadata grouping by some criteria, is not possible, which is why *Infotheca* has been integrated into other databases, as will be shown below.

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5 *Infotheca* as an Important Language Resource in Different Research Areas

For years, *Infotheca* has published significant results in the field of library and information science, but for more than a decade, it has been publishing

25. In this case, the analytical record is linked to one of two catalog records for the journal *Infotheca*, depending on whether the issue was published in print or electronic format.

significant results in the digital humanities, making it a very important resource for researchers in these fields. Furthermore, it is published bilingually and in Open Access, and as the editor-in-chief for more than a decade, Prof. Cvetana Krstev recognized that its content could become an important resource for applying different language tools for Serbian processing developed by the JeRTeh Society and could be used in research in the field of computational linguistics. Therefore, the bilingual (English-Serbian) parallel corpus *INFOteka* was created (more in Section 5.1), which became part of the multilingual digital library Bibliša (more in Section 5.2). From that moment on, different tools for natural language processing have been applied, especially those in the field of information and terminology retrieval and extraction from domain corpora.

As the first corpus that became part of the Bibliša digital library, *INFOteka* was used for testing the system performance and search capabilities. From the beginning, Bibliša has offered metadata search and full-text search, enabling the composition of queries using both simple and multi-word keywords in Serbian and English, with the possibility of expanding search queries both morphologically and semantically, using different lexical and terminological resources. Along with this, the corpus was also used for testing the display options for search results and the entire interface environment, after which the possibilities of improving the entire system were analyzed in order to make it more than just a simple search tool (Stanković et al. 2012; Stanković, Obradović, and Trtovac 2012).

An important example of research in which *INFOteka* is used is the doctoral dissertation of Dr. Aleksandra Trtovac (Тртовац 2016, 2017). In this research, the corpus was used in the field of information retrieval and extraction from the library and information science domain. Since *INFOteka* is a domain corpus from this field, and also part of the Bibliša digital library²⁶, the dissertation analyzed in detailed the information retrieval possibilities within this library and tested its search capabilities. It also investigated lexical resources used to enhance and refine users' queries (Stanković et al. 2015), especially the morphological e-dictionary of the Serbian language (Krstev 2008; Krstev and Vitas 2009), which contains an electronic terminological dictionary from library and information science into which the Dictionary of Librarianship (Kovačević, Injac, and Begenišić 2004) was integrated. The evaluation of the obtained results helped supplement the electronic terminological dictionary from library and information science,

26. At the time of the research, the corpus included parallelized issues from 2007 to 2014.

as well as other lexical resources, with new terms and lexical units found in the *INFOteka* corpus during the research. Also, it helped in the development of a new resource, Biblimir, which should improve Bibliša's search capabilities (Stanković, Obradović, and Trtovac 2012).

The next example of research in which the journal *Infotheca* was used is the study of (Stanković and Davidovć 2021). Within this research, Wikidata was created not only for the journal itself, but also for each article published in it which, at the time of the research, was part of the *INFOteka* corpus in Bibliša. Wikidata was created based on existing metadata about the journal, scholarly articles, and their authors in the corpus. After its creation, links were added to the journal articles on the Bibliša website, and the co-authorship graph was also presented as an interactive page. Metadata from Bibliša were exported into CSV format, and then the tools OpenRefine and QuickStatements were used. At the end, a HTML page integrating Wikidata Query Service with Bibliša was prepared. Also, the queries retrieving tables of the latest published articles, frequency of keywords in articles, pictures of authors, author profile table, co-authorship graphs, distribution of authors by sex, etc., were written. More about *Infotheca's* Wikidata is given in Section 5.3.

The latest research example is presented in (Stanković 2026) in which textometry and a comparative analysis of the parallel corpus *INFOteka* were presented, with the aim of examining the lexical, structural, and thematic characteristics of the corpus itself. In this research, individual metadata for Serbian and English subcorpora exported from Bibliša were used, as well as full texts of articles in both languages. By applying different methods (frequency analysis, analysis of collocations, time progression, specification, and topic modeling), the subcorpora were analyzed individually and comparatively; some characteristics and differences were presented, and the obtained results confirmed that parallel bilingual corpora are a valuable and important resource for linguistics and interdisciplinary research.

5.1 Parallel Corpus *INFOteka*

A parallel corpus is a multilingual collection consisting of one or more texts in one language (the source language) and their translations into one or more different languages (the target language). Parallel corpora are created by pairing semantically equivalent structural elements of texts in the source and target languages, resulting in a set of Translation Units (TUs), each consisting of two or more Translation Unit Variants (TUVs). The Natural

Language Processing Group, University of Belgrade, now the JeRTeh Society, has, since its inception, been developing parallel corpora containing Serbian, either as a source or a target language. In this context, it has developed a parallelization procedure consisting of several steps, which were also applied in the creation of the INFOteka parallel corpus:

1. text preparation and segmentation into alignment units (segments),
2. alignment of units,
3. visualization of parallelized texts, control and correction of produced pairs,
4. generation of parallelized texts in TMX (Translation Memory eXchange)²⁷ format,
5. splitting the TMX file into individual XML files,
6. verticalization of individual texts and corpus creation.

The first step, text preparation and segmentation into alignment units (segments), involves structuring the texts by marking sections, paragraphs and segments (in practice, most often sentences). Segments are used as translation unit variants, but the alignment of corresponding text parts is performed at all three levels to ensure greater precision, which is necessary for the parallelization program. Papers from *Infotheca* were marked using the following tags: <body> for the entire text, <div> for sections, <head> for titles and subtitles, <p> for paragraphs, and <seg> for marking segments (sentences). After annotation, two XML files were generated in accordance with the Text Encoding Initiative (TEI)²⁸: one for the source language (in this case, English) and one for the target language (in this case, Serbian). Both XML files were validated using the appropriate Document Type Definition (DTD)²⁹.

The files generated in the first step are then parallelized using different tools for the automatic generation of aligned segments. The members of the Belgrade Natural Language Processing Group opted for software packages developed at the “Laboratoire Lorrain de Recherche en Informatique et ses Applications” (LORIA)³⁰ in France: Xalign, for automatic alignment of segments, and Concordancier, for the visualization and manual correction

27. TMX is an ISO standard (ISO 24616:2018) that defines the storage of so-called translation memories and their exchange between different software translation tools, as well as between different companies that maintain translation memories.

28. Text Encoding Initiative - TEI

29. Document Type Definition - DTD

30. Laboratoire Lorrain de Recherche en Informatique et ses Applications – LORIA

of alignment errors. These tools are integrated into the ACIDE environment for generating aligned parallel texts (Obradović, Stanković, and Utvić 2008). ACIDE consists of two modules: Alignment and TMX. The Alignment module integrates Xalign and Concordancier. The default input consists of well-formed and validated XML files in the source and target languages, and the output is a new XML file with aligned translation unit variants (segments). Parallelization aims for 1-1 alignment, i. e. establishing a direct correspondence between equivalent segments in the source and target languages. ACIDE was used for the parallelization of articles in Infotheca, and after all necessary corrections, 1-1 alignment was achieved.

The fourth step, the generation of a parallelized text in TMX format, is carried out in the second module of ACIDE. This module produces a file in TMX format which consists of the header and the document body. The header contains metadata describing the parallelized text, while the document body consists of a translation units set containing one or more semantically equivalent translation unit variants (Figure 1).

[illegible]

Figure 1. Example of the parallelized text in TMX format

The fifth and sixth steps involve splitting the TMX file into individual texts in XML format and verticalizing individual XML files. Splitting means that the generated TMX file is decomposed into separate XML files for each language (source and target), containing information on translation units. Produced individual XML files are used as input for the parallel corpus. A separate corpus is created for each language, and connections are made that enable parallel search. Before corpus creation, verticalization is performed.

meaning that each token (word, number, punctuation mark, XML tag, XML comment, etc.) is placed on a separate line. These two steps are important when IMS OCWB³¹ is used for corpus creation, as was the case with corpora such as SrpKor (Utvić 2013), SrpFranKor (Vitas and Krstev 2004, 2006), SrpEngKor (Krstev and Vitas 2011), developed by the Belgrade Natural Language Processing Group. However, for Infotheca and other corpora that are part of the Bibliša digital library, the generated TMX file is sufficient. However, both steps were done in the case of *Infotheca*.

At the time of writing, the *INFOteka* parallel corpus included all parallelized issues from 2007 to 2025. According to data from Bibliša, the corpus contains 228 articles and 30,062 aligned segments (sentences). Although the total number of articles in the corpus is 228, only 207 are fully parallelized, as issue 2 (2019) and issue 2 (2021) were published only in English as special issues and could not be parallelized. However, metadata for these articles were entered in Bibliša in both languages, thereby enriching the *INFOteka* corpus in English, which is important for information retrieval in this scientific field.

5.2 *INFOteka* in Bibliša

Bibliša is a web tool developed by the Belgrade Human Language Technology Group aimed at enhancing search capabilities in digital libraries of e-journals (Stanković et al. 2012). Over time, parallel corpora have been incorporated into Bibliša, such as the Serbian-German Literary Parallel Corpus – SrpNemKor (Андоновски 2019, 2021),³² and the Serbian-Italian Literary Parallel Corpus ItSrKor³³ (Moderc et al. 2023), among others. The main feature of Bibliša is that it enables users to compose queries using both simple and multiword keywords in more than one language, which can be expanded semantically and morphologically using different supporting monolingual and multilingual lexical and terminological resources (Stanković et al. 2012; Stanković, Obradović, and Trtovac 2012; Stanković et al. 2015; Stanković et al. 2016).

Each digital object in Bibliša is described using appropriate metadata. Its structure was originally prepared to describe a journal, its individual issues, and each article individually (Stanković et al. 2016, 1711), but over time

31. **IMS OCWB** is free, open source software developed for working with text corpora.

32. **SrpNemKor**

33. **ItSrKor**

the structure has been changed, so that other types of digital objects can be described, such as those objects in parallel literary corpora (Андоновски 2019, 2021). When loading journal articles, it is first necessary to describe the issue with the following metadata: identification number (ID), volume, issue, month, and year of publication. In this way, a collection of a certain issue of the journal is created, into which articles are then uploaded and described using the following metadata, in both Serbian and English: article identification number (ID), UDC number, author(s) name(s) (if there is more than one author they are listed in the order they appear in the paper), contact information (email), affiliation, Wikidata reference, article title, category, pages, abstract, keywords, link to the full text, and, where applicable, information about the translator. After entering the metadata, the TMX file is uploaded; it must contain the article ID so that it can be successfully uploaded. After this step, users are allowed to view the metadata (Figure 2), the TMX format of the article (unregistered users can only see the first nine aligned segments) (Figure 3), a link to the article's full text (link to the PDF in OJS), a link to the Bag of Words³⁴, and a link to Wikidata (more in the next Section). In addition to individual article metadata, users can also see the whole list of articles that are part of the *INFOteka* corpus.³⁵

5.3 *Infotheca* and Wikidata

Besides Bibliša, Infotheca has its own Wikipedia page³⁶, as well as Wikidata entries both for the journal itself, and for all articles that are part of the corpus. In this way, the visibility of the journal on the web, as well as of the Serbian language, is increased.

Wikidata is a multilingual open knowledge base developed by the Wikimedia Foundation with the aim of enabling the storage and retrieval of structured multilingual data from Wikipedia in an interoperable, machine-readable format. As Wikidata is based on the principles and guidelines of the Semantic Web, the database has records in the form of statements in RDF³⁷ triples: subject (item) – predicate (relation) – object (value) (Schreiber and Raimond 2014). The subject (item) can be any topic (person, object, place,

34. Bag of Words represents a set of words in one text with the calculated frequency of their occurrence in that text, regardless of their grammatical forms and word order in the sentence.

35. *Corpus INFOteka*

36. *Инфотека*

37. *Resource Description Framework*

 [Log In] [Register] BIBLIŠA: ALIGNED COLLECTION SEARCH TOOL Home Metadata browse Metadata search Mongo search Manage data Help Tutorial About	
Analysis of family relationships of characters in the srpELTeC corpus based on semantic web techniques and textometry	Analiza porodičnih odnosa likova srpELTeC korpusa zasnovana na tehnikama semantičkog veba i računarskoj lingvistici
Infotheca, Scientific paper [pdf]	InfoTeKa, Naučni rad [pdf]
ID: 1.2025.1/2.1 Number: 1/2 Volume: 25 Month: 12 Year: 2025 UDC: 811.163.41/322.2	[bom/tmx]
Milica Ikonić Nešić Institution: University of Belgrade, Faculty of Philology Mail: milica.ikonic.nestic@fil.bg.ac.rs	Milica Ikonić Nešić Institution: Univerzitet u Beogradu, Filološki fakultet E-pošta: milica.ikonic.nestic@fil.bg.ac.rs
Abstract This paper presents an analysis of family relationships of characters in the SrpELTeC collection of Serbian novels published between 1840 and 1920, using a textometric approach and semantic web techniques. The study explores the appearance of family relationships between literary characters in the corpus in regards to the periods in which the novels were written, as well as to the authors of the novels. Taking into account the overlap between the literary movements of Romanticism and realism during the aforementioned periods, the analysis examines in which direction family relationships are more prevalent, and whether male characters are more represented than female characters in the collection. Visualizations of the relationships between characters are presented through linking the characters with novels in Wikidata and by expressing SPARQL queries, as well as through the network analysis using the Gephi tool.	Apstrakt U radu je predstavljena analiza porodičnih odnosa likova u kolekciji SrpELTeC srpskih romana objavljenih od 1840. do 1920. godine, kroz tekstometrijski pristup i tehnike semantičkog veba. Istraženo je pojavljivanje porodičnih odnosa između književnih likova u korpusu u odnosu na periode pisanja romana, kao i u zavisnosti od pisca dela. Uzimajući u obzir preplatanje književnih pravaca romantizma i realizma u periodu pisanja romana, ispitano je u kom su pravcu porodični odnosi zastupljeniji, kao i da li je u kolekciji broj muških likova više zastupljen od ženskih. Vizuelizacije odnosa među likovima predstavljene su kroz povezivanje likova sa romanima u Wikidacima i postavljanjem SPARQL upita, kao i mrežnom analizom korišćenjem alata Gephi.
Keywords: SrpELTeC, family relationships, literary characters, Wikidata, Gephi, SPARQL	Кључне речи: SrpELTeC, porodični odnosi, književni likovi, vikipodaci, Gephi, SPARQL
Pages: 7-40	Стране: 7-40
Publishing place:	Mesto izdanja:
Publisher:	Izdavač:
Publishing year:	Godina izdanja:
Translator:	Prevodilac:
C:\inetpub\Bibliša\Mongo\export\11\svg\1_2025_1_2_1_tmx_0.svg	

Figure 2. Metadata view in Bibliša for an article published in *Infotheca*

concept). It has a unique, persistent identifier, which is assigned automatically when the record is created and cannot be changed later. Also, each QID is unique, which means that it can be assigned only once. A data item identifier is a positive integer with an upper-case Q as a prefix (QID) and may, in addition to being linked to a title and a description, have a number of aliases and statements (claims, expressions) representing its properties and values (Stanković and Davidović 2021, 90). Predicate (relation) is a property of a subject and, like the subject, has a persistent identifier: a positive integer with an upper-case P as a prefix (PID). The object provides additional information about the subject and can be another item, a string, a URL, etc.

In the Wikidata base, *Infotheca* is an item with the QID “Q25460443”³⁸ (Figure 4) and has certain numbers of statements. Table 1 presents a comparative overview of the statements for the item Q25460443 in natural language (English), their annotation with ID identifiers in the Wikidata statement format.

As mentioned, all papers that are part of *INFOteka* are individual items in Wikidata with statements such as “published in (P1433) Infotheca: Jour-

38. Infotheca: Journal for Digital Humanities (Q25460443)

BIBLIŠA: ALIGNED COLLECTION SEARCH TOOL	
[Log In] [Register]	
Home Metadata browse Metadata search Mongo search Manage data Help Tutorial About	
ANALYSIS OF FAMILY RELATIONSHIPS OF THE CHARACTERS IN THE SRPELTec CORPUS BASED ON SEMANTIC WEB TECHNIQUES AND TEXTOMETRY / MILICA IKONIĆ NEŠIĆ = ANALIZA PORODIČNIH ODNOSA LIKOVA KORPUSA SRPELTec ZASNOVANA NA TEHNIKAMA SEMANTIČKOG VEBIA I TEKSTOMETRIJI / MILICA IKONIĆ NEŠIĆ	
[ABOUT]	
En/De/Fr/It - (first 9 out of 281 sentences) [pdf]	Srpski - (prvih 9 od 281 rečenica) [pdf]
n1 ABSTRACT: This paper presents an analysis of family relationships of characters in the SRPELTec collection of Serbian novels published between 1840 and 1920, using a textometric approach and semantic web techniques.	n1 SAŽETAK: U radu je predstavljena analiza porodičnih odnosa likova u kolekciji SRPELTec srpskih romana objavljenih od 1840. do 1920. godine, kroz tekstometrijski pristup i tehnike semantičkog vebia.
n2 The study explores the appearance of family relationships between literary characters in the corpus in regards to the periods in which the novels were written, as well as to the authors of the novels.	n2 Istraženo je pojavljivanje porodičnih odnosa između književnih likova u korpusu u odnosu na periode pisanja romana, kao i u zavisnosti od pisca dela.
n3 Taking into account the overlap between the literary movements of Romanticism and Realism during the aforementioned periods, the analysis examines in which direction family relationships are more prevalent, and whether male characters are more represented than female characters in the collection.	n3 Uzimajući u obzir preplitanje književnih pravaca romantizma i realizma u periodu pisanja romana, ispitano je u kom su pravcu porodični odnosi zastupljeniji, kao i da li je u kolekciji broj muških likova zastupljeniji od ženskih.
n4 Visualizations of the relationships between characters are presented through linking the characters with novels in Wikidata and by expressing SPARQL queries, as well as through the network analysis using the Gephi tool.	n4 Vizuelizacije odnosa među likovima predstavljene su kroz povezivanje likova sa romanima u vikipodacima i postavljanjem SPARQL upita, kao i mrežnom analizom korišćenjem alata Gephi.
n5 KEYWORDS: SRPELTec, family relationships, literary characters, Wikidata, Gephi, SPARQL	n5 KLJUČNE REČI: SRPELTec, porodični odnosi, književni likovi, vikipodaci, Gephi, SPARQL
n6 The sub-collection of Serbian novels (referred to as SrPELTec) (Krstev and Stanković 2022, 2020; Stanković et al. 2022; Patras et al. 2020) was developed under the auspices of the COST Action CA16204 Distant Reading for European Literary History.	n6 Potkolekcija srpskih romana (nazvana SrPELTec) (Krstev and Stanković 2022, 2020; Stanković et al. 2022; Patras et al. 2020) nastala je pod okriljem COST akcije CA16204 Distant Reading for European Literary History (Udaljeno čitanje za evropsku istoriju književnosti).
n7 One of the main objectives of this Action was to form a multilingual corpus (named the European Literary Text Collection - ELTeC), consisting of 100 novels, first published between 1840 and 1920, in twelve European languages, which comprises its language sub-collections (Odebrecht, Bumard, and Schoch 2021).	n7 Jedan od najvažnijih ciljeva ove akcije bio je priprema višezjezičnog korpusa (nazvanog European Literary Text Collection - ELTeC) koji sadrži po 100 romana; prvi put objavljenih u periodu 1840-1920, za dvanaest evropskih jezika, koji čine njegove jezičke potkolekcije (Odebrecht, Bumard, and Schoch 2021).
n8 The Serbian subcollection of novels contains 5,886,528 tokens and 4,769,262 words.	n8 Srpska potkolekcija romana ima 5.886.528 tokena i 4.769.262 reči,
n9 All words are annotated with part-of-speech tags and lemmas (Stanković et al. 2020; Frontini et al. 2020). Also, all words contain information about named entities (Stanković et al. 2019), thus enabling the application of advanced text analysis methods in accordance with the distant reading paradigm.	n9 sve reči su anotirane vrstom reči i lemom (Stanković et al. 2020; Frontini et al. 2020) i informacijom o imenovanim entitetima (Stanković et al. 2019), što otvara mogućnost primene naprednih metoda analize teksta, u skladu sa paradigmom udaljenog čitanja.

Figure 3. TMX view for an article published in *Infotheca*

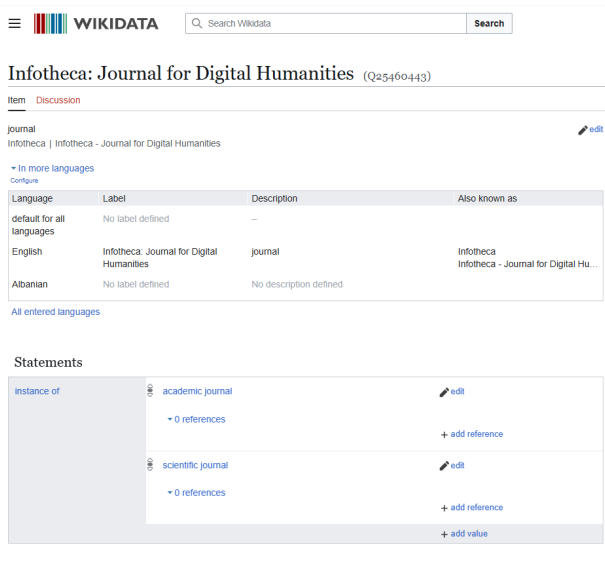


Figure 4. Item Q25460443 (Infotheca) in Wikidata

nal for Digital Humanities (Q25460443)” (Figure 5). Table 2 presents a comparative overview of selected statements for the item “The Language of Food and Its Dictionary” (Q122583889)³⁹ in natural language (English), their annotation with ID identifiers, and their Wikidata statement format.

It is possible to search metadata in Wikidata using the Wikidata Query Service environment⁴⁰ by composing SPARQL queries (Simple Protocol and RDF Query Language)⁴¹. There are numerous query examples that can be used by users who are not familiar with the SPARQL language, and query results can be visualized in various ways (Андоновски 2019, 144–149), (An-donovski 2023, 43–51), (Ikonić Nešić, Stanković, and Rujević 2023, 63–65). In 2025, the full Wikidata graph was split into two distinct graphs; the main graph and the scholarly graph. The scholarly graph includes all triples for items that contain (Lubiana, Rasberry, and Mietchen 2025):

39. The Language of Food and Its Dictionary

40. Wikidata Query Service

41. SPARQL is a protocol and query language for RDF databases

WIKIDATA

The future of science – Open Science and Open Data (Q205835894)

Item [Discussion](#) [R](#)

scientific paper published in December 2020 [edit](#)

[+ in more languages](#)

[Configure](#)

Language	Label	Description	Also known as
default for all languages	No label defined	–	
English	The future of science – Open Science and Open Data	scientific paper published in December 2020	
Serbian (Latin script)	Будućност науке - отворена наука и отворени подаци	No description defined	
Serbian	Будućност науке - отворена наука и отворени подаци	научни чланак објављен у децембру 2020.	

Statements

instance of [academic journal article](#) [edit](#)

[+ 0 references](#) [+ add reference](#) [+ add value](#)

work available at URL [https://infotheka.bg.ac.rs/ojs/index.php/infotheka/article/view/2020.20.1_2_3_en/211](#) [edit](#)

language of work or name English

[+ 0 references](#) [+ add reference](#)

[https://infotheka.bg.ac.rs/ojs/index.php/infotheka/article/view/2020.20.1_2_3_sr/210](#) [edit](#)

language of work or name Serbian

[+ 0 references](#) [+ add reference](#) [+ add value](#)

published in [Infotheca: Journal for Digital Humanities](#) [edit](#)

[+ 0 references](#) [+ add reference](#) [+ add value](#)

Figure 5. Property “published in (P1433)” with the value Q25460443 (Infotheca: Journal for Digital Humanities)

Infotheca: Journal for Digital Humanities instance of scientific journal, academic journal, text corpus. Its inception was in 2000. Publishers are: University of Belgrade, Faculty of Philology, University Library "Svetozar Marković" and the Serbian Academic Library Association. ISSN number is 1450-9687 subject named as Infoteka, distribution format printed matter and 2217-9461 subject named as Infoteka (Online), distribution format online publication.

Infotheca: Journal for Digital Humanities (Q25460443) instance of (P31) scientific journal (Q5633421), academic journal (Q737498), text corpus (Q461183). inception (P571) „2000“; publisher (P123): University of Belgrade Faculty of Philology (Q3542768), University Library "Svetozar Marković" (Q683389) and Serbian Academic Library Association (Q98821991). ISSN (P236) „1450-9687“ subject named as (P1810) Infoteka, distribution format (P437) printed matter (Q1261026). ISSN (P236) „2217-9461“ subject named as (P1810) Infoteka (Online), distribution format (P437) online publication (Q1714118).	Q25460443 P21 Q5633421; Q737498; Q461183; P123 Q3542768; Q683389; Q98821991; P236 „1450-9687“ P1810 „Infoteka“; P437 Q1261026; P236 „2217-9461“; P1810 „Infoteka (Online)“; P437 Q1714118.
--	--

Table 1. Comparative representation of selected statements in natural language, using identifiers, and in the Wikidata statement format for item Q25460443.

1. statements with the property “instance of (P31)”⁴² that matches any one of the 49 scholarly QIDs: for example, “scholarly article” (Q13442814) and 24 subclasses of it, “thesis” (Q1266946) and 15 subclasses of it, as well as “erratum” (Q1348305), “dissertation” (Q1385450), “comment” (Q58897583), “research report” (Q59387148), “field study report” (Q1402850), “conference poster” (Q54670950), “scientific note” (Q114613919) and, perhaps surprisingly, “Bachelor of Literature” (Q112585758), and
2. 2. statements with the property “publication type of scholarly work (P13046)”.⁴³

Accordingly, there are now two query services. For searching data in the main graph, the previously mentioned environment is used, while for searching data in the scholarly graph a separate query service is available at <https://query-scholarly.wikidata.org/> (*Wikidata:SPARQL query service/WDQS graph split*). This query service is used for searching the data regarding *Infotheca*, because it has the statement “instance of (P31): academic

42. Wikidata: instance of (P31)

43. Wikidata: publication type of scholarly work (P13046)

The Language of Food and Its Dictionary instance of academic journal article. Author Duško Vitas. Publication date July 2023, published in Infotheca: Journal for Digital Humanities, language of work or name English and Serbian. DOI 10.18485/INFOTHECA.2023.23.1.1.

The Language of Food and Its Dictionary (Q122583889) instance of (P31) academic journal article (Q18918145). Author (P50) Duško Vitas (Q12751371). Publication date (P577) „July 2023“. published in (P1433) Infotheca: Journal for Digital Humanities (Q25460443). language of work or name (P407) English (Q1860) and Serbian (Q9299). DOI (P356) 10.18485/INFOTHECA.2023.23.1.1.	Q122583889 P31 Q18918145; P50 Q12751371; P577 „jul 2023“; P1433 Q25460443; P407 Q1860; Q9299; P356 10.18485/INFOTHECA. 2023.23.1.1.
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Table 2. Comparative representation of selected statements in natural language, using identifiers, and in the Wikidata statement format for item Q122583889.

journal (Q737498); scientific journal (Q5633421); text corpus (Q461183)”, while articles have the statement “instance of (P31): academic journal article (Q18918145)”.

We will illustrate the use of SPARQL queries with three examples. The first lists all papers from *Infotheca* published in the period 2018–2022; the results are presented as a timeline⁴⁴ and are sorted by the date of publication (Figure 6). The second one lists all papers published in *Infotheca* that have more than three authors; the results are presented as a tree structure and sorted by the number of authors decreasing⁴⁵ (Figure 7). The third query lists all authors who have published more than three papers in *Infotheca*. This query was formulated in two ways: the first one lists authors and the number of their published papers for the period 2007–2025, and the query results are presented as a table (Figure 8);⁴⁶ the second one lists all authors and the papers they have published, and the query results are presented as an interactive graph (Figure 9).⁴⁷

Example 1:

```
SELECT DISTINCT ?item ?itemLabel ?volume ?issue ?publication_date
WHERE { # paper published (P1433) in Infotheca (Q25460443)
```

44. Visualization of the first SPARQL query in the form of a timeline,
<https://w.wiki/KcGc>

45. Visualization of the second SPARQL query in the form of a tree,
<https://w.wiki/KcNQ>

46. Visualization of the third SPARQL query in the form of a table,
<https://w.wiki/M5sN>

47. Visualization of the third SPARQL query in the form of an interactive graph,
<https://w.wiki/KcU\protect\TU\textdollar>

```
?item wdt:P1433 wd:Q25460443;
# volume of publication (P478)
wdt:P478 ?volume;
# issue of publication (P433)
wdt:P433 ?issue;
#publication_date (P577)
wdt:P577 ?publication_date.
FILTER (?publication_date >= "2018-06-01T00:00:00Z"^^ xsd:dateTime
&& ?publication_date <= "2022-06-01T00:00:00Z"^^ xsd:dateTime)
SERVICE wikibase:label
{bd:serviceParam wikibase:language "[AUTO_LANGUAGE],mul,en".} }
ORDER BY DESC (?publication_date)
```

Example 2:

```
SELECT DISTINCT ?item ?itemLabel(COUNT (?author) AS ?authorCount)
WHERE { #paper published (P1433) in Infotheca (Q25460443)
  ?item wdt:P1433 wd:Q25460443;
  # author (P50)
  wdt:P50 ?author.
SERVICE wikibase:label
{bd:serviceParam wikibase:language "[AUTO_LANGUAGE],mul,en".} }
GROUP BY ?item ?itemLabel
HAVING (COUNT(?author) > 3)
ORDER BY DESC (?authorCount)
```

Example 3a:

```
SELECT ?authorLabel(COUNT(DISTINCT ?item) AS ?publicationCount)
WHERE { # paper published (P1433) in Infotheca (Q25460443)
  ?item wdt:P1433 wd:Q25460443;
  # author (P50)
  ?item wdt:P50 ?author.
# Get the author label
SERVICE wikibase:label
{bd:serviceParam wikibase:language "[AUTO_LANGUAGE],mul,en".} }
GROUP BY ?author ?authorLabel
# Filter for more than 3 papers
HAVING (COUNT(DISTINCT ?item) > 3)
ORDER BY DESC (?publicationCount)
```

Example 3b:

```
SELECT ?author ?authorLabel ?item ?itemLabel
WHERE { #Find publications in Infotheca (Q25460443)
  ?item wdt:P1433 wd:Q25460443;
  # author (P50)
  wdt:P50 ?author.
# Filter for authors with more than 3 publications in this journal
{ SELECT ?author (COUNT(?item) AS ?publicationCount)
WHERE { # Find publications in Infotheca (Q25460443)
  ?item wdt:P1433 wd:Q25460443;
  # author (P50)
  wdt:P50 ?author.
}
}
GROUP BY ?author
```

```

HAVING (COUNT(?item) > 3)
}

# Labels
SERVICE wikibase:label
{bd:serviceParam wikibase:language "[AUTO_LANGUAGE],mul,en".} }
ORDER BY DESC (?publicationCount)

```

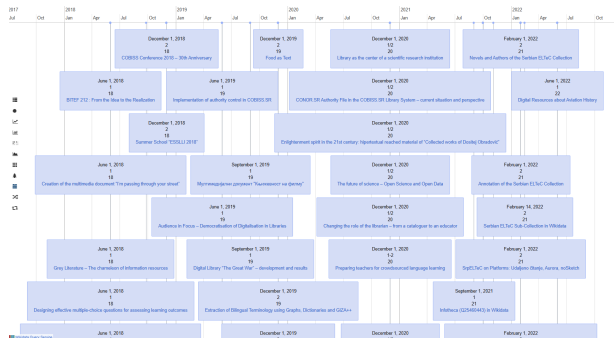


Figure 6. Visualization of the SPARQL query in the form of a time scale

- Central and South-European language resources in Meta-Share 11
- i-Librarian - Free online library for European citizens 8
- Cooperative Work in Further Development of Serbian Wordnet 7
- ICTs in National Libraries of Bangladesh, Indonesia, Philippines, & Uganda: Comparative Study 6
- Working on the Multimedia Document "Ai" se nekad dobro jelo" 6
- Creation of the multimedia document "I'm passing through your street" 6
- The development of the GeolISSTerm terminological dictionary 5
- The Use of the Omeka Platform for Digital Libraries in the Field of Mining 5
- Peter in the Cloud of Education 4
- Annotation of the Serbian ELTeC Collection 4

Figure 7. Visualization of the SPARQL query in the form of a tree

6 Conclusion

The paper presents all changes of the journal *Infotheca*, from its inception to the present day, and its transformation from a traditional resource into

author	publicationCount
Q wd Q99281502	17
Q wd Q97199587	12
Q wd Q99281834	11
Q wd Q12751371	8
Q wd Q99281544	6
Q wd Q99281474	5
Q wd Q99368929	5
Q wd Q99281736	4
Q wd Q99463969	4

Figure 8. Visualization of the SPARQL query in the form of a table

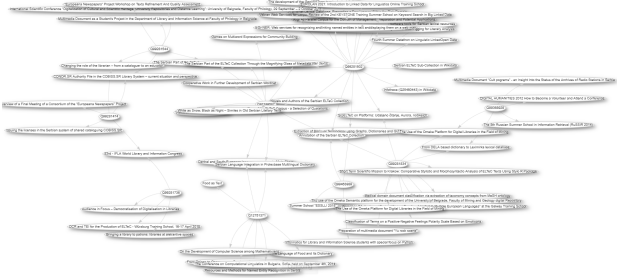


Figure 9. Visualization of the SPARQL query in the form of an interactive graph

a fully online Open Access publication. The implementation of the Open Journal System (OJS) has enabled the editorial team and all collaborators (authors, reviewers, copyeditors, proofreaders, and technical editors) to participate in one place in the preparation of *Infotheca* issues. In addition, by using the L^AT_EX package with templates for page layout design prepared according to the document class used by Springer, authors have the possibility to submit their texts already prepared in the publishing format. For this purpose, Overleaf is used as a free collaborative L^AT_EX editor, allowing submitted papers to be simultaneously reviewed and technically edited by *Infotheca*'s technical editors with granted access. With the implementation of OJS and Overleaf, all activities related to issue preparation can be carried out without the exchange of a large number of emails, which is a great technical improvement of the journal.

To facilitate faster, easier, and simpler information retrieval within *Infotheca*, the journal's archive has been integrated into different databases. The fact that the papers are published bilingually and in Open Access, as well as the fact that Prof. Cvetana Krstev has been the editor-in-chief for more than a decade, were the main characteristics that influenced the creation of the bilingual parallel corpus *INFOteka*, which gave the journal a different form. The fact that it is also a domain-specific corpus has had an additional influence on it becoming a digital language resource very important in research across different scientific fields, including information and terminology retrieval and extraction from domain corpora, and computational linguistics. Furthermore, by integrating the corpus into Bibliša, a wider circle of researchers has been enabled to search the corpus content using metadata search or full-text search composing queries in more than one language that can be expanded, both semantically and morphologically, using different supporting monolingual and multilingual lexical and terminological resources. Users can also view the search results in various ways.

On the other hand, the creation of Wikidata entries for all papers in the parallel corpus, which can also be accessed via Bibliša, has enabled a different way of information retrieval regarding *Infotheca*, as well as alternative presentation of the obtained results. Unlike Bibliša, which also supports full-text search, Wikidata focuses on metadata, i.e., structural metadata. Therefore, information retrieval regarding *Infotheca* in this database is of exceptional importance, as it enables researchers to formulate complex queries and get results that cannot be obtained from Bibliša or COBISS. In addition, as Wikidata is part of the Linked Open Data (LOD) cloud, the journal, and also the Serbian language, are integrated into this huge ecosystem on the

web. Its presence in Wikipedia further increases both the journal's visibility, and the visibility of the Serbian language.

Infotheca will continue to publish scientific results and professional expertise in the field of digital humanities in the Republic of Serbia and abroad, as well as reviews of significant events and publications in this field, striving to achieve the highest possible quality. In the upcoming period, the development of the journal will proceed in several directions. Planned activities include bibliometric and citation analysis, the completion of the parallel corpus by adding issues from 2000 to 2006 so as to complete the archive, and, in addition to regular analytical processing, retrospective processing, which will include assigning DOI to works published prior to 2016.

In 2025, the 25th volume was published, marking a quarter century of the journal's existence, as well as an important period in the work of the University Library "Svetozar Marković". The Library has played a crucial role in the continuity of *Infotheca* since its inception. In addition to being one of the publishers, it also serves as the headquarters of the SALA. Particularly important is the engagement of the librarians and IT specialists employed at the Library, who, through their work and editorial activities in *Infotheca*, contribute to its sustainability and quality. The work of all librarians, including the work of Serbian and English proofreaders employed at the Library, is in the scope of their everyday professional duties, while external collaborators involved in journal editing, work on a voluntary basis. This demonstrates the great enthusiasm and commitment of all collaborators to maintain such a journal within a small yet significant scientific community.

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From Courtesy Letters to Digital Copies: Interlibrary Loan — Experiences of the University Library “Svetozar Marković” in Belgrade

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ABSTRACT: This paper presents the development and transformation of interlibrary loan services at the University Library “Svetozar Marković” in Belgrade, from their earliest beginnings to the present-day practice, which is substantially transformed. Interlibrary loan is examined as a specific form of scholarly documents exchange — one of several modalities for the organization of information and documents that gained considerable momentum in the immediate aftermath of World War II, when science was assigned a prominent and autonomous role in society. By virtue of the nature of the materials it encompasses, this activity has been uniquely positioned to bear witness to a wide range of developments in the communication field of science, spanning virtually all of its disciplines. The paper identifies and describes the successive stages of development and transformation of this service, as well as the corresponding shifts in scholarly communication.

KEYWORDS: interlibrary loan, scientific documents supply, structures of scholarly documents, University Library “Svetozar Marković”.

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1 Historical Overview

Resource sharing and scientific documents supply — designations that are increasingly replacing the classical term “interlibrary loan” — constitute

a professional activity whose methodology, scope, content, and indeed its newer term have been shaped by profound changes in information technology, as well as in copyright law and intellectual property. At its foundations, however, the activity has preserved the same principles that guided it in ancient times, above all the principle of *noblesse oblige*: a great library has always lent books to its less affluent counterpart (Kenney 1971, 121). Ever since the time when the Library of Alexandria (Figure 1) lent part of its collection to the Library of Pergamon — its greatest rival — as this evocative image is often invoked in the literature, despite the absence of reliable historical sources, major libraries have regularly lent books to all who requested them.

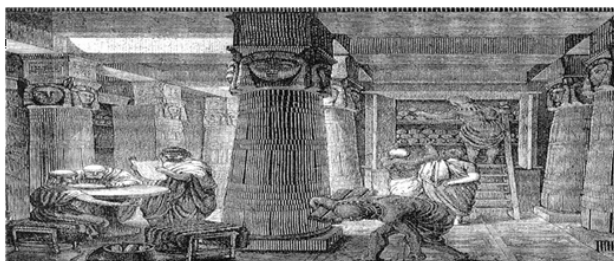


Figure 1. O. von Corven: The Library of Alexandria

We do not have any authenticated records of the exchange of papyrus and parchment from that era, a period marked by fierce competition between the two greatest libraries of the ancient world; however, the active use of sources recorded in the hidden catalogues of monastic libraries can be traced with considerable clarity throughout the Middle Ages. One of the earliest documented instances of both lending and copyright is preserved in the legend of St. Columba. Around the year 560, St. Columba, during a stay at a monastery, secretly copied a psalter belonging to his teacher, St. Finnian. The case was adjudicated by the Irish king Dermott, who ruled in favor of St. Finnian; his judgement became foundational for all subsequent legislation on the lending of such materials and on copyright: “To every cow her calf, and consequently to every book its copy” (Cornish 2003). From the fifteenth to the nineteenth century, as can be seen from these instances of “getting personal in the margin” (Kwakkel 2014), all the great libraries that emerged across Europe shared their collections in one form or another (Hessel 1977).

Marginalia found throughout collections of medieval manuscripts attest to a practice of lending among scriptoria across Europe. For example, the transcript of Saint Augustine in the glosses of Peter Lombard's *On the Trinity* (*De Trinitate*) at Trinity College, Cambridge, dating from the eighth century, contains a list of books serving as a kind of medieval catalogue of the episcopal library in Würzburg (Figure 2). Based on the notes inscribed by librarians in the margins alongside this list, it is possible to reconstruct an extensive loan practice between that library and the libraries of the monasteries at Fulda and Holzkirchen during the eighth century (Lowe 1928, 11).



Figure 2. *Saint Augustine in the Glosses of Peter Lombard*, Trinity College, Cambridge (Kwakkel 2014).

Independent of these courtly forms of the activity, the beginnings of systematic practice are associated with the work of the French humanist and astronomer Nicolas-Claude Fabri de Peiresc (1580–1637), who established this type of cooperation among the Royal Library in Paris, the Vatican Library, and the Barberini Library in Rome in the seventeenth century. Alongside him, mention should also be made of Gabriel Naudé, whose work *Advice on Establishing a Library* remains to this day a compelling, if not entirely contemporary, read.

2 Interlibrary Loan in Yugoslavia and Serbia

The activity was systematically established in both the United States and Europe at the turn of the twentieth century, in nearly parallel developments.

Yugoslavia occupied a notable position within the well-developed network of interlibrary loan in Europe during the interwar period. Its trajectory was, however, repeatedly disrupted for political reasons. The Archive of the University Library “Svetozar Marković” preserves early correspondence with European libraries concerning the book lending. The earliest evidence of the activity’s modest beginnings is recorded in the *Guide to National Information, Loan, and Exchange Services* published by the International Institute of Intellectual Cooperation (*Guide des services nationaux de renseignements du prêt et des échanges internationaux*, second revised edition, 1933). The Guide contains one of the earliest references to lending activity in Yugoslavia — a brief note on the existence of the practice in Yugoslav libraries, along with the address of the Bureau for the Exchange of Publications at the Ministry of Foreign Affairs, which at that time functioned as the central institution for interlibrary loan activities (Павловић 2012, 13).

In addition to the Guide, a significant source is the questionnaire distributed by the National Library of Switzerland in the lead-up to the IFLA Madrid Conference of 1935 (Godet 1937, 5–7). The questionnaire, which included comparative statistics on lent publications, was filled out by a small number of IFLA member states, among them Yugoslavia — specifically the university libraries in Belgrade and Zagreb (14–15). The Archive of the Swiss Library Association (*Association des bibliothèques et des bibliothécaires suisses*) preserves the response of Uroš Džonić, Director of the University Library in Belgrade, addressed to the University Library in Bern (Figure 3), as well as, filed under the same reference number, the response of the University Library in Zagreb. As is apparent in both cases, interlibrary loan had not yet been established as a formal service; nevertheless, it may be inferred that from the time of this survey onwards, the activity began to receive considerably greater attention. Although it was not registered as a national centre for interlibrary loan, the University Library “Svetozar Marković” had effectively fulfilled that role by virtue of the volume of its operations, even in the pre-war period.

It is worth recalling here the era in which the University Library in Belgrade was inaugurated. At precisely that time — or, more accurately, two years thereafter — the prevailing practice of the activity across Europe was described in the following terms:

“But if you want a book from France, it has to go through diplomatic channels. In other words: the library writes to the Ministry of Education, the Ministry of Education approaches the Ministry of Foreign Affairs, which contacts the Danish

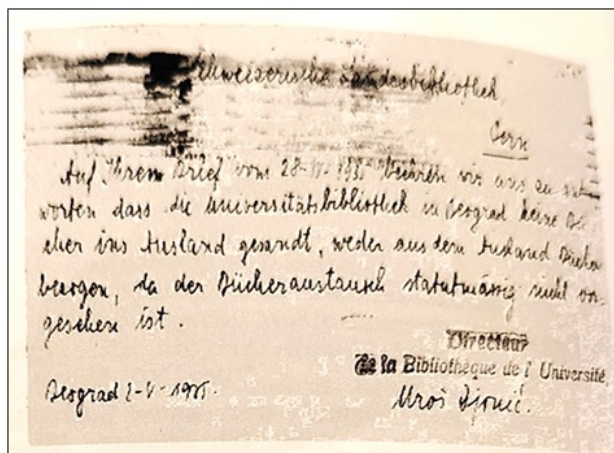


Figure 3. The response of Uroš Džonić

Legation in Paris. The Danish Legation writes to the French Ministry of Foreign Affairs, which forwards the request to the Bibliothèque nationale de France. The book is then returned by the same route, from ministry to ministry, until it finally reaches the library. And the Danish professor who once needed a manuscript to be sent from Paris.” (Drachmann 1928, 35)

3 The University Library “Svetozar Marković”: Stages of Development

Scientific documents supply was formally established in the immediate aftermath of World War II, a period in which science was accorded an unprecedented role in society, accompanied by the largest investments in scientific research to that point in history. By virtue of the nature of the materials it encompasses, this activity is uniquely positioned to illuminate not only the internal changes within the service itself and within basic science, but also a range of less visible structures within the communicative field of science and culture. In this sense, it constitutes a significant record of shifts in the philosophy and sociology of science.

From the 1960s, when interlibrary loan became a regular activity in all major libraries, professional practice operated under a regional model for the

distribution of responsibilities. The coordinating institution for Serbia was once again the University Library “Svetozar Marković” in Belgrade (ULSM), and it is possible to identify at least three distinct stages of the activity’s development. An earlier paper (Pavlović 2010) provides a detailed account of these stages up to 2009. As the most recent stage is still ongoing, it should be noted that its defining tendency — particularly over the past five years — has been one of continuous transformation and redefinition of the activity (Figure 4).

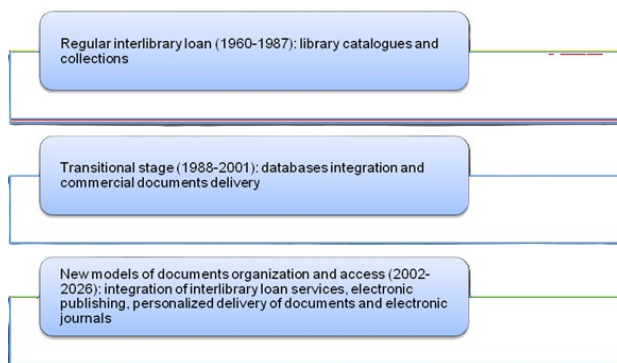


Figure 4. Stages in the development of interlibrary loan at the ULSM

Within the decentralized system, the interlibrary loan network prior to 1988 comprised the University Library “Svetozar Marković”, the National Library of Serbia, the Central Library of the Serbian Academy of Sciences and Arts (SASA), and the Matica Srpska Library. In practice, all types of libraries participated in the loan process. As is also the case in the European context, the reconstruction of this period was only made possible through a combination of quantitative and various qualitative methods (surveys, interviews, and personal communications). Annual reports and statistical data from these libraries attest to a considerable level of activity during this period: cooperation was maintained with over 300 libraries worldwide, and the total number of requests ranged from several hundred in the early 1960s, to more than 4,500 in the mid-1980s (Figure 5).

Until the mid-1970s, the majority of requests concerned monographic publications in the social sciences and humanities, with the ratio between

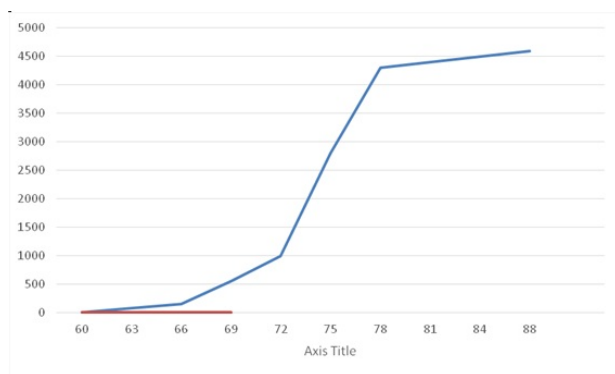


Figure 5. Number of outgoing and incoming requests, 1960–1987.

these two fields standing at approximately 3:1 in the early 1960s. From the mid-1970s, this balance began to shift: requests from the humanities and social sciences declined, while those from the natural and technical sciences increased (Павловић 2012, 134). The structure of loan requests during this period is illustrated in Figure 6.

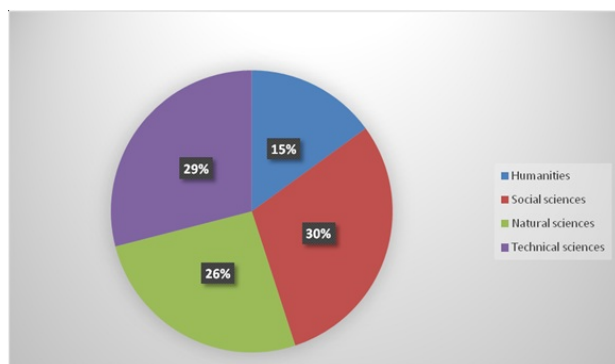


Figure 6. ULSM: Structure of interlibrary loan requests with foreign partners by scholarly fields, 1960–1987.

Mention must also be made of the discrete interlibrary loan systems that operated during this period — specifically the separate systems established for particular scientific disciplines, most notably the biomedical and technical sciences. These functioned entirely independently of the general system and were almost invariably excluded from statistical reporting, despite accounting for nearly 70% of Yugoslavia's total lending volume (134).

Hampered by an unconsolidated information infrastructure, characterized by unplanned and uncoordinated development, inadequate funding, and persistent difficulties arising from unregulated foreign currency transactions, the interlibrary loan service during this period nevertheless constituted an active function of the ULSM within its broader European context.

The transitional stage of 1988–2001 is characterized by the consolidation of information technologies, initiated within the framework of the Yugoslav Scientific and Technological Information System (1987), the establishment of shared cataloguing, and the integration of databases into the information retrieval chain. Analysis of requests from this period revealed a structure not significantly different from that of the earlier phase; however, the conditions were created for a fundamental shift in the model of access to scholarly information. Nevertheless, the wartime circumstances of the 1990s in Yugoslavia and the resulting disruption of international communication arrested the emerging momentum in the development of library and information services. The failed attempts to establish a library network for Serbia, the discontinuity in the acquisition of serial publications and databases and the breakdown of the first coordinated acquisition system, a general lack of dedicated funding, the suspension of international financial transactions, and the broader economic crisis were the principal factors that halted the development of a new model of interlibrary loan services (140–155).

The third stage of interlibrary loan development has been shaped by a multiplicity of general and specific factors that have led to a substantial redefinition of existing practices and the emergence of entirely new operational trends. This is the period of documents dematerialization, the adoption of digital content, and the development of fundamentally new possibilities for the circulation of scholarly materials. Of particular significance in this context is the emergence of open access, which has brought about a major transformation of library and information practice in Serbia.

This stage of scientific documents supply represents a “turning point” in the integration of electronic journals into scholarly practice. In the early 2000s, the University Library in Regensburg provided access to more than 6,000 electronic titles, of which 74% pertained to the medical sciences and

26% to the humanities and social sciences (Mahé 2002, 23). At the ULSM, access to electronic journals is associated with the year 2002, and the establishment of the Serbian Library Consortium for Coordinated Acquisition (KoBSON). At the same time, lending activity transitioned to electronic forms, primarily through the SUBITO service, TIB Hannover (*Technische Informationsbibliothek Hannover*), the British Library Document Supply Centre (simultaneously the oldest service with which Yugoslavia had collaborated), INIST (*Institut de l'information scientifique et technique*), and CISTI (*Canada Institute for Scientific and Technical Information*) (Figure 7).

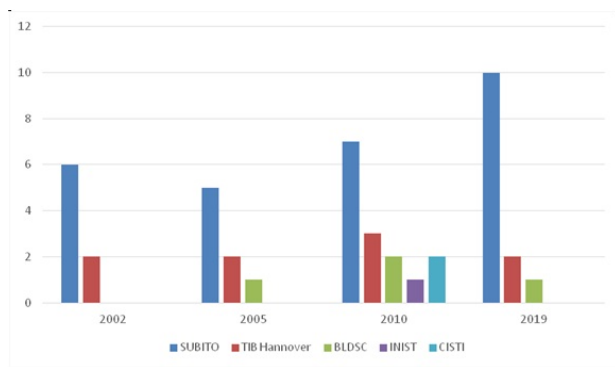


Figure 7. Documents supply services at the ULSM, 2002–2019.

The rapid increase in articles retrieved through these services prompted projections regarding a future decline in interlibrary loan requests, and the potential disappearance of the activity altogether. A similar dampening effect on request volumes was anticipated from the retrospective conversion of serial publications, particularly due to the increased visibility of older volumes and rare periodicals in electronic catalogues. This operational model, offered by major publishers regarding electronic journals and the retrospective conversion of serial publications — widely known as Big Deals — was identified as the most significant factor in the decline of the interlibrary loan. However, the experiences of the ULSM and several major libraries worldwide proved largely unexpected: the volume of lending during this period not only failed to decrease, but in fact recorded substantial growth. Alongside several rational explanations for this phenomenon (the incomplete nature of

retrospective conversion, library funding constraints, and the like), the references also offer the explanation that users will always “take one more step in seeking an elusive document” (McGrath 2007, 4).

Figure 8 provides a graphical overview of the modes of interlibrary loan at the ULSM across the stages described above, including the integration of electronic journals into scholarly practice.

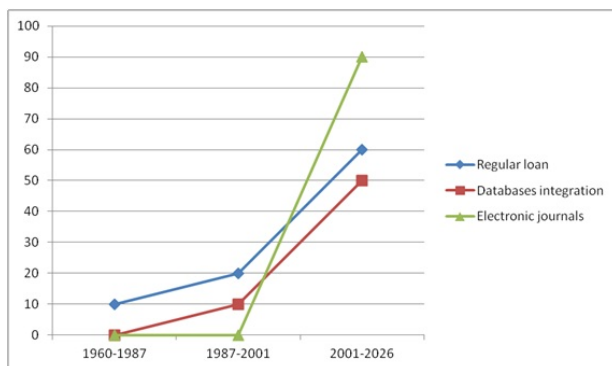


Figure 8. Interlibrary loan at the ULSM.

4 Open Lending

The line between traditional and electronic information sources is today becoming increasingly blurred, and their joint use constitutes the contemporary continuation of what was once known as interlibrary loan. At the same time, these two modalities represent the two decisive factors that have contributed to an entirely new operational space for the activity. In a world of new information technologies and the daily proliferation of new source-discovery services, evolving user expectations are reshaping the scope of the activity in such a way that regular interlibrary loan is becoming an elite option for information access. The connection of users to information sources — alongside the traditional modes of scholarly documents delivery — now entails negotiations with publishers, direct contact with authors and experts, the identification of freely available platforms, and similar strategies, all of which have substantially expanded the operational scope of the service.

The concept of “open access” in science, promoted by the Competitiveness Council of the European Union, envisions unrestricted access to academic information free from financial, legal, and technical barriers.

“Open science is a topic very close to our hearts. During the Dutch Presidency, our goal was to bring Europe to the forefront of global change and a new way of conducting research and science, based on openness, big data, and cloud computing.” (Dekker) Under this framework, for example, all scientific publications should be freely accessible by the end of 2020 (Schöpfel 2016, 150).

Scientific documents supply services and the “digital transport” chain have, in this respect, been thoroughly oriented towards open access over the past decade. To the financial, legal, and technical barriers identified above, temporal ones must be added as well: open science offers the possibility of accessing a document even before its formal publication. This is of particular significance given the widely observed slowness, unreliability, and inaccessibility of the scholarly communication system — the last of which has been described in the literature as a “Faustian bargain¹,” or as an offer by publishers that authors “would not be able to refuse!” (Waaaijers 1997).

Open access has made it possible to supply documents in compliance with legal requirements. Yet, the new era has also introduced new constraints, particularly in this domain. A considerable proportion of the scholarly material in demand is accessible exclusively on an institutional basis — for campuses, universities, and research institutes — but cannot be forwarded to end users. In the practice of the ULSM, it is also common to encounter situations in which documents that have once appeared in open access repositories cannot subsequently be published by a commercial publisher. Nevertheless, open access undeniably represents both a challenge and a new direction for lending services, even though it has been interpreted in some studies as a potential threat to the activity’s continued existence (Baich 2012, 55).

1. See: Harnad 1997: “This is the point where I have to introduce the ‘Faustian Bargain’, but let me say at the outset that this is not meant to be demonizing paper publishers at all; they, like the scholar, are joint victims of the technology and the economics of print on paper. For the Faustian Bargain is this: If you wish to immortalise your words at all, you will have to surrender your copyright in exchange, so your publisher can recover the substantial cost of getting your intellectual goods aboard the paper flotilla at all. The author must collaborate in denying access to his adverts to anyone who (or whose library) has not paid for them.”

A substantial proportion of the documents requested are available through open access channels. Although major libraries routinely conduct training sessions on search strategies, many users continue to turn to librarians for assistance — an experience also documented in libraries worldwide (55). Open access significantly facilitates the fulfillment of requests, particularly in the case of dissertations and “gray literature,” which are often more difficult to obtain through conventional means. Equally noteworthy are the considerably shorter delivery times and the costs involved, which are frequently minimal or virtually non-existent.

Figure 9 presents the documented experience of the ULSM of scientific documents supply in the period 2020–2025, disaggregated by publication type — journal articles, books, gray literature, and dissertations — and includes statistics for both regular interlibrary loan and lending from open access sources.

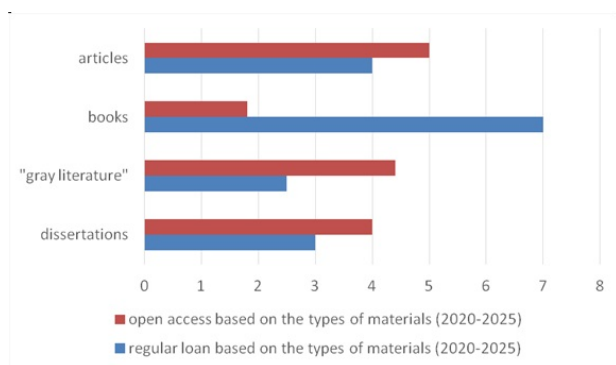


Figure 9. Scientific documents supply at the ULSM, 2020–2025.

In the case of books — particularly in the field of the humanities — regular interlibrary loan continues to take precedence over open access. Figure 10 illustrates the number of requests fulfilled through Google Books, the Internet Archive, the Hathi Trust Digital Library, the digital collection of the Bibliothèque nationale de France (Gallica²), and the digital collection of the National Library of Russia.

2. Gallica

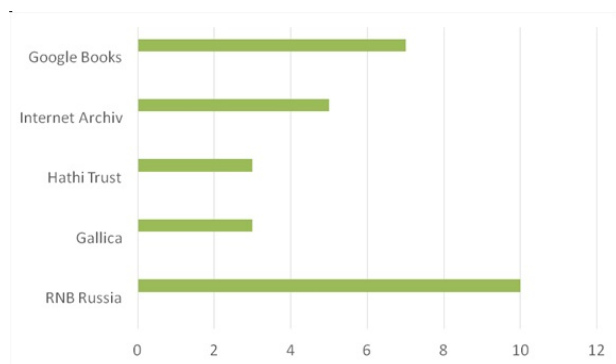


Figure 10. Lending of books from open access sources, 2020–2026.

Figure 11 illustrates lending activity for theses and dissertations for the period 2019–2026. A considerable number of theses and dissertations were obtained from open access sources, primarily through the Open Access Theses and Dissertation³ service, which provides access to approximately 2.5 million theses and dissertations, and the Networked Digital Library of Theses and Dissertation⁴ service, which holds records for over four million items. A portion of academic content and dissertations was also obtained through the Google Scholar platform.

Conference abstracts, presentations, protocols, reports, patents, and similar materials account for a significant proportion of the items requested through the lending service. Alongside conference websites, supply has been accomplished largely through the open access resources of the Essex Library⁵ and the All Academic⁶ archive and service — particularly through its Archive of Academic Materials (Figure 12).

With regard to the supply of scholarly journal articles, in addition to the widely used German SUBITO system, open access systems are increasingly being employed, including Cite Seer X⁷, arXiv⁸, and the digital collections of major world libraries such as Gallica (Figure 13).

3. Open Access Theses and Dissertation

4. Networked Digital Library of Theses and Dissertation

5. Essex Library

6. All Academic

7. Cite Seer X

8. arXiv

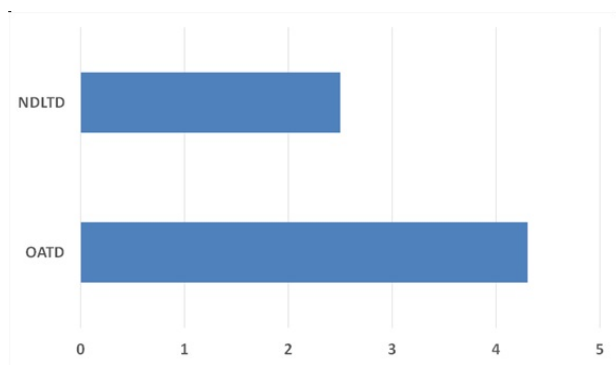


Figure 11. Lending of theses and dissertations from open access sources, 2019–2026.

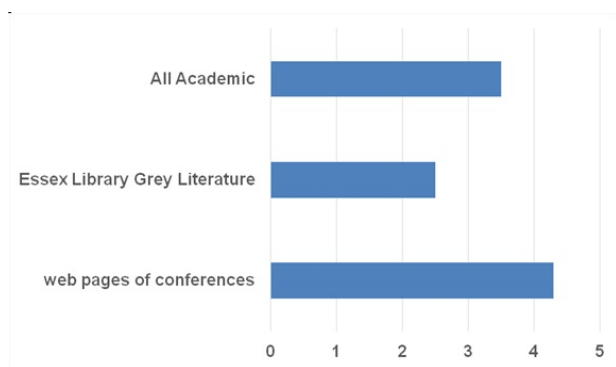


Figure 12. Supply of gray literature from open access sources, 2019–2026.

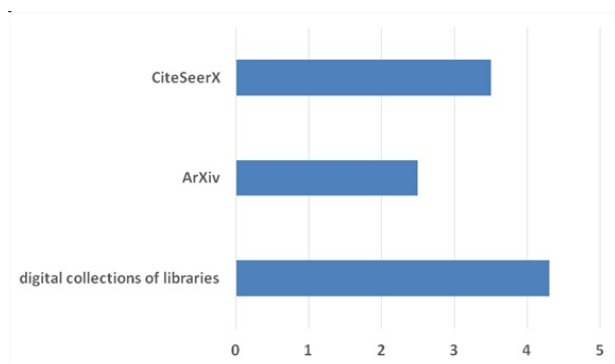


Figure 13. Supply of journal articles from open access sources, 2019–2026.

5 Conclusion

The changes affecting library and information activity in the twenty-first century, driven by digital transformation, are reflected in every segment of professional practice, including scientific documents supply and interlibrary loan. Open access and the development of open repositories covering publications across all scholarly disciplines have contributed to greater availability of materials and reduced financial costs. In addition, they have facilitated access to materials that were previously more difficult to obtain, such as “gray literature” and doctoral dissertations. Within the overall volume of lending, the share of scientific document supply from open access sources has recorded substantial growth over recent decades.

The University Library “Svetozar Marković” was among the first institutions in Serbia to integrate open repositories, open access, as well as portal and search engine queries and direct contact with authors, into the practice of interlibrary loan — a development that has been recognized in the international literature (Schöpfel 2014, 191). The Library’s notable experience in modernizing the activity, and the analysis of scholarly information organization within this particular economy of documents, necessarily involves, as the present overview demonstrates, a continuous examination not only of the operational efficiency of the activity and its management, but also of the opportunities this activity offers in advancing the broader space of free access to knowledge.

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Digital Service at the University Library: Portal of Old Cartographic Materials

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ABSTRACT: Since its founding, the University Library “Svetozar Marković” has been diligently building and enriching its collection of cartographic materials, acquired primarily through purchase, but also through donations. Owing to their value and significance, the collection is preserved under special conditions in the Old and Rare Books Department and comprises several hundred charts spanning the period from the 16th to the 21st century. The Library has carried out three cartographic digitization projects (2023–2025), financially supported by the Ministry of Culture of the Republic of Serbia, resulting in the Portal of Old Cartographic Materials. This paper discusses the digitized cartographic materials selected for the projects, the structure and significance of the Portal, as well as its role in enhancing the user experience. Digitization enables the presentation of this type of library material for the purpose of promoting the Library’s collections, provides access to old and damaged materials preserved under special conditions, and facilitates further collaboration on joint projects with other cultural and scientific institutions.

KEYWORDS: cartographic materials, cartography, University Library “Svetozar Marković,” Portal of Old Cartographic Materials, map digitization.

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1 Introduction

In the modern information society, libraries play a significant role not only as custodians of written materials, but also as active mediators in the dissemination of knowledge and information. The development of digital technologies has led to a transformation of library services, with library websites becoming one of the most important channels of communication with users (Stokić Simončić 2018, 21–25). Through their websites, libraries today offer catalogs, digital collections, electronic databases, and additional digital tools that assist users in navigating and utilizing library resources.

The University Library “Svetožar Marković” was founded in 1926, and is one of the most significant library institutions in Serbia. Its primary function is to support the educational, scientific, and research activities of the University of Belgrade. It holds a rich collection of books, serial publications, manuscripts, non-book materials, archival documents, and electronic information resources available to users online. As the central library of the University of Belgrade, it follows contemporary trends and strives to make its services accessible and user-friendly. In addition to traditional library services, it devotes particular attention to the preservation of old and rare materials in its collections, such as its valuable collection of cartographic materials. For this reason, among other initiatives, the Library is developing a range of digital services, including the Portal of Old Cartographic Materials¹, which is presented in this paper. Between 2023 and 2025, three cartographic digitization projects were carried out with financial support from the Ministry of Culture of the Republic of Serbia. The digitization of these materials enables additional promotion of collections of the University Library “Svetožar Marković” (UBSM), allows researchers to study old and valuable materials that, due to various forms of damage, are stored under special conditions and cannot otherwise be accessed, and facilitates collaboration on joint projects with other cultural institutions and scientific organizations. The aim of this paper is to analyze the results achieved through the projects, the content and significance of the Portal created within their framework, and its role in enhancing the user experience.

2 The Concept of a Map

In practice, the terms *karta* and *mapa* are often used interchangeably. However, there is still some ambiguity regarding their precise meaning, and they

1. Portal of Old Cartographic Materials

are frequently considered synonyms. According to (Sretenović 1989, 57–59), a map is a conditionally mathematically reduced, generalized, and constructed pictorial-symbolic model of a specific spatial unit on a mathematical surface (globe) or on a mathematical plane (plan or map). Pavišić (Pavišić 1976, 13) similarly defines a geographic map as “a representation of the entire Earth’s surface or part thereof, drawn using specific symbols, reduced in scale, generalized, and constructed on a plane according to a defined mathematical principle, indicating the geographical distribution and interrelationships of certain natural and social objects, phenomena, and facts.” A map is an instrument for presenting the results of studying and explaining numerous natural and social phenomena and relationships across various scientific disciplines, as well as an essential tool for diverse terrain studies in support of the planning and construction of various facilities of general social significance (14). According to (14), the term *karta* derives from the Latin word *charta*, which originally meant “letter, message, report, document, or charter.” It was not until the 14th century that the term came to be used in its current meaning.

Both terms are used in various countries, with distinctions drawn based on the type of map. Instead of *karta*, the term *mapa* is sometimes used — for example in Czech — while in English-speaking area the equivalent is “map.” In Great Britain, the term *chart* is also used, but exclusively for nautical charts (13). In Serbia, the term *karta* is standard and encompasses all graphical representations of the Earth’s surface, including all types of maps (plans, topographic maps, general geographic maps, thematic maps, etc.).

3 Map Digitization Projects at the UBSM

Three projects for the digitization of old and rare cartographic materials were carried out at the University Library “Svetozar Marković” between 2023 and 2025. For these purposes, materials of great importance were selected, both for domestic and international researchers across various humanities disciplines. Some of these materials document the historical development of Serbia and its territorial expansion, such as the map of the Principality of Serbia (Figure 1) by Jovan Bugarski, and constitute part of the national cultural heritage. Others stand out from the collection for their craftsmanship and exceptional beauty. Their value is assessed on the basis of the richness of illustrations, vignettes, dimensions, dedications, coats of arms, engravings, or the reputation of the printers of the period; some of these maps were hand-colored with considerable detail (e.g., *Tabvla* – an engraving of the Slavs).

One such map is shown in Figure 2². In addition to the outstanding value of the materials themselves, the Serbian cartographers and bibliophiles who collected cartographic materials are also of particular significance, as discussed in the sections that follow.

3.1 First Project

The first project, *Presentation and Permanent Archiving of Maps from the Collections of the University Library “Svetozar Marković” on a Specialized Portal and Further Preservation Work*, financially supported by the Ministry of Culture of the Republic of Serbia in 2023, provided for the digitization of geographic maps and their permanent archiving on a specialized portal so as to preserve them for future generations of researchers. In the first project, material selection was based on a territorial criterion: maps depicting Belgrade, Serbia, and Yugoslavia were selected first, followed by maps of Europe and the Adriatic Sea. The second criterion was chronological, with maps from the 16th, 17th, and 18th centuries digitized as a priority.

Maps from the 19th century were subsequently digitized, with particular emphasis on Jovan Bugarski (1803–1865), a prominent Serbian cartographer and engineer. Information about him has been preserved thanks to his son, the architect Aleksandar. It is known that Jovan Bugarski graduated and qualified as an engineer at the University of Budapest in 1838. He arrived in Serbia in 1840, and was granted Serbian citizenship in 1842. Upon his arrival in Serbia, he petitioned Prince Mihailo Obrenović for employment and, through the Prince’s support, was appointed as an officer of the Main Control Department of the Ministry of Finance (Илић 2019).

One of the most important undertakings during his time in Serbia was the production of a map of Serbia. He drafted the first geographic map of the Principality of Serbia in Belgrade, in 1843, which was lithographed by Anastas Jovanović. The map was submitted to Prince Aleksandar with a petition requesting his assistance in its publication, having been reviewed by experts who deemed it accurate and useful. However, this did not happen for reasons that remain unknown, and Bugarski and Jovanović published the map at their own expense in Vienna in 1845, dedicating it to the former Prince Mihailo Obrenović. The map was issued in three variants. The first is in Serbian without a dedication; the second is in Serbian with a dedication to Prince Mihailo; and the third is in French, also with a dedication to

2. Object available at: <https://maps.unilib.rs/?object=112>

Prince Mihailo that is located on the left side of the map, and reads as follows: “Нѣговој Свѣтлости Милостивѣйшем Господару Князу Михаилу М. Обреновићу Всепокорнѣйше посвећуе издатель.”³ All three maps list Belgrade as the place of publication, although it is established that only the first variant was printed in Belgrade, while the other two were printed in Vienna. It is assumed that Prince Mihailo assisted with funding the printing, since the State Council had refused to do so — which may explain the dedication. However, it may also be understood as an expression of gratitude for Prince Mihailo’s appointment of him to state service upon his arrival in Belgrade. This was unquestionably the first Serbian map recognized by the expert community of the time and cited by many foreign compilers of maps of Serbia. The Library received this map as a gift from collector Joca Vujić, and it bears the stamp of his Museum.

The Map of the Principality of Serbia from 1845, published in Vienna, is shown in Figure 1⁴. In the lower right corner of the map, a group of Serbs is depicted gathered around an oak tree bearing the Serbian coat of arms, with a panorama of Belgrade in the background. The scale is provided in Russian versts, geographic miles, and Turkish miles. In the middle of the upper section of the map, 17 Serbian districts are labeled: Aleksinac, Valjevo, Belgrade, Šabac, Kruševac, Čačak, Kragujevac, Morava, and others.

No existing platform was used for the Portal of Old Cartographic Materials, and it does not represent an enhancement of any previously existing portal. It was purpose-built for this project. All materials were digitized using equipment available in the Digitization Department at the UBSM: Bookeye 4 Archive and Epson GT 20000, at resolutions of 300 and 600 dpi in JPG format using the RGB color palette. In addition to digitization, metadata was also produced within the project framework. The metadata was generated by exporting bibliographic records from the COBISS catalog in COMRC/XML format via the Z39.50 protocol at the time of portal creation, with automated transfer to be established in subsequent phases when new objects are uploaded. Based on the bibliographic record, a metadata set was defined for describing digital objects on the Portal: title, author name, year of publication (for all objects the year of first edition is listed, and for most objects also the year of the facsimile edition, i.e. reprint), publisher, physical description, scale, and map description. A sample COMRC/XML

3. „Нѣговој Свѣтлости Милостивѣйшем Господару Князу Михаилу М. Обреновићу, Свепокорнѣйши посвећује издатель.”

4. Object available at: <https://maps.unilib.rs/?object=22>

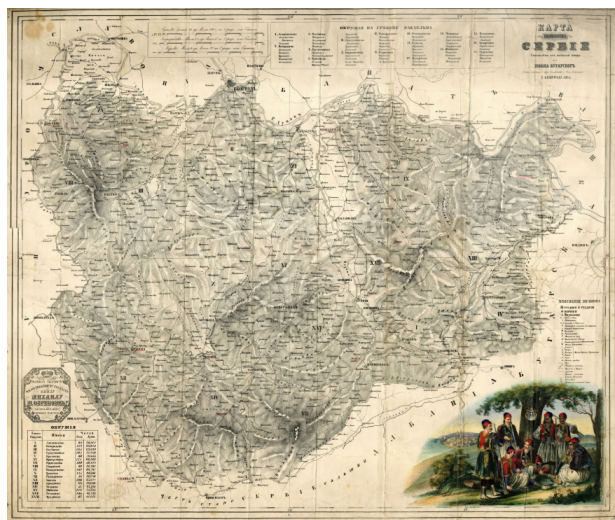


Figure 1. Карта Княжества Србіе, 1845. (Map of the Principality of Serbia, 1845)



Figure 2. Tabvla Geographica exhibens Regnvm Slavoniae cum Syrmii Ducatu

record and the metadata structure for the digital object shown in Figure 3⁵ are provided below.

Sample COMRC/XML Record:⁶

```
<record xmlns="http://www.loc.gov/MARC21/slim">
<leader>00678cem a2200205 i 4500</leader>
<controlfield tag="001">19385868</controlfield>
<controlfield tag="003">SI-MaCOB</controlfield>
<controlfield tag="005">20260422000000.0</controlfield>
<controlfield tag="007">ajlaa|||</controlfield>
<controlfield tag="008">931013q1740|||gw ||||| ||1||ger c</controlfield>
<datafield tag="034" ind1="1" ind2=" ">
<subfield code="a">a</subfield>
</datafield>
<datafield tag="040" ind1=" " ind2=" ">
<subfield code="a">NBS</subfield>
<subfield code="b">srp</subfield>
<subfield code="c">SI-MaIIZ</subfield>
<subfield code="d">UBSM</subfield>
<subfield code="e">ppiak</subfield>
</datafield>
<datafield tag="080" ind1=" " ind2=" ">
<subfield code="a">711.4</subfield>
</datafield>
<datafield tag="100" ind1="1" ind2=" ">
<subfield code="a">Baeck, Elias, </subfield>
<subfield code="d">1679-1747. </subfield>
<subfield code="4">aut</subfield>
<subfield code="0">(SI-MaCOB)66175241</subfield>
</datafield>
<datafield tag="245" ind1="0" ind2="0">
<subfield code="a">Neu accurater Plan der Haupt Vestung Belgrad / </subfield>
<subfield code="h">[Kartografska grada] </subfield>
<subfield code="c">Elias Baeck á H. sculps et excudit</subfield>
</datafield>
<datafield tag="255" ind1=" " ind2=" ">
<subfield code="a">[1:12 000].</subfield>
</datafield>
<datafield tag="260" ind1=" " ind2=" ">
<subfield code="a">Augusta Vind. : </subfield>
<subfield code="b">Elias Baeck, </subfield>
<subfield code="c">[1740?]</subfield>
</datafield>
<datafield tag="300" ind1=" " ind2=" ">
<subfield code="a">1 plan grada : </subfield>
<subfield code="b">bakrorez ; </subfield>
<subfield code="c">41 x 34 cm. </subfield>
</datafield>
<datafield tag="651" ind1=" " ind2="4">
<subfield code="a">Beograd</subfield>
<subfield code="v">Planovi gradova. </subfield>
</datafield>
<datafield tag="856" ind1="4" ind2="1">
<subfield code="u">https://maps.unilib.rs</subfield>
```

5. Object available at: <https://maps.unilib.rs/?object=1>

6. Permanent link: <https://plus.cobiss.net/cobiss/sr/sr/data/cobib/19385868>

```
</datafield>
</record>
```

Sample Metadata Structure on the Portal:

[Наслов](#)
 Neu accurater Plan der Haupt Vestung Belgrad /
[Аутор](#)
 Baeck, Elias, 1679-1747.
[Година издања](#)
 1740?
[Издавање и производња](#)
 Augusta Vind. : Elias Baeck,
[Година првог издања](#)
 1740?
[Физички опис](#)
 1 plan grada : bakrorez ; 41 x 34 cm.
[Размера](#)
 [1 : 12000].
[Опис](#)
 Beograd Planovi gradova.

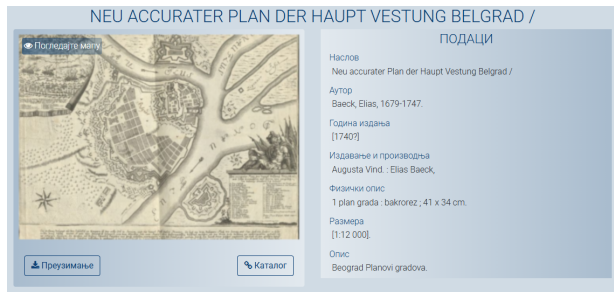


Figure 3. Neu accurater Plan der Haupt Vestung Belgrad, 1740 (New Precise Plan of the Main Fortress of Belgrade, 1740)

The Portal also contains accompanying texts on individual maps, Serbian and foreign cartographers, and other information relevant to this subject. Importantly, the Portal was conceived and designed to allow new materials to be added on an ongoing basis, whether from future projects or as a part of everyday work activities.

A total of 61 maps were digitized and cataloged within the first project. During the project, the Faculty of Geography of the University of Belgrade

proposed a continuation that would include more intensive promotion of the digital collection to interested researchers — primarily those in the fields of geography, history, and cultural history — as well as to researchers in library and information science for professional development purposes, and to the broader interested public. Throughout its duration, the project was promoted via social media and the Library's website, with a clear acknowledgment that it had been funded by the Ministry of Culture of the Republic of Serbia.

3.2 Second Project

Based on the initiative of professors from the Faculty of Geography and the promotion of the Portal to researchers in that field, it was decided that the Library would apply for a continuation of the project in 2024. The Ministry of Culture of the Republic of Serbia funded the project *Completing the Digitized Map Collection from the Collections of the University Library "Svetozar Marković" on the Specialized Portal and Further Preservation and Presentation Work*, which provided for the digitization of geographic maps from special and legacy collections at the UBSM and their publication on the Portal with accompanying descriptions. The materials for this project were selected from collections with the status of cultural goods of great importance, using the same territorial and chronological criteria applied in the previous project. The selected materials depict the territory of Serbia and neighboring countries, as well as European countries. A total of 60 maps were digitized in this project.

In this project, a significant portion of the maps was digitized from the Special collection of Joca Vujić. The donation of the distinguished bibliophile and landowner Joca Vujić (1863–1934), born in Senta, is particularly noteworthy among private donors. A passionate collector, he opened the first private museum in his native town Senta, at the beginning of the 20th century, where he displayed 10,000 rare books, a collection of archival documents, a numismatic collection, 400 paintings from the Biedermeier and Romantic periods, and various ethnographic artifacts. An exceptional patron of culture, Joca Vujić bequeathed his private library and collection of archival documents to the University of Belgrade and the University Library (Брзуловић Станисављевић 2025, 67–72). Some of the maps in the UBSM collections originate from Vujić's museum and all bear his stamp. One map of particular note belongs to the *Siege of Belgrade* collection. The maps in this collection were predominantly produced using the copperplate

engraving technique, with the exception of one drawn by hand in iron gall ink and subsequently colored in watercolor. This map, shown in Figure 4, depicts a plan of the battle fought on August 16, 1717, under the command of Eugene of Savoy⁷.



Figure 4. Plan de la glorieuse bataille donnée le 16.e aout, 1717. proche de Belgrade (Plan of the Glorious Battle Fought on August 16, 1717, near Belgrade)

3.3 Third Project

The successful two-year project was continued in 2025 with *The Future of the Past: Completing the Digitized Collection of Atlases and Maps on the Specialized Portal*, which, like its two predecessors, received financial support from the Ministry of Culture of the Republic of Serbia. Within the framework of this project, the digitization process was extended to include valuable atlases from the Library's collections, as well as vignette maps⁸

7. Object is available at <https://maps.unilib.rs/?object=10>

8. A vignette is a decorative ornament or illustration that gradually fades into the surrounding paper. Originally, it often took the form of a vine motif. It was

of Belgrade (20 maps were digitized), which are of particular cultural and historical significance. Both atlases and maps were added to the existing digital collections with accompanying texts, legends, and metadata. Given that the infrastructure was already in place, the project was completed within a remarkably short timeframe.

4 Portal Structure

The Portal of Old Cartographic Materials is organized into several sections: About Maps, Collections, Our Cartographers, Foreign Cartographers, and About the Project. Within the Collections section, maps are arranged by geographic principle across seven collections: Belgrade, Europe, the Adriatic Sea, the Mediterranean Sea, the Balkan Peninsula, Yugoslavia, and the World. To date, 120 individual geographic maps have been archived within the collections, along with two atlases. One atlas was produced by Pavle Solarić in 1804, and it contains 37 individual geographic maps (Figure 5)⁹. This valuable atlas also bears the stamp of the Joca Vujić Museum in Senta. The second was produced by Fra Mauro in 1457 (reprint produced in 1956) and contains 49 individual geographic maps. This atlas is the most important medieval world map which combines geographical knowledge from Europe, Asia and Africa from that time¹⁰. Both atlases are archived in the World collection.

The oldest map on the Portal dates from the 16th century. It is an original work by Anthony Jenkinson from 1562, known for its depiction of Russia, Moscow, and Tartary. It contains various mythological scenes and depictions of people and domestic animals inspired by the travels of Marco Polo. These elements add a narrative layer to the map, merging exploration with

used as a decorative frame on maps. In cartography, vignettes were employed to create a soft, gradual fading of the image edge or a graphical effect along coastlines (or other boundaries), in order to highlight areas of interest. They produce a “soft” frame that draws the viewer’s attention toward the centre of the map. Contour lines are emphasized through shading, so that boundaries are not sharp lines, thereby achieving visual prominence of selected areas. Vignettes may be used to accentuate borders, rivers, roads, or the transition between land and sea, among other features. For more information on vignettes, see:<https://rhollick.wordpress.com/2018/09/21/vignette/>

9. Object is available at: <https://maps.unilib.rs/?object=186>

10. Object is available at: <https://maps.unilib.rs/?object=184>



Figure 5. Пъшій землеписникъ (Atlas of Pavle Solarić), 1804.

imaginative storytelling (Figure 6)¹¹. During this period, the leading European states were increasingly documenting and mapping distant lands, driven both by curiosity and colonial ambitions. The map reflects the contemporary European understanding of the vast regions of Russia and Central Asia, often blending factual geographical information with imaginative representations (Shirley 1983).

The map features a prominent decorative cartouche¹² framing the title. This element not only identifies the map, but also serves as an ornament

11. Object is available at: <https://maps.unilib.rs/?object=64>

12. A cartouche (French *cartouche*, from Italian *cartoccio*) is a decorative element or panel (often in the form of a partially unrolled scroll, shield, or wreath) on which various symbols or signs are placed (such as a monogram, motto, family coat of arms, or emblem). In the 16th–18th centuries, it was widely used in architecture, book design as a frame for an ex libris, printer's mark, publisher's imprint, etc.), manuscripts, and maps. On geographical maps, the cartouche typically contained the map title, information about the author, the name and portrait of the dedicatee of a dedicatory inscription, as well as mythological elements, scenes, scale information, and sometimes the map legend. The term also refers to the rope-shaped frame enclosing the name of a pharaoh in hieroglyphic and hieratic ancient Egyptian texts. For more information on cartouches, see: https://old.bigenc.ru/fine_art/text/2049830

typical of cartographic works from this era. Numerous inscriptions and labels in Latin provide descriptions of various regions and toponyms, bearing witness to the regional and cultural knowledge of the time. The map is also decorated with vignettes depicting mythological scenes, local populations, and wildlife. These illustrations serve to enhance the viewer's understanding of the region, albeit through the lens of European interpretation and mythology.



Figure 6. Russiae, Moscoviae et Tartariae description, 1562. (Russia, Moscow, and Tartary – Description, 1562)

On the Portal's homepage, some of the oldest maps are highlighted. Accessing the individual collections displays the digital objects, i.e., the cartographic materials belonging to that collection. Clicking the “more” button associated with each digital object opens more detailed information about the map, specifically the metadata describing the object in question. In addition, users may download the object and access its catalog record in COBISS. Correspondingly, the Portal URL has been added to all records in COBISS.

5 Conclusion

Geographic maps constitute a reliable historical source and a document of the era in which they were produced, reflecting the political, social, and natural conditions of a given period. They enable the reconstruction of former state borders, the tracking of their changes, and the analysis of the spatial distribution of settlements, transportation routes, forested areas, and hydrographic networks. For the scientific study of cartography, all maps that have been preserved across the various stages of societal development from the earliest times to the present are significant. They serve as references for drawing conclusions about the state of cartography in specific periods of social development.

The projects carried out between 2023 and 2025 led to the creation of the Portal of Old Cartographic Materials, which provides for the permanent archiving of this type of material. A total of 120 valuable maps with complete descriptions and accompanying texts, and 2 atlases comprising 86 geographic maps, have been published on the Portal. The Portal of Old Cartographic Materials is highly beneficial to researchers: it eliminates the need to travel to the library in person, offers a more convenient research experience, and is accessible at any time. Furthermore, each map has been cataloged and its metadata entered into the unified library system (COBISS), from which it has been transferred to the Portal. In addition to metadata, accompanying texts on individual maps, prominent Serbian cartographers, and other relevant information are provided alongside the digital objects. It is also worth emphasizing that the Portal was conceived and designed to allow new materials to be added on an ongoing basis, from future projects or as a part of everyday work activities.

The primary objective of the projects was the preservation of valuable old and rare materials from the UBSM collections — specifically, old maps of great importance. This objective has been fully achieved through digitization and permanent archiving on the Portal, with the possibility of extending the entire process since new materials can be added at any time. These materials are thus accessible to all interested researchers, as well as to the broader public, and accompanying texts make research process easier. At the same time, library professionals can use this Portal to familiarize themselves with the richness of the UBSM collections and to develop professional competencies in this area through supplementary workshops incorporated into the project framework.

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The Austrian Library in Belgrade: A Space that Connects Culture, Education, and International Cooperation

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ABSTRACT: The paper examines the role of the Austrian Library in Belgrade as a contemporary cultural and educational center whose activities extend beyond the traditional frameworks of library functions. Special attention is devoted to the Library's program activities— literary meetings, workshops, exhibitions, film screenings, and language skills development programs—which engage audiences and promote contemporary Austrian culture. These programs contribute to the development of reading literacy, critical thinking, and lifelong learning, while simultaneously creating an open and stimulating space for intercultural dialogue, creativity, and the interconnection of diverse communities. The analysis of these activities demonstrates that the Austrian Library functions as a vibrant cultural hub that contributes to community development and strengthens cultural ties between Serbia and Austria.

KEYWORDS: Austrian Library in Belgrade, cultural and educational programs, lifelong learning, intercultural dialogue.

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1 Introduction

Libraries as cultural centers have long ceased to be an exception and have become a common phenomenon. They have established themselves globally as places that, in addition to their core functions, bring together broader

communities and provide opportunities for a wide range of cultural and educational content. As institutions oriented toward a highly heterogeneous audience, they bridge generational and ethnic divides, and through international cooperation, cultural divides as well. The Austrian Library in Belgrade operates as a special unit of the University Library “Svetozar Marković.” It was founded as part of the international initiative of the Federal Ministry for European and International Affairs of Austria (Bundesministerium für europäische und internationale Angelegenheiten – BMEIA) as part of a wide network that has been active for 40 years and consists of a total of 65 libraries. With its distinctive structure and diverse programs, the Austrian Library in Belgrade represents one of the outstanding examples of a library as a cultural hub.

2 Cultural and Educational Activities

Austrian Libraries in host countries are not merely libraries in the narrow sense of the word, but also vibrant cultural centers. Their mission is to promote Austrian culture, science, and the German language. In addition to functioning as “academic satellites of Austria abroad,” they also serve as information and cultural centers, which, in cooperation with cultural forums and representations of the Republic of Austria in the countries in which they operate, organize cultural and scientific events and constitute an important part of Austrian cultural policy abroad (Angelegenheiten 2020, 225). The significance of these libraries is evidenced by the fact that more than one thousand cultural and educational activities are organized in them annually (according to the most recent report, a total of 1,066 events were conducted in 2024 alone (Marinkovic 2025)). In this spirit, the Austrian Library in Belgrade has developed a rich program since its founding, which is free of charge and open to all interested citizens, including those who are not members. Literary meetings, workshops, film evenings, and exhibitions are organized, and particular attention is drawn to language cafés and board game days, where German language is learned through conversation, play, and socializing in a relaxed atmosphere.

3 Literary Program

Libraries hold strategic importance in the development of literacy and reading competencies, as they provide access to literature and promote a culture

of reading, and given their potential to reach a large number of people, they represent ideal venues for advancing literacy. Contemporary approaches to learning and the concept of lifelong education have led to a broader understanding of literacy, which is today defined as a set of functional and transferable knowledge, skills, and strategies developed throughout one's entire life through social interaction (Pavlović Babić and Baucal 2010). PISA defines reading literacy as the ability to understand, use, and evaluate texts, as well as the ability to reflect on the text read and to engage with it in order to achieve personal goals, develop knowledge and potential, and participate in society (Mo 2019). Reading literacy, therefore, does not entail merely the basic comprehension of written material, but also a critical approach to texts. With this in mind, the Austrian Library in Belgrade has carried out a series of activities aimed at promoting reading, critical thinking, and creative writing. These activities have included literary meetings, book launches, literary competitions, as well as workshops and competitions for writing literary reviews.

Literary meetings hold particular significance, as they provide the local audience with direct contact with contemporary Austrian literature and its authors, who have presented their new books at the Library—and in several cases, the first translations of their works into Serbian. Through readings and discussions, attendees gain the opportunity to more thoroughly understand literary currents, themes, and the social context in which contemporary works are produced, while the dialogue with authors opens a space for vibrant cultural exchange. This direct encounter and interaction between authors and audiences contributes to the broader cultural reach of such events, as literature transcends the boundaries of text and becomes a medium for intercultural connection and mutual understanding. The Austrian Library in Belgrade has to date hosted the authors: Gerhard Blaboll, Karin Peschka, Raphaela Edelbauer, Margarita Kinstner, Iris Blauensteiner, Bianca Tschaikner, Magdalena Schrefel, and Goran Novaković.

In collaboration with the Department of Germanic Studies at the Faculty of Philology in Belgrade, thematic literary evenings titled “Chatting about Books” (Ger. *Buchgeplauder*) have also been organized. The selection of titles reflects the intention to distinguish this event from the many similar ones, and through its informal character, to attract a younger audience and encourage participation in reading and literary discussions. The program, launched in October 2025, is conceived as a monthly series with a summer recess, and each gathering focuses on the work of a single significant author of Austrian literature. The opening two programs were devoted to the creative

work of Rainer Maria Rilke and Ernst Jandl. The program is divided into two segments: the introductory, educational and theoretical part presents participants with a brief biographical and bibliographical framework, as well as a review of the significance and reception of the featured author's work, both in the context of their own era and in the contemporary context. The second part of the program is interactive in character and involves audience participation through the analysis of the author's texts and open discussion, or through creative writing workshops. Within these workshops, participants are encouraged to write their own texts, drawing on the poetics, style, and technique of the featured author. Ernst Jandl's poetry proved to be particularly well-suited for such activities, given its unconventional form and the fact that he himself invited readers to experiment with his technique.

In April 2023, in collaboration with the Goethe Institute, the Embassy of Austria, the Austrian Cultural Forum, and the Faculty of Philology in Belgrade, a literary review writing workshop was organized. The instructors were Ines Scholz from the Austrian Society for Literature (Österreichische Gesellschaft für Literatur) and Tino Schlench, a young German author, journalist, and creator of the literary blog "Literaturpalast." The workshop was divided into two parts—theoretical and practical—and as preparation, participants were assigned to read the work *Alles was glänzt*, the debut novel of the young Austrian writer Marie Gamillscheg. In the first part of the workshop, participants were introduced to techniques for the analysis and interpretation of contemporary literary works. The second part comprised a series of practical exercises, the first of which was focused on the analysis and comparative examination of different types and formats of literary reviews. For this exercise, the instructors selected three examples: one literary review from the Austrian weekly *Falter*, one from the German weekly *Der Spiegel*, and reviews published on the social media platform Instagram. During this segment, participants were engaged through discussions with the instructors, after which they had the opportunity to engage in writing a literary review in one of the formats covered, and subsequently to discuss their work with one another and with the instructors, exchange ideas, and give and receive advice and suggestions. The workshop was held at the Faculty of Philology in Belgrade. All participants received certificates of participation, and students of German Studies at the Faculty of Philology in Belgrade were able to earn ECTS credits¹ as a supplement to their diploma. The language used during

1. ECTS – European Credit Transfer and Accumulation System. ECTS credits are awarded for the student's total workload, which includes active coursework (lectures, exercises, seminars, colloquia, examinations, thesis), professional internship,

the workshop was German, which enabled direct engagement with contemporary German literature and provided participants with the opportunity to advance their German language skills at a higher and more specialized level.

Due to the great interest and highly positive impressions of the workshop participants, it was decided that this program would be repeated the following year, with Ines Scholz once again as instructor. This time, the workshop was conducted in an online format, with the aim of enabling participation from different cities. As in the previous year, participants were assigned to read a literary work selected by the instructor prior to the workshop—on this occasion, the novel *Herr Kato spielt Familie* by the Austrian writer Milena Michiko Flašar. The structure of the workshop remained unchanged, consisting of a theoretical and a practical part, and participants again received a certificate of participation.

In addition to these workshops, the Austrian Library has contributed to the development of writing skills through the organization of competitions. Participants had the opportunity to engage in writing literary reviews, as well as in literary competitions on assigned topics, submitting works in the format of short stories or poems. With the support of partners such as the Austrian Cultural Forum, the Goethe Institute, and Austrian lecturers from the University of Belgrade and Novi Sad, the Library organized six competitions—three literary and three literary review competitions. Upon the conclusion of each competition, award ceremonies were held at which participants read their works, and all received prizes for participation. Furthermore, all submitted works were published in collections issued by the Library in online format. Through these initiatives, the Library and its partners seek to provide participants with additional encouragement, ensure the visibility of their creative work, and recognize the effort invested. The program has been held annually since 2019, on the occasion of World Book and Copyright Day, and the Library intends to continue organizing these competitions each year, thereby instituting an enduring tradition of cultivating the written word and giving young people the opportunity to showcase their creative skills.

One notable outcome of the call for workshop participation relates to the structure of registered participants. Approximately one-third of workshop attendees did not belong to the fields of philology and the humanities, but rather to various disciplines within the natural sciences (Џидић and Ђелић 2022). A similar, though somewhat less pronounced, structural pattern was observable among participants in the literary competitions, and was partic-

and independent study, and are required for the successful completion of individual courses, semesters, academic years, and the entire program of study (author's note).

ularly evident among attendees at other cultural activities of the Library. Such a diverse audience composition may be interpreted as an indicator of the Library's potential to contribute, through this type of engagement, to the formation of a broader academic and cultural community. Similar results have been observed by colleagues at other Austrian Libraries; Blaženka Klemar Bubić, head of the Austrian Library at the Faculty of Philosophy in Zagreb, notes: "The numerous programs organized by the Austrian Library attract not only students of German Studies and their professors, but also students from other academic programs, as well as people who are not directly associated with the Faculty of Philosophy. In this way, contacts and friendships are established that can lead to the initiation of new collaborative projects (Klemar Bubić 2019)."

The literary programs at the Austrian Library are therefore of exceptional significance, as the Library, through the implementation of such activities, not only promotes Austrian literature, but also fosters creativity and the development of critical thinking, while building an active and internationally connected community of young authors and readers.

3.1 Film Evenings

As early as 1972, the UNESCO Public Library Manifesto emphasized the need for audiovisual materials in public libraries, both for adults and for children. The following year, the Round Table on Audiovisual Materials was created within IFLA, encompassing all "non-book resources" or—according to another definition—all documents whose use requires appropriate equipment (Royan and Cremer 2004, 5). Although the Austrian Library in Belgrade formally operates within an academic library, one of its key objectives, as emphasized by its founding institution BMEIA, is to attract as broad a public as possible and to present Austrian culture to diverse target groups. In accordance with these objectives and the IFLA guidelines, the Austrian Library in Belgrade provides its users not only with access to films from its own DVD collection, but also with organized screenings of Austrian cinematic works beyond the Library's collections. Thanks to the support of the Austrian Cultural Forum, which acquires screening rights on behalf of the Library, a series of film evenings (Ger. *Filmabende*) dedicated to contemporary Austrian cinema have been organized. The screenings are free of charge and open to all interested visitors, and are frequently accompanied by a discussion of the film shown. To date, more than ten films have been screened, and the Library intends to continue this activity, given the considerable interest and highly positive impressions of attendees.

3.2 Exhibitions

Although the contemporary library strives to follow the needs of its users and respond to their expectations, it must not lose sight of its fundamental role as a guardian of knowledge and an educational institution in society. In practice, this means that a library should not merely satisfy the needs of its users, but also guide and inspire them, foster their personal and intellectual development through the provision of high-quality cultural content, and introduce them to subjects that were previously unfamiliar to them. Exhibition activity in libraries is not a product of contemporary society; rather, it has accompanied their development throughout history in various forms—from zoological specimens displayed in the ancient Library of Alexandria, through the so-called “cabinets of curiosities” (Ger. *Wunderkammer*) of Renaissance Europe, in which richly decorated books were exhibited alongside numerous precious objects, to the contemporary thematic and artistic exhibitions that can be seen in libraries around the world today. They serve to highlight library collections, enhance the user experience, and enable users to participate more actively in community life (Ng-He 2019), to stimulate curiosity and affirm creativity (Ng-He and Meinke 2022).

The thematic exhibitions organized by the Austrian Library fulfill precisely this role, addressing significant historical periods, notable figures, and important connections between Austria and Serbia. They are accompanied by concisely prepared bilingual catalogs (in Serbian and German) and interactive content, which render them accessible and appealing to both experts and the general public, while the compiled bibliography serves as an excellent starting point for further independent research work. Each exhibition entails the presentation of representative publications from the Library’s collections that thematically complement the exhibited content. Special emphasis is placed on younger audiences, to whom the Library seeks to present the featured themes in a contemporary and visually engaging manner through interactive or multimedia elements such as films and podcasts (Џидић and Ђелић 2022), enabling them to acquire new knowledge. Among the exhibitions realized to date, the following stand out: “Intellectual Beauty: The First Distinguished Serbian Women Educated in Austria in the Late 19th and Early 20th Century,” “Notes from Immeasurable Thirst: Franz Kafka (1883–1924), on the Occasion of the Centenary of the Author’s Death,” and “Disputed Memories: Bogdan Bogdanović (1922–2010), on the Occasion of the 100th Anniversary of the Renowned Architect’s Birth.” An additional value of this program lies in the fact that the exhibitions are realized as traveling installations, which, following their initial presentation in Belgrade,

visit numerous cities throughout Serbia with the support of the Austrian Cultural Forum. The quality and relevance of these programs is evidenced by the fact that the exhibitions of the Austrian Library have been received with great interest at host institutions. This is reflected in high attendance, positive comments from local audiences, and the fact that the Library frequently receives inquiries regarding future exhibition projects that could be hosted by these institutions.

3.3 Language Skills Development Programs

As an incentive for learning German and a support measure for those already studying the language, the Austrian Library has organized, in addition to the aforementioned literary programs, various activities aimed at language skills development, such as language cafés (Ger. *Sprachcafés*) and board game days (Ger. *Spieltage*). Language cafés were organized in collaboration with Austrian lecturers and interns, and participants had the opportunity to converse on various topics in a relaxed atmosphere. To ensure that participants always had a topic for discussion and could easily initiate a conversation, the organizers prepared a selection of topics that would be interesting and accessible to a wider number of attendees. At each language café, native speakers of German were also present, which provided participants with the invaluable experience of direct communication with a native speaker. These activities represent a significant contribution to the development of language competencies, particularly in situations where the language is being learned outside its natural speech environment and learners have no opportunity to engage with the language outside the instructional process.

The Austrian Library's board game days were conceived as a continuation and programmatic expansion of an activity organized by the University Library "Svetozar Marković" on the occasion of the International Games Day—an initiative launched by Jenny Levine and Scott Nicholson, with the institutional support of the American Library Association (ALA). The aim of the initiative was to reconnect communities with libraries through the educational, recreational, and social values of various types of games (AASL 2026). The concept was for libraries around the world to connect by simultaneously playing the Global Gossip Game (a version of the telephone game) online, while also offering visitors a variety of board games for use within the library on that day. The initiative, which in 2007 was first conceived as a National Games Day, grew into an International Games Day due to an exceptionally positive public response, then into an International Games

Week, and since 2022, the entire month of November has been designated as International Games Month. The University Library “Svetozar Marković” joined the initiative in 2014 with the support of the American Corner, which contributed part of its extensive board game collection and participated in the organization. Since 2016, the Austrian Library has assumed organizational responsibility for the program and integrated it into its regular annual schedule of activities, continuing the successful collaboration with the American Corner and expanding it through new partnerships with the Goethe Institute, the Austrian Institute, and the Austrian Cultural Forum, which contribute to the realization of the program by lending board games in German. Thanks to the Austrian Cultural Forum, several new board games were also acquired for the Austrian Library’s collection. Special attention is paid to the educational potential of the selected games, with a preference for those that stimulate conversation and contribute to the development of language competencies. An additional value of this concept lies in the fact that certain games are thematically designed to familiarize participants with the history, geography, and culture of German- and English-speaking countries, thereby simultaneously enhancing language competencies and broadening general knowledge in an interactive and accessible format. In this regard, the inclusion of games in German and English has further strengthened the program as a platform for informal learning and intercultural exchange, in addition to fulfilling its primary purpose of attracting users to the Library and fostering social interaction. Given that this activity has been met with an excellent response and highly positive impressions from visitors, board game days are also organized independently of International Games Month, and the program is now held multiple times throughout the year.

Both of the aforementioned activities—language cafés and board game days—represent a significant form of programmatic work aimed at connecting the community with the Library and encouraging the active participation of users. More broadly, they enable participants to connect with one another, exchange experiences, and engage in informal learning, particularly in the areas of language acquisition and improvement. Thanks to the relaxed atmosphere and the absence of formal frameworks, a stimulating environment is created in which participants communicate more readily, express their opinions more freely, and overcome the fear and inhibitions that more formal modes of instruction or institutional settings often engender.

3.4 Programs for Young Children

Data from studies on the long-term effects of early education point to the significant role of this approach in the development of cognitive competencies in children, while major educational reformers such as Johann Heinrich Pestalozzi, Maria Montessori, and John Dewey emphasized the importance of the child's active participation in the learning process, a stimulating environment, and the balanced development of cognitive, emotional, and practical abilities. Early access to education and the provision of an environment in which a child's mind can develop independently in a safe and stimulating setting are therefore essential for the development of the child's intellectual and moral capacities, and libraries can support this by offering a secure, neutral space and carefully designed interactive programs. The Austrian Library has sought to include in its cultural and educational program activities intended for the youngest users, and its collection holds more than eighty books for children and young adults. On several occasions, group visits by school-age and preschool-age children were organized in collaboration with the German School in Belgrade. The program was carefully prepared in accordance with the age of the various groups and included numerous activities such as reading workshops, storytelling sessions, and interactive introductions to the function, significance, and organization of a library. For example, during readings of selected stories, children were encouraged to ask simple questions and discuss the behaviors and decisions of characters, with the aim of developing critical thinking and understanding the importance of good choices. In addition, through these programs, the Library seeks to cultivate a love of reading and nurture curiosity, encouraging new generations to experience the Library as a space of inspiration, learning, and play. Although children are not the primary target group of academic libraries, there are valid reasons for including programs intended for the youngest users when conditions permit. Ultimately, today's children are potential future university students and users of academic libraries. As Richard M. Dougherty, former Director of the Library at the University of California at Berkeley and President of the American Library Association (1990–1991), observes: "Today's five-year-old who is struggling to acquire language skills will soon be entering college. The challenges we now face will not be resolved quickly or easily. If the library is truly to become an information resource, rather than just a repository of books and journals, it is of critical importance that academic librarians become involved in the efforts of their colleagues and help children become successful readers and successful students (Dougherty 2022)."

4 Effects of Program Activities

One of the key challenges facing the Austrian Library in Belgrade—a challenge that is, unfortunately, not uncommon in contemporary library practice—relates to attracting and retaining audience in the long term. Given that the Library's collection consists largely of literature in German, one of the primary target groups comprises students of the Department of Germanic Studies at the Faculty of Philology of the University of Belgrade. Nevertheless, despite a carefully selected primary and secondary literature, as well as the benefits the Library offers—free membership and the possibility of borrowing up to ten publications for a period of one month—the challenge of stimulating greater interest and developing a stable community of regular users remains. One factor contributing to this situation may be the Library's physical location. Although it is located within the University Library, an institution that brings together a broad academic community, conversations with students and academic staff of the Faculty indicate that they frequently prefer to use libraries situated in the immediate vicinity of their home department, such as the library of the Department of Germanic Studies or the library of the Goethe Institute. In this context, the cultural and educational programs organized by the Library acquire additional significance, as they represent not merely a supplementary activity, but an important instrument of visibility and a mechanism for connecting with potential users. An analysis of the programs implemented to date demonstrates that it is precisely literary meetings, workshops, film screenings, and interactive language programs that serve as primary mechanisms for attracting new users. Visitors who come to the Library for individual cultural and educational programs frequently return as users of its services, which indicates that programmatic activity can play a significant role in the gradual formation of a stable reading community within the Library.

Positive effects of programmatic activities have also been observed at the individual level. Valuable insights into the significance of these activities from the perspective of participants themselves have been gathered through written and oral evaluations. A considerable number of attendees indicated that participation in the programs contributed above all to the development of their language competencies, while also enabling the establishment and strengthening of contacts beyond their usual social circles. Furthermore, the involvement of individuals who in an academic context are most commonly perceived as authority figures—such as university lecturers and library staff—in informally structured activities contributes to the development of

mutual trust and a feeling of confidence in communication, and ultimately to the creation of a pleasant atmosphere that extends beyond the boundaries of those activities.

In the area of international cooperation, the Austrian Library has, over the course of its many years of engagement, established a reputation as a reliable partner. As an initiator and participant in numerous programs, it has consolidated existing partnerships and expanded its network of new collaborators. The positive experiences and outcomes of previously implemented activities have resulted in the Library continuously receiving new offers for collaboration—whether from partner institutions wishing to involve it again in their projects, or from authors who, following successful presentations of their works at the Library, express interest in returning as guests. In addition, partners frequently recommend the Library to other institutions and individuals as a trustworthy collaborator. Such results indicate that the programs of the Austrian Library, in addition to achieving their cultural and educational objectives, contribute significantly to the development of international, as well as national partnerships, and to the expansion of a cultural network that connects a diverse audience. In the broader context, the Austrian Libraries have, for forty years, steadfastly and successfully promoted Austrian culture, particularly in Central and Southeastern Europe, where they are most widely represented. They constitute a reliable platform for intercultural dialogue and the development of cultural networks beyond the borders of individual states, foster international research, and contribute to a deeper mutual understanding of cultural traditions, which represents a prerequisite for a peaceful, stable, and prosperous Europe (Безналя 2025).

5 Conclusion

Over the course of more than twenty years of existence, the Austrian Library in Belgrade has grown into a fully-fledged cultural and educational center within the expansive network of Austrian Libraries in 28 countries across Europe and Asia. Through literary meetings, exhibitions, workshops, and language programs, reading, critical thinking, and lifelong learning are fostered. These activities enable the development of linguistic, cognitive, and social competencies, while simultaneously contributing to the interconnection of cultures and creating an interactive and welcoming environment for the learning and cultural development of visitors. All of the aforementioned activities further position the Library on the map of significant cultural events in Belgrade, while through the programs of traveling exhibitions and

online workshops, they contribute to the cultural and educational offering throughout Serbia. At the same time, these activities attract new reading audiences, stimulating interest in books and reading, and thereby contribute to the formation of new generations of regular users. In conclusion, it may be noted that the Austrian Library does not neglect its traditional role either, but dedicates itself to cultivating the existing reading community and working systematically toward its further expansion and development.

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Creating Quality Digital Content: The Wiki Librarian Project

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ABSTRACT: The Wiki Librarian project, which has been running for ten years at the University Library “Svetozar Marković” in Belgrade, represents a successful example of linking academic education with digital knowledge culture. Students from the Department of Library and Information Science at the Faculty of Philology, University of Belgrade, are required to participate in a student internship as part of the course Digital Text 2, where they learn to create high-quality and verifiable articles on the Serbian Wikipedia. Practical work in the library, under the mentorship of experienced librarians, enables students to develop research and writing skills, critical thinking, and digital literacy, while simultaneously contributing to the growth of Wikipedia. Between 2016 and 2025, 159 students completed the internship, creating 172 new articles and supplementing 17 existing ones, a significant number of which received high-quality ratings. This paper analyses the methodology of the student internship, the results achieved, and the significance of the project for academic education, the development of library competencies, and the enrichment of the Serbian Wikipedia.

KEYWORDS: Wikipedia, Wiki Librarian project, education, librarians, University Library “Svetozar Marković” in Belgrade, LIS students, Digital Text 2.

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1 Introduction

In the contemporary information age, the internet has become the primary source of knowledge. As the largest online encyclopedia, Wikipedia constitutes an indispensable resource providing access to relevant information in real time. The University Library “Svetozar Marković” in Belgrade, in collaboration with Wikimedia Serbia, developed the Wiki Librarian project in order to enable students — alongside librarians — to acquire practical experience in the creation of quality digital content. Students from the Department of Library and Information Science at the Faculty of Philology in Belgrade, within the course Digital Text 2, have the opportunity to write and edit Wikipedia articles through training sessions and practical workshops; such work constitutes an integration of academic competencies and digital literacy. The project has been accredited by the National Library of Serbia and has, over the course of a decade, encompassed numerous generations of students and librarians, enabling them to acquire and enhance the competencies essential to research, writing, and the technical formatting of content (Стакић, Поповић, and Кринуловић 2021).

2 Wikipedia and Young Editors

Wikimedia Serbia, founded in 2005 as the local branch of the global Wikimedia Foundation, has developed educational programmes enabling schools and universities to use Wikipedia as a platform for learning and research (Кринуловић, Стијеновић, and Стакић 2015). Since 2007, students have had the opportunity to write and edit Wikipedia articles instead of conventional seminar papers. The first student article in Serbian was devoted to ENIAC, the first digital electronic computer, and since that time the number of participating students and librarians has continuously grown (Стакић, Поповић, and Кринуловић 2021). Young editors learn how to conduct thorough research, critically analyse information, and present it reliably. In this way, competencies in critical thinking and research skills are developed, as well as an awareness of the ethical management of digital content. Students also develop communicative and social skills through teamwork and collaboration with mentors, while technical aspects — text editing, adding references and images, and understanding Wiki syntax — contribute to the development of digital literacy (Стакић, Поповић, and Кринуловић 2021).

2.1 The Educational Programme of Wikimedia Serbia

The educational programmes of Wikimedia Serbia are intended for schools, faculties, and other educational institutions. Seminars, workshops, and edit-a-thons enable students and instructors to acquire practical knowledge in content creation and the application of principles of information verifiability. The objective of the programmes is to encourage the creation of relevant and high-quality content and to promote open access to knowledge. Success is measured by the number of articles created and improved, the quality of the text, and their usefulness to the community (Стакић, Поповић, and Кринуловић 2021).

2.2 Young People on Wikipedia

Students and pupils are generally not recommended — and are frequently not permitted — to cite Wikipedia in academic papers, yet many begin their research process on precisely that platform (Kazaljka). Young editors on Wikipedia constitute an important and active segment of the community that creates and edits content on this global online encyclopedia. They often represent a significant proportion of the volunteer base, whose contribution is one of the key reasons for Wikipedia's success and relevance. Editing articles enables young people to use Wikipedia as a platform for scholarly learning and research. The process of creating and supplementing articles requires thorough engagement with sources, critical analysis, and fact-checking, which contributes to the development of critical thinking and research skills. In addition to academic development, participation in Wikipedia editing enables young editors to develop social skills as well. Collaboration with other members of the community demands communication, teamwork, and the capacity to operate effectively within an international environment. Such experience is exceptionally valuable, as young people learn to collaborate with individuals from diverse cultural backgrounds, perspectives, and professional contexts — a skill of inestimable importance in the contemporary digital age. Editing Wikipedia also constitutes a significant educational experience (Поповић, Шевкушић, and Стакић 2015). Through writing articles, young people learn to systematise information, analyse data, and express their ideas in a clear and precise manner. These skills are valuable not only in academic settings, but also in future professional development, as they foster the capacity to learn independently, solve problems, and think logically. Working on Wikipedia also develops technical competencies. Students and young editors learn how to use Wiki text for formatting,

add images and references, and gain an understanding of the structure and operating principles of digital platforms, thereby acquiring the ability to manage digital content effectively. An important aspect of young editors' work is the development of social responsibility; they acquire an awareness of the importance of reliable information and the ethical use of sources. The mentorship and support provided by experienced editors represent a further important component of the learning process. Young editors have the opportunity to learn from experts, to receive feedback and guidance. Ultimately, the work of young editors on Wikipedia has long-term significance: their engagement enriches content, fosters diversity, and contributes to the availability of reliable knowledge. In this way, they become agents of new standards in digital education and participants in shaping the future of information platforms (Стакић, Поповић, and Кринуловић 2021).

2.3 Student Internship

One year after the establishment of cooperation between Wikimedia Serbia and the University Library "Svetozar Marković" — more precisely, in 2016 — an organised student internship for students of Library and Information Science at the Faculty of Philology, University of Belgrade, was launched within the framework of the Wiki Librarian project. This internship is integrated within the course Digital Text 2, and its objective is to provide students with practical experience in working with digital tools for the creation and editing of content on Wikipedia.

During the internship, students attend a series of lectures and workshops covering the fundamentals of writing encyclopedic articles, proper text editing, the use of Wiki syntax, and the addition of reliable references. The internship offers multiple benefits. In addition to refining skills in writing and digital processing, students have the opportunity to become acquainted with the environment of one of the most significant libraries in Serbia and to familiarise themselves with the organisation of library work. The internship encompasses the preparation of materials for articles, which are subsequently entered directly onto the Serbian Wikipedia and formatted in accordance with the requirements of the Wiki platform. Particular emphasis is placed on the citation of references from relevant sources. Students receive clear instructions and a scoring list with precise criteria that an article must satisfy in order to be accepted.

The article text must contain a minimum of 3,500 bytes and be written clearly, in encyclopedic style, without superfluous generalisations. The pres-

ence of an infobox — or alternatively a gallery of three images — earns additional points, as does at least one picture illustrating the subject. The article must contain at least four subheadings to ensure the automatic generation of a table of contents, and must include internal links to relevant Wikipedia articles. A minimum of three reliable references is obligatory to ensure the article's validity and to prevent its deletion. If an article, by its nature, cannot contain an infobox or illustrations, this requirement is compensated by expanding the text by 2,000 bytes. Students thus learn to adapt their work to the given circumstances while maintaining high quality. Through this internship, students acquire skills that serve them both in academic settings and in future professional development. They learn to conduct research, evaluate sources, create structured and logically presented content, and collaborate with peers and mentors, all of which contributes substantially to their future competence as librarians and digital media experts.

2.4 Results Achieved

Between 2016 and 2025, a total of 159 students from the Department of Library and Information Science at the Faculty of Philology, University of Belgrade, completed the student internship at the University Library. A total of 172 new articles were created and 17 articles were supplemented (Figure 1).

The written articles met all the necessary requirements, and a considerable number of articles were rated as very good. These findings indicate that the student internship was successfully conducted.

3 Discussion and Significance of the Project

The project demonstrates how academic education and digital literacy can be successfully integrated into a practical programme that benefits both students and the broader community. The role of librarians as mentors and educators is of particular significance, given that they are responsible for developing in students the competencies that will be invaluable in their future professional work. The project contributes to the digital knowledge culture and enriches the Serbian Wikipedia with relevant and reliable content, thereby increasing the availability of knowledge in open access.



Figure 1. Number of students and created articles during the student intership

4 Conclusion

A decade of the Wiki Librarian project confirms that the combination of student internships, librarian mentorship, and digital platforms can make a significant contribution to the development of education, library competencies, and the dissemination of knowledge through open access. Students acquire practical experience in researching, writing, and editing articles, and the Serbian Wikipedia has been enriched by hundreds of new and supplemented articles — a result that clearly demonstrates the value of this programme for the academic community and for society as a whole.

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The Publishing Activity of the University Library “Svetozar Marković” in Belgrade: The Role of the Editor-Copyeditor in the Publishing Process

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ABSTRACT: The publishing activity of the University Library “Svetozar Marković” in Belgrade constitutes a significant dimension of its cultural and academic mission. This paper examines the specificities of library publishing, with particular emphasis on the professional role of the editor-copyeditor as a linguistic expert. By tracing the historical development and contemporary practices in this field, the paper highlights the diversity of publications and their relevance to both the academic community and the broader public. It is argued that library publishing is grounded in principles of social responsibility and academic reliability, and is characterized by a high degree of linguistic and structural editorial refinement. The central section of the paper is devoted to the analysis of editorial and copyediting work as a complex, multilayered, yet frequently underappreciated process. The conclusion underscores that the editor-copyeditor, building upon the author’s contribution, serves as a crucial link in the final shaping of the text, and bears professional responsibility essential to its linguistic quality, reliability, and enduring value.

KEYWORDS: publishing activity, University Library “Svetozar Marković,” editor, copyeditor, linguistic norm, academic standards, linguistic expertise, cultural and scholarly responsibility.

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1 Introduction

Libraries have traditionally occupied a distinguished position in contemporary society, owing to their significance for educational processes at various levels and to the unique cultural mission they have fulfilled over centuries.¹ The role of the modern library is not confined to the acquisition, preservation, and provision of library materials; it entails active participation in the shaping of knowledge, the culture of memory, and scholarly discourse. In recent decades, a discernible trend in academic communication has emerged whereby university and research libraries increasingly assume the role of publisher or partner in scholarly publishing, particularly in the context of open access (Brown et al. 2013).

2 An Example of European Practices

During a study visit to Berlin², we had the opportunity to gain direct insight into how university libraries integrate publishing activities into their operations. In this context, we visited the Jacob and Wilhelm Grimm Centre — the University Library of Humboldt University of Berlin (Universitätsbibliothek der Humboldt-Universität zu Berlin), the Philological Library of the Free University (Philologische Bibliothek der Freien Universität Berlin), the Library of the Technical University (Universitätsbibliothek der Technischen Universität Berlin), and several other scientific research institutions.

The example that best illustrates this integration is the publishing platform Berlin Universities Publishing – BerlinUP³, which enables researchers to publish the results of their work in peer-reviewed monographs and journals under an open access model. As an academic, non-commercial publisher, BerlinUP applies the diamond open access model, whereby both publication and access to content are free of charge for authors and readers alike. This

1. The author of this paper has worked as a copyeditor and editorial manager for nearly two decades, and for more than twelve years has been employed as an editor and copyeditor at the Publishing Center of the University Library “Svetozar Marković” in Belgrade. The text is based on many years of experience, condensed into a role that requires equal responsibility toward the author, the reader, and the language itself.

2. As part of the program financially supported by Bibliothek und Information Deutschland (BID)

3. [Berlin Universities Publishing](#)

activity is organized through an integrated system that includes series editors, editorial boards, and a dedicated team for open access and academic publishing. A particularly important aspect of its operation is a standardized peer review and editorial control process, in which editors, editorial managers, and copyeditors are responsible for the substantive, formal, and ethical quality of submitted works; they organize the review process and determine which submissions meet the criteria for publication. All publications receive a DOI identifier and are archived in the repository of the Technical University of Berlin (TU Berlin), with integration into national and international open access platforms to ensure lasting availability, transparency, and the tracking of scholarly output. In addition, BerlinUP provides comprehensive and personalized support to authors at every stage of the publishing process.

An analysis of the data gathered during this visit suggests that a high degree of integration of publishing activities within library and information systems constitutes a factor of both efficiency and quality in the publishing process, and that such integration is accompanied by well-developed mechanisms for author support. This model demonstrates that libraries can successfully combine academic expertise with editorial and technical infrastructure, covering the entire process from content preparation and metadata management through to final publication.

In the context of Serbia, this model is relevant to an understanding of the role of the University Library “Svetozar Marković” in Belgrade (hereafter referred to as the Library), which has already distinguished itself in providing access to scientific information and developing digital collections. The development of a centralized publishing infrastructure could ensure high-quality scholarly communication in accordance with contemporary international standards for academic publishing.

3 Publishing at the University Library “Svetozar Marković”

The University Library “Svetozar Marković” in Belgrade, as the central academic library in Serbia, aspires to a broader role in the development of scholarly communication. Beyond its core function of acquiring, processing, preserving, and providing access to library materials, the Library participates in the production and mediation of knowledge through its own publishing activity, which has expanded considerably over the past fifteen years. The developmental trajectory of the Library’s publishing work can be traced

from the earliest lists of received books and periodicals from the year 1948, through regulations, guides, catalogues, and annual reports, to bibliographies and reviews of doctoral dissertations defended in Serbia, and works dedicated to Svetozar Marković in the mid-1970s. From contemporary perspective, of particular historical significance are the phototype editions of Ivo Andrić's works *Ex Ponto* and *Nemiri* (1975), prepared in collaboration with the literary association "Petar Kočić." These editions were not isolated undertakings; they were subsequently followed by phototype reprints of Vuk Stefanović Karadžić's *Pismenica serbskoga jezika* (1984) and Stojan Novaković's *Srpska knjiga: njeni prodavci i čitaoci u XIX veku* (1982). Together, these publications illustrate the Library's academic commitment to the preservation of cultural and scholarly heritage. In the years that followed, this publishing activity was further expanded to include the first bibliographies of works, scholarly proceedings (1976), specialized monographs, and exhibition catalogues.

Speaking more broadly, in the first quarter of the 21st century the Library entered a new phase of development, characterized by a deliberate and systematic enhancement of its publishing activity. A dedicated organizational unit — the Centre for Publishing Activity — was established within the Library, and from that point the publication of contemporary scholarly and specialized monographs, studies, thematic proceedings, manuals, documentary materials, conference abstract books, and electronic and digital publications was undertaken systematically, along with linguistic and multidisciplinary journals offering overviews of the latest research and contemporary linguistic and library practices. It is thus evident that publishing has ceased to be a peripheral function and has become a continuous and distinctive activity of the academic institution, fully attuned to the contemporary information and cultural environment.

In this spirit, new series have been launched with the aim of advancing scholarly thought and popularizing knowledge, each with a recognizable visual identity. Among these, the series *Homilije*⁴ is particularly noteworthy, as it publishes scholarly and specialized monographs as well as edited

4. *Dinamika pripovednog prostora* (2016) by Aleksandra V. Jovanović, *Teška slika: megalopolis angloameričkog i srpskog romana* (2016), by Maja Cvijetić, *Vreme i prostor u 'Zlatnom runu' Borislava Pekića* (2016) by Nebojša Lazić, *Figure preobražaja u književnom delu Danila Kiša i Prima Levića: od književne poetike do kulturne antropologije* (2019) by Aleksandar Kostić, *Kartografija mašte* (2020) and *Angloamerička teorija na prelazu milenijuma: diskurs i granice* (2024) by Aleksandra V. Jovanović.

volumes of doctoral dissertations in the field of literary studies. The series includes the subseries *Biblio*, devoted to edited volumes of doctoral dissertations on library and information science topics. Four titles⁵ in this subseries are authored by members of the Library's staff — a fact that illustrates a highly significant and relatively uncommon dimension of library practice, whereby the institution itself provides a platform for publishing the scholarly contributions of its own employees. The series as a whole comprises ten titles to date and has established a stable foundation for the presentation of long-term research results.

The editions *Kanon*⁶ and *Karnegi* have featured poetic translations and an anthology of Serbian war prose.

One of the most significant achievements of the Library's publishing activity is the collection *Knjigohranilište Univerziteta u Beogradu*⁷ (*The Book Repository of the University of Belgrade*), dedicated to a systematic examination of the Library's history, development, and role in the national educational, scholarly, and cultural tradition. Conceived as a long-term publishing and research project to mark the centenary of the institution, this collection represents a form of institutional self-reflection designed to illuminate comprehensively the Library's history, evolution, and significance from its founding to the present day. It brings together scholarly research, a culture of institutional memory, and public presentation of institutional heritage, with plans for its continuation in the years ahead.

Within the domain of specialized and scholarly documentary monographic publications, works are published that are oriented towards the systematic analysis, processing, and contextualization of library and archival materials, as well as the study of the infrastructural and functional aspects of the scholarly information system. These publications address topics in the

5. *Pronalaženje informacija u digitalnim bibliotekama*, (2017), by Aleksandra Trtovac, *Nova paradigma saradnje u bibliotekama* (2017) by Adam Sofronijević, *Paralelni srpsko-nemački korpus književnih tekstova: izrada, pronalaženje informacija i semantički veb* (2021) by Jelena Andonovski and *Fenomen pseudonima kao vid autorstva u bibliotečko-informacionoj delatnosti* (2024) by Nataša Dakić.

6. Ivan V. Lalić: *Koraci prema moru* (2014); new translations by Fransis R. Jones, ed. Aleksandar Jovanović and Svetlana Šeatović Dimitrijević; Vladimir Kašnar: *Usrajni otisci* (2017).

7. *Put do knjigohranilišta: obeležavanje 100. godišnjice osnivanja Univerzitetske biblioteke "Svetozar Marković"* (2021); *Knjigohranilište kao građevinski i arhitektonski izazov* (2024); *Posebne biblioteke i legati* (2025), ed. of the collection Dragana Stolić.

area of scientific information and document supply, and include the critical processing and publication of significant archival materials of historical, cultural, and scholarly importance. An illustrative example is the publication *Porodična prepiska kneza Miloša Obrenovića iz Arhivske zbirke Joce Vujića* (2016, edited by Tatjana Brzulović Stanisavljević).

In the first quarter of the 21st century, the Library has also published volumes of collected papers that advance critical and scholarly discourse in the humanities and social sciences, including domestic and international interdisciplinary proceedings exploring cultural, historical, and literary themes. Work on such volumes is especially demanding, as it involves harmonizing different authorial styles, methodological approaches, and levels of linguistic competence, imposing complex and responsible tasks on the editor and copyeditor. A title worthy of particular mention is *Kultura sećanja: medicina, bioetika, nacizam, etika u bibliotekarstvu*⁸ which emerged from a roundtable attended by university professors and experts, and was devoted to ethics in scholarly research and librarianship. Its occasion was the contemporary debate surrounding the use of a publication of contested bioethical status — Pernkopf's *Atlas of Topographic Anatomy* — which the University Library had received from the Nazi organization DOB during the German occupation in 1942.

An especially productive segment of the Library's publishing output consists of exhibition catalogues, which function as a form of synthesis of the historical, cultural, and scholarly heritage held in its collections. Far from serving merely supplementary material, these catalogues often evolve into independent publishing projects that enrich the Library's overall output. They most commonly combine original scholarly texts with systematic bibliographies, thereby acquainting both expert and broader audiences with the contents of exhibitions and the collections themselves. Since exhibitions are organized to mark significant anniversaries, jubilees, and important cultural and scholarly events, these occasions shape the thematic and conceptual framework of the accompanying catalogues. The significance of this category of publication is reflected also in quantitative terms: in the period from 2000 to 2026, ninety catalogues have been published. This is hardly coincidental, as exhibition catalogues serve to present to professional and wider audiences alike the intellectual treasures that the Library holds in safekeeping.

Periodicals, as a regular form for the publication of new research and critical reviews, connect authors and readers through continuous professional

8. *Kultura sećanja: medicina, bioetika, nacizam, etika u bibliotekarstvu: zbornik sa okruglog stola*, 2023, ed. Dragana Mihailović et al.

and scholarly communication. At the Library, contemporary developments in digital humanities and linguistic practice are covered by the journals *Infotheca* and *Novorečje*. *Infotheca*⁹ is a multidisciplinary journal for digital humanities that publishes original scholarly and professional articles subject to peer review by an international editorial board, as well as various types of publication and event reviews in this field. It is published simultaneously in Serbian and English, is fully open access, and all its content may be downloaded free of charge. *Novorečje*¹⁰ is a scholarly and popular journal launched with the aim of publishing new, as well as previously published, texts in the field of neological research. It is published twice a year.

The influence of the Centre for Publishing Activity is felt throughout the Library's entire operation. It is there that ideas take material form and manuscripts become books and digital publications. From 2000 to 2026, the Library as publisher has issued nearly three hundred titles. A comparison with available historical data indicates that approximately 75% of the Library's total publishing output since its founding was produced during this period. This figure, beyond attesting to a quantitative expansion, speaks to the systematic modernization and institutional consolidation of library publishing. The Centre's vision is oriented towards the further development of its publishing program, the broadening of its thematic scope, and the establishment of a reliable and recognized position in the creation of academic and cultural content in Serbia and the wider region.

4 Between Manuscript and Reader: The Editor-Copyeditor as a Holder of Multiple Roles

The publishing activity of the University Library "Svetozar Marković" represents a confluence of scholarly, educational, and cultural functions. The publishing process itself is complex and multilayered, as it encompasses a range of tasks that precede the final publication of a work. Editorial policy is grounded in clear quality criteria, with manuscripts passing through multiple stages of substantive and linguistic review. Given limited staffing and financial resources, publishing activity often relies on a small number of collaborators who perform several roles. In the practice of our library publishing, the tasks of editing, content editing, and copyediting are therefore frequently carried out by a single individual. In this paper, the combined

9. *Infotheca*

10. *Novorečje*

position of editor-copyeditor is treated as a hypernym — that is, a collective term encompassing multiple stages of textual revision.

The diversity of the Library's publishing output also implies a variety of conceptual approaches and methodological procedures, since each category of publication brings with it specific editorial, preparatory, and linguistic challenges.

Unlike commercial publishing, library publishing operates in the service of the community and is grounded in principles of social responsibility and academic reliability (Skinner et al. 2014). The Library's publishing activity therefore plays an undeniable role in the promotion of scholarly, educational, and cultural content. In such a context, the quality of linguistic and structural editorial work carries particular weight, as it directly affects the institution's reputation. What must first be emphasized is that such a function of library publishing presupposes complex linguistic interventions, encompassing the consistent application of standard orthographic and grammatical norms, the syntactic and stylistic harmonization of the text, adaptation to functional style and genre, the preservation of the author's voice while ensuring readability and clarity, the identification of linguistic inconsistencies that affect meaning, and frequently the verification of citations, quotations, and sources.

One of the central problems encountered in practice is the intuitive conflation of literacy with competence held by an editor-copyeditor. The capacity for deep reading and writing is not generally considered a qualification for editorial or copyediting work — a misconception that ultimately devalues this profession. A responsible engagement with a text requires higher formal education, a thorough command of the norms of the standard language (grammar, orthography, syntax, and stylistics), familiarity with different functional styles and registers, and years of experience working with diverse types of texts and the specific challenges they pose. In short, multiple philological competencies are required — competencies that belong to the domain of linguistic expertise. The editor-copyeditor's work protects the author, the reader, and the language itself, not merely by aligning the text with established norms but by preserving its vitality and the diverse authorial styles it contains — and at times even their deliberate innovations. The editor-copyeditor prevents grammatical, stylistic, or terminological errors from impairing the clarity of the text or its scholarly reliability. At the same time, linguistic interventions have a significant educational dimension: through comments, suggestions, and explanations, the editor-copyeditor guides the author toward a better understanding of linguistic norms and lexical and

stylistic variants. This kind of dialogue enables the author to understand why particular changes have been made, to enhance their own linguistic competence, and to apply the knowledge gained in future work.

The professional procedures of the editor-copyeditor can be described through various levels of reading and interventions in a text, which in our case correspond to editing, content editing, copyediting, and proofreading. Editing is a process that requires careful structural organization of the text, the logical connection of its parts, a clear definition of chapters (Mackenzie 2011), as well as consistent treatment of bibliographies, footnotes, and ancillary elements. By virtue of its complexity, it has been considered “more an art than a craft, something best acquired through a combination of sharpness and experience” (Skinner et al. 2014). Content editing (from German *Redaktion* — refinement) is the most demanding step in the editing process; in terms of the scope and complexity of interventions, it is comparable to the changes made to a text by an editor. It is followed by copyediting (from Latin *lector* — reader, language teacher, from the verb *legere* — to read), which implies comprehensive correction of the linguistic and stylistic shortcomings of a text — that is, its improvement in accordance with the grammatical, orthographic, and stylistic rules of the standard language. Copyediting also entails the correction of individual substantive errors, the harmonization of terminology with linguistic norms, and the ensuring of a clear and consistent textual structure. Finally, proofreading (Latin *correctura*, from the verb *corrigere* — to correct, to rectify) represents a final review of the text, the aim of which is the correction of typos and compliance with the standards of the printed or digital edition. Particular attention is paid to hyphenation, punctuation, line formatting, and typographic appearance so as to ensure that the text is visually neat.

To this sequence we would add a further important and somewhat rare editorial-copyediting skill — knowledge of, or at least the ability to recognize, multiple languages, especially when working on translations. By comparison with the source text, it is possible to identify semantic deviations, to correct unnatural constructions arising from the influence of a foreign language, and to ensure a semantically precise and functional rendering into the target language. Even when a translation initially looks satisfactory, grammatical errors may remain, such as incorrect use of prepositions and their associated case constructions, as well as inconsistencies in gender and number. Furthermore, in longer texts or those produced by multiple translators, terminological inconsistencies frequently arise. Finally, the editor-copyeditor identifies stylistic unevenness caused by an overly literal adherence to the original —

including the excessive use of the passive voice, passive constructions and participles, and other forms of linguistic interference — and proposes linguistic and stylistic corrections to ensure that the text is natural, clear, and appropriate to the spirit of the target language.

In the Library's publishing practice, the role of the editor-copyeditor may be described as a bridge between language and the profession — given that this is a specific domain where traditional library concepts and new terminology from information technology intersect. The rapid proliferation of such terminology further complicates the work, as new terms appear — predominantly anglicisms widely used in information science — which do not yet have established translations in practice and consequently appear in various forms (translated, transliterated, or retained in the original form). A decision must be made as to the most appropriate term, which must then be applied consistently. It falls to the copyeditor to resolve such linguistic dilemmas, drawing upon dictionaries, normative linguistic handbooks, and grammars. Recourse is also frequently made to relevant translations of international standards and recommendations in order to align terminology with contemporary scholarly and theoretical currents and practice. Throughout this process, it is essential to seek a balance between general linguistic norms and the specificities of specialized usage, since language must be both firm and flexible.

Within our library publishing practice, at least three levels of reading may be distinguished. The most demanding is the substantive and conceptual level — what is known as heavy copy-editing¹¹ (Linnegar, n.d.; Einsohn and Schwartz 2019) — at which the text is considered as a whole: its structure and clarity are assessed, terminological consistency and stylistic coherence are evaluated, and logical gaps, insufficiently substantiated claims, and potential omissions in source citation are identified. The inferential level involves linguistic and stylistic editing focused on the harmonization of style, the refinement of formulations, and the adaptation of register to the purpose of the publication. The last and easiest level, literal, encompasses linguistic standardization and final review — that is, the correction of grammatical and orthographic errors.

11. It refers to different levels of linguistic intervention—from the so-called light copy-editing, which minimally intervenes in the text, through medium copy-editing, to deep, complex editing — heavy copy-editing, which includes more extensive linguistic and content-related interventions, as well as fact-checking and the verification of citations.

A particular challenge lies in finding the equilibrium between an author's individual linguistic voice and the imperatives of standardization, particularly in manuscripts originating from heterogeneous genres and scholarly disciplines. It should be noted that authors come from diverse academic and professional backgrounds and consequently exhibit varying degrees of linguistic competence and stylistic refinement. For this reason, the editor-copyeditor employs in-text commentary functions in order the author may identify limitations in expression, logical inconsistencies, or stylistic unevenness. Where the author demonstrates linguistic proficiency and a clear understanding of the communicative aims of the text, the copyeditor's role remains clearly defined: in such cases, editorial intervention is directed to orthography, terminological consistency, and the technical aspects of the text, where necessary. Accordingly, interventions are minimal and oriented towards improving readability, with full respect for the author's intent. Such a collaborative editorial process is grounded in mutual trust and respect.

5 Conclusion

The role of editor-copyeditor is, by its very nature, neither merely technical nor marginal. On the contrary, it constitutes a form of intellectual and linguistic mediation between the authored text and the normative framework of the Serbian standard language, integrating editing, content editing, and copyediting into a complex and responsible process of preparing a manuscript for publication. Within the contemporary digital environment — characterized by automated translation, superficial modes of communication, and the accelerated production of content — this phase of textual preparation must not be neglected, although it frequently is. The copyeditor's contribution is rarely acknowledged; their role is largely invisible, yet precisely in its absence the consequences become unmistakably apparent. The editor and copyeditor guard against the erosion of linguistic norms. The Library's Publishing Department, as a newly established organizational unit within the institution, represents a paradigm of the possible: it demonstrates that within a single cultural institution it is possible to develop a publishing system in accordance with high academic standards — one in which, between manuscript and reader, an entire world of quiet, expert practice unfolds, with the editor-copyeditor as one of its key links. Although editorial and copyediting responsibilities have long existed as an integral component of the work performed by librarians and other experts within the institution, the novelty resides in the fact that this function is now acquiring a clearer professional definition

within the framework of library publishing. This paper serves as a reminder that in every high-quality publication — however imperceptible this may appear at first glance — the editor and copyeditor have, through their careful labor, breathed final form into the work. In this sense, the role of the editor-copyeditor in institutional library publishing may justifiably be understood as an overarching, hyperonymic professional category that encompasses all forms of linguistic intervention in a text. It is precisely in this synthetic capacity that its significance lies — a significance that is at times decisive for the quality of a publication.

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Special and Legacy Collections of the University Library “Svetozar Marković” in Belgrade

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The publication *Knjigohranilište Univerziteta u Beogradu: posebne biblioteke i legati* (The Book Repository of the University of Belgrade: Special and Legacy Collections) is the third volume in a collection dedicated to the history and work of the University Library “Svetozar Marković” in Belgrade. The collection *Knjigohranilište* was launched in 2021 to mark the centenary of the construction of the first academic library in Serbia. The first volume, titled *Počeci* (Beginnings), addresses the founding of the Library, while the second — *Projekti izgradnje i rekonstrukcije* (Construction and Reconstruction Projects) — documents the original building period as well as subsequent expansion projects. The present volume, dedicated to special and legacy collections, was edited by Svjetlana Đelić, Svetlana Pucarević, Dragana Mihailović, and Dr Tatjana Brzulović Stanisavljević, and represents a collaborative effort by more than 15 authors — librarians of the University Library — whose individual contributions constitute this collected volume.

The title *Knjigohranilište* draws attention to a prominent yet often overlooked inscription displayed in the entrance hall of the University Library, above the bust of Andrew Carnegie: *Let it be known that this book repository was established and founded as the fruit of a noble thought and a generous gift of the Carnegie Foundation, and that by the grace of God it was opened on the 24th of May, 1926.* According to available sources, this inscription was not composed spontaneously; rather, a dedicated committee oversaw its formulation in the period leading up to the Library’s opening in 1926, and this version was selected as the most fitting among several proposed alterna-

tives. The collection *Knjigohranilište* as a whole thus endeavours to uncover lesser-known aspects of the history and institutional narrative of the University Library in Belgrade — aspects that have frequently remained obscured or have not received adequate attention. Comprehensiveness, thoroughness, and clarity are the guiding principles of the entire collection, and these are particularly evident in the most recent volume, which presents the Library's gift collections.

1 Thematic Scope of the Publication

All gift collections held by the University Library carry the call number PB, designating them as “special collections”. These collections constitute undoubtedly the most valuable and significant portion of the Library's holdings, as they contain some of the oldest and most precious publications, manuscripts and old and rare printed books, unique archival materials, etc. In certain instances, the University Library has become the custodian of extraordinary material assets, including the legacies of Isidora Sekulić and Vojislav Jovanović Marambo. The Library currently holds 37 received and catalogued gift collections, each bearing the name of its donor or the individual who originally formed the collection. The publication notes, however, that the present overview represents a cross-section taken immediately prior to the celebration of the Library's major centennial anniversary (1926–2026), as new valuable collections have already been announced and are in the process of being acquired, processed, and incorporated into the holdings.

Although the special collections vary considerably in scope, composition, content, and value, the third volume of *Knjigohranilište* does not present a selection, but rather a representation of *all* special collections, applying a strictly formal principle — the collection's assigned number, i.e., its call number. This approach ensures that every collection, including those less widely known, is accorded its proper place within the whole. Moreover, several collections — particularly those that have been received by the University Library more recently — are described in print for the first time in this publication. Thus, presented side by side, are the special collections of Petar Budmani, Dr Svetozar M. Marković, Miroslav Premru, Otto Karmin and Dr Heinrich Christensen, Gedeon Dunderski, Luka Čelović Trebinjac, Prince Božidar Karađorđević, Andrew Carnegie, Dimitrije Ruvarac, Joca Vujić, Slobodan J. Jovanović, Branimir Ćosić, Jovan Aleksijević, Živojin P. Simić, Stojan Novaković, Aleksandar Stojanović, Manojlo Maša Nikolić, Rudolf Sardelić, Dimitrije Mitrinović, Isidora Sekulić, Aleksandar

Belić, Vojislav Jovanović Marambo, Momčilo Milošević, Mihajlo Pupin, Radoslav Perović, Vojin Milić, Miroljub Todorović, the Austrian Library, Janko Radovanović, Zagorka Golubović, the Francophone Centre, Vid Vukasović, Branislav Krstić, Momčilo and Miroslava Popović, Slobodan Žunjić, and Bogdan Bogdanović.

The survey of all special collections in the publication is complemented by several texts that represent a significant added value to such an undertaking. At the beginning, the volume includes two introductory essays that address, among other matters, *the very concept of a legacy collection*, that is, a gift collection. One of these essays explicates the key distinction between a gift collection and a legacy collection, while the other examines the meaning of related terms — such as legator and legatee — which are frequently misunderstood, and presents the legislative framework governing this area. At the other end of the volume, a supplementary section contains several shorter texts devoted to those donors whose gifts did not formally constitute a distinct gift collection, but instead became part of the Library's general holdings; among these donors are Anica Savić Rebac, Uroš Predić, Ranko Bugarski, etc. The publication concludes with a review authored by MA Dušica Grbić, an Archeographer advisor at the Matica Srpska Library and one of the most acknowledged experts on this subject. The review does not merely offer an evaluative opinion of the publication; it also provides additional valuable insights into the place of special collections within the national scientific circle and culture.

The collected volume *Knjigohranilište* on special and legacy collections has thus acquired a multifaceted function: it reveals a specific segment of the University Library's holdings (the special collections), while simultaneously processing one of the most significant concepts in library and information science (legacy collection, gift collection); and, through mentioning other donors, it draws attention to the far-reaching cultural and social significance of the act of donation — an act through which valuable heritage has been preserved for future generations, even under unfavourable material and historical circumstances.

2 Overview of the Gift Collections

Each contribution on a special collection, as stated in the introductory notes, contains several obligatory elements: *a biography* of the donor or the individual whose name the collection bears, accompanied by *a photograph* where available; information regarding the *mode of acquisition* and the collection's

“path” to the University Library; a *description* of the collection in terms of its overall scope, with particular attention to the most valuable works it contains; and, finally, *selected bibliography* pertaining to the collection. Despite the fact that every contribution adheres to this structure, each text nonetheless bears the individual imprint of its author, who has approached the particular special collection in the manner deemed most appropriate for conveying its value and significance.

All texts are richly illustrated — featuring images of covers, title pages, bookplates, signatures, dedications, and other visual elements — which enrich the publication both visually and informatively.

The collected volume *Knjigohranilište Univerziteta u Beogradu: posebne biblioteke i legati* aspires to be comprehensive, factually substantiated, and professionally relevant, not only for the study of the work and collections of the University Library “Svetozar Marković,” but also for library and information science more broadly. However, in addition to its extensive corpus of material, this substantial publication endeavours to convey a deeper idea — one that, as stated in the introduction, concerns “people who love books, both those who collected and preserved them, and those who have continued that mission in the awareness of their duty to present the acquired and preserved heritage to others.” In doing so, the volume draws attention to the personal, humanistic dimension that it partially illuminates — a dimension that is frequently absent from institutional histories: the dedication of great bibliophiles, both those who owned the collections and those who recognised their worth. For it is ultimately that dedication, and that love of books, which sustains a library institution, shapes its history, and positions it within national culture.

MEMINI, ERGO SUM¹: University Library “Svetozar Marković” (1926-2026)

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Review of the monograph: *A Century of the University Library in Belgrade: A Look into the New Millennium*. Belgrade: University Library “Svetozar Marković” and Kosmos Publishing, 2026

1 On Knowledge and Memory

The phenomenon of memory has long constituted one of the central preoccupations in the history of philosophy, arising directly from the fundamental question of the origins of human knowledge. For certain philosophers, memory is primarily a metaphysical category — it is anamnesis, the soul’s recollection of eternal truths apprehended in the realm of ideas prior to its embodiment. By contrast, others regard memory not as an a priori given, but as a product of experience and complex associative processes; within the framework of empiricism, memory is defined as an archive of sensory experience and an indispensable constitutive element of personal identity and continuity...

Even this brief historical and philosophical overview of select ideas makes evident that knowledge and memory are inextricably linked along the human path toward the comprehension of truth. Within this context, the vocation of a librarian is elevated to the level of a noble duty — the preservation of that truth.

1. I remember, therefore I am: a variation on the Cartesian principle: Cogito, ergo sum (I think, therefore I am).

Memory is not merely the reproduction of the past; it is the force that enables the spirit of a species to shape future generations while simultaneously ensuring that spirit's own preservation. By caring for cultural heritage, libraries render it immortal, thereby guaranteeing the very survival of the cultural world. It is on this unwavering belief in the power of knowledge, and on a devoted concern for the indestructibility of human memory, that the present review of a significant anniversary — the centenary of the founding of the University Library “Svetozar Marković” in Belgrade, an institution of the highest cultural, historical, and scholarly distinction — is grounded.

2 Set, Union, Intersection

The University Library “Svetozar Marković” is not merely an institution of cultural and educational significance; it is a foundation of Serbia's academic community. From the construction of the first building designed specifically to house the Library to the establishment of a modern center for digital literacy development and open science, through its sustained support for research activities and the education of successive generations of academic citizens, to the digitization of the cultural heritage entrusted to its care, the Library has built a community of people and books.

As one of the largest academic libraries in the Balkans and the parent institution for more than 230 faculty and institute libraries, the Library has become one of the central pillars of the library and information system of Serbia. With a collection of over 1.5 million bibliographic items and invaluable legacy collections, it is also the custodian of a significant intellectual heritage.

As such, the Library integrates collections, users, librarians, researchers, research scientists, and other libraries, weaving among them dense networks of interrelationships and becoming, simultaneously, their set, union, and intersection — a concept this monograph addresses at length.

3 Fans and Mirrors

The monograph *A Century of the University Library in Belgrade: A Look into the New Millennium* bears witness to the broad spectrum of activities that have defined one hundred years of the University Library's work. Starting from the core functions of library and information services — acquisition, cataloging, preservation, and lending of library materials and resources —

the scope broadens to encompass developmental activities in the domains of digitization, the implementation of advanced information technologies, and participation in international cooperation through membership in renowned professional organizations, and major international projects.

Conservation and restoration, evaluation of scientific work – citation analysis, education of users and librarians, as well as support for doctoral researchers, reference services, the development of portals for digitized content, the transcription of manuscript materials, the activities of the Library’s art center, the publishing activity, initiatives to increase the visibility of doctoral dissertations, and the retrospective digitization of dissertations — these and many other areas are presented and described in dedicated chapters of the monograph, each of which functions as a small mirror reflecting, from its own particular angle, the face of the University Library.

The Library’s human resources — its librarians — also represent a first-rate institutional asset. In the concluding section of the monograph, the name of every individual who devoted their professional vocation to laying the foundations of this institution is recorded. Alongside these names, the publication honors those who were entrusted with the care of the Library throughout its history: Uroš Džonić, Milica Prodanović, Ivo Frol, Miroslav Pantić, Stanija Gligorijević, Ivan Gađanski, Miroslav Ralić, Nikola Marković, Dejan Ajdačić, Bogoljub Mazić, Stela Filipi-Matutinović, and Aleksandar Jerkov. We must not forget the one whose name the Library bears: Svetozar Marković, who, during his short life, left a lasting mark through his advocacy for reform in Serbian literature and, above all, for social justice.

It is never possible to enumerate all the names deserving of recognition; yet from the year in which — through the generosity of the Carnegie Foundation — academic knowledge found a home of its own, an unbroken line of benefactors began. These donors saw in the development of this institution not only a common good, but also a pledge of their own lasting legacy. By bequeathing legacy collections, gift collections, and precious archival materials, the great figures of Serbian culture entrusted to the Library the heritage they had created or preserved themselves. Among these bequests is the legacy of towering figures of language and history: Vuk Karadžić, Stojan Novaković, and the brothers Ruvarac; of literary creators: Isidora Sekulić, Vojislav Ilić Marambo, Anica Savić Rebac, Zmaj, and Laza Kostić; as well as of intellectuals and educators such as Dositej Obradović and Sava Tekelija — and these are just some of the names whose “small libraries of great people” and manuscript legacies have merged into the precious treasury of the University Library.

Many editions and documents from these collections have been given a new digital form, thereby enabling yet another renewed, virtual life. A portion of these materials has also been featured in curated presentations that have traveled the world, appearing under the spotlights of major international conferences where they represented Serbia, its history, culture, and science.

4 Searching and Research Activities

The development of a shared cataloging and bibliographic database constitutes the central pillar of library activity and therefore merits particular attention. For the purpose of data standardization and efficient resource sharing, the University Library has been committed to this activity since the late 1980s, when the first efforts toward a joint database for the libraries of the former Yugoslav republics were initiated. From this foundation, through the combined efforts of the three keystones of the Serbian library system — the National Library of Serbia, the Matica Srpska Library, and the University Library “Svetozar Marković” — the Virtual Library of Serbia emerged, which today serves as the primary working tool for librarians and a fundamental prerequisite for professional development.

The search system grounded in shared cataloging is the principal source of metadata within the library network of Serbia. It provides the foundational infrastructure for projects requiring accurate and verified information about library materials. Thus, this database served as an indispensable prerequisite for the creation of the eNauka portal — one of the most significant resources for the Serbian academic community today, the sustainability of which is owed in no small part to the diligent efforts of librarians.

The sustained investment in the development of search capabilities, from bibliographic databases to full-text databases and researcher databases, has substantially strengthened the research potential of Serbian science as a whole. In this way, the University Library has actively fulfilled the primary purpose of its existence: the development of resources to enhance access to the materials and sources essential to scientific progress. By serving researchers, the University Library has simultaneously cultivated its own research capacities, both within the field of library and information science and in related disciplines. This is evidenced by the fact that, within a relatively short period, the Library’s organizational structure has accommodated dedicated units concerned with the development of scholarly potential and the education of emerging academic researchers.

Considered as a whole, the monograph *A Century of the University Library in Belgrade* permits the conclusion that the Library's history represents a continuous effort toward the gathering of knowledge — i.e. its localization. At the same time, the Library physically consolidates information about that knowledge through the catalog format, stores and preserves its material carriers, and thereby achieves manifold and varied control over its documents collection — which is the primary task of any library. As a further development of this function, the Library employs contemporary information tools to create interconnections among physically separate documents, constructing new relationships between them through advanced contextual search systems. It is precisely at this point that tradition and modernity meet, where care for the preservation of historical heritage encounters an awareness of the Library's own role in shaping contemporary access to knowledge and learning.

Finally, let us return to memory and remember that the knowledge preserved within the University Library "Svetozar Marković" belongs to the corpus of world knowledge, which bears upon its face the stone countenance of eternity — for knowledge is as old as time itself. Thus, the book commemorating one hundred years of the Library's existence will remain part of this corpus as a testimony that will serve as a reference source for researchers, students, and the cultural public alike, enhancing the international visibility of Serbian science and culture while securing a representative account of the Serbian academic tradition.

May these few solemn and cordial words serve as a birthday gift to the Library, in honor of knowledge and in celebration of memory.

Author Guidelines

1 Author Guidelines

All Infotheca articles are published both in English and Serbian (in Cyrillic script) in the same issue. Authors should submit their articles in one of the languages; only after the notification of acceptance the translated article is expected (for Serbian authors; for all other authors translation from English to Serbian is provided by the journal). Except the printed edition, all articles are also published in the online edition in open access.

2 Paper Categorization

For documents accepted for publishing which are subject to review, the following categorization in the Journal applies:

1. Scientific papers:
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 - (b) Review paper (containing original, detailed and critical review of a research problem or a field in which authors' contribution can be demonstrated by self citation);
 - (c) Preliminary communication (original scientific work in progress, shorter than a regular scientific paper);
 - (d) Disquisition and reviews on a certain topic based on scientific argumentation.
2. Scientific articles presenting experiences useful for advancement of professional practice.
3. Informative articles can be:
 - (a) Introductory notes and commentaries;
 - (b) Book reviews, reviews of computer programs, data bases, standards etc.
 - (c) Scientific event, jubilees.

Papers classified as scientific must receive at least two positive reviews. The opinions of the Editorial Committee do not have to correspond to those expressed in the published papers. Papers cannot be reprinted nor published under a similar title or in a changed form.

3 Elements of Manuscripts

1. For authors who prepare their texts using Microsoft Word, papers should not normally exceed 15 A4 pages. For longer articles the authors should contact the journal editors.
2. Names and surnames of all authors should be written in the sequence in which they will appear in a published paper.
3. After each author's full name, without titles and degrees, an e-mail address should be specified, ORCID, as well as the full and official name of his or her affiliation. (For large organizations full hierarchy of names should be specified, top down).
4. The submission date should be provided.
5. The authors should suggest the category of their paper but the Editor-in-Chief is responsible for the final categorization.
6. An informative abstract not normally exceeding 250 words that concisely outlines the substance of the paper, presents the goal of the work and applied methods and states its principal conclusion, should accompany the paper. The abstract should be supplied in both languages used for publication. In the abstract, authors should use the terms that, being standard, are often used for indexing and information retrieval.
7. Authors should supply at least 3 but not more than 10 keywords separated by commas that designate main concepts presented in the paper. The list of keywords should be supplied in both languages used for publication.
8. If paper derives from a Master's thesis or Doctoral dissertation authors should give the title of the thesis or dissertation, as well as a date of its submission and names of responsible institutions.
9. If the paper presents the results of authors' participation in some project or program, authors should acknowledge the institution that financed the project in a special section "Acknowledgment" at the end of the article, before the "Reference" section. The same section should contain acknowledgment to individuals who helped in the production of the paper.
10. If the paper was presented at a Conference but not published in its Proceedings, this should also be stated in a separate note.
11. Authors can use footnotes, while endnotes are prohibited; however, too long footnotes should be avoided. Authors can add appendices to their paper.
12. The referenced material should be listed in the section "References" at the end of the paper. In the reference list authors should include all in-

formation necessary for locating the referenced work. All items referenced in the text should be listed here; nothing that was not referenced in the text should appear in this section.

4 Editing Conventions for Accepted Papers

1. Papers should be prepared and submitted using LaTeX. There are journal style and packages separately for English (the journal style and all packages for papers can be accessed here, the journal style and all packages for reviews can be accessed here) and Serbian texts (the journal style and all packages for papers can be accessed here, the journal style and all packages for reviews can be accessed here). Authors that are not familiar with LaTeX can prepare their papers using Word, as .doc, .docx, .rtf or .txt documents. These authors should not use any special formatting - the final formatting and transformation to LaTeX will be done by the Infotheca team.
2. The papers written in Serbian should use CYRILLIC alphabet because they will be printed in that script. The only exceptions are those parts of the text for which the use of the other script, such as Latin, is more appropriate. All scripts should be represented using Unicode encoding, UTF-8 representation.
3. Title of the paper should not be written in capital letters. The authors should keep the length of titles reasonable – preferably less than 150 characters. For titles longer than 90 characters authors should provide a shorter title that will be used for page headers.
4. Italic type may be used to emphasize words in running text, while bold type or italic bold type can be used if necessary. Underlined text should be avoided. Please do not highlight whole sentences or paragraphs.
5. Paper can be divided in sections and subsections, but more than two levels of the section headings should be avoided. All sections and subsections will appropriately numbered. Appendices, if any, should come at the end of the paper and they will also be appropriately labeled. If using lists, do not use more than two levels of nesting.
6. All paragraphs should be separated by one empty line (one Enter).
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8. The authors are kindly requested to add (if possible) the link to the screen from which a screenshot was taken. When taking a screen shot of a part The authors are kindly requested to add (if possible) the link to the screen from which a screenshot was taken. When taking a screen shot of a part of some screen, authors are advised to use the Zoom possibility of the browser or other program. For diagrams that are produced with Excel, please provide the original .xls document.
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1. For preparation of a reference list use **Chicago Manual of Style** reference list entry. Chicago Manual of Style has two ways of reference citation in text: Notes and Bibliography style and Author-date system (In-text citation). Infotheca Editorial Board decided to **Author-data system (In-text citation)**.
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3. Entries in the reference list should be ordered alphabetically by authors or editors names, or publishing organizations (when no authors are identified). If this list contains several entries by the same authors, these entries should be ordered chronologically.
4. Full names of journals, and not their short titles or acronyms, should be specified.

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