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DOI 10.2478/jazcas-2025-0016

CHALLENGES IN DEVELOPING A GLAGOLITIC REVERSE DICTIONARY OF CROATIAN CHURCH SLAVONIC

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MIHALJEVIĆ, Josip: Challenges in Developing a Glagolitic Reverse Dictionary of Croatian Church Slavonic. Journal of Linguistics, 2025, Vol. 76, No 1, pp. 177 – 191.

Abstract: The Glagolitic script is the oldest Slavic script and one of the two Slavic scripts (the other is Cyrillic). It was actively used in Croatia until the 19th century. Today, the Glagolitic script is a symbol of Croatian national identity. It has significant cultural, artistic, and esthetic value. The goals of the Old Church Slavonic Institute are researching, discovering, recognizing, systematically listing, and editing Glagolitic manuscripts, inscriptions, and printed books. One of the Institute's main tasks is to create a digital version of the *Dictionary of the Croatian Redaction of Church Slavonic*. This is a long-term project, and the dictionary has so far only been published in printed form (A to I). In addition to the creation of the digital dictionary, additional web content is being developed (e.g. games), which will provide an additional source and tool for dictionary compilers and users. One of these additional contents is the reverse dictionary, which consists of the headwords written in Glagolitic from the Dictionary. A reverse dictionary is a dictionary in which the words are sorted alphabetically by their final rather than initial letters, i.e. the words are sorted based on their endings. This allows users to look up words by focusing on their final segments. Reverse dictionaries are useful for scientific research, especially for the study of word-formation (e.g. the study of masculine-feminine pairs), but they can also be used for other purposes, such as finding rhymes and compiling educational games. A reverse dictionary for Croatian Church Slavonic is thus a useful tool for further research. The problem is not only that the word search is not done in a classic matter (where the string is searched from the beginning of the word) but also that the Glagolitic script has some specific letters which have to be mapped to certain characters in the Latin script and that the reverse dictionary has headwords in two scripts (Latin and Glagolitic). Currently, no available software solution can accommodate for these problems, so the reverse dictionary is being developed from scratch using a custom code. This paper presents the challenges and solutions in the development of the Croatian Church Slavonic Reverse Dictionary.

Keywords: Croatian Church Slavonic Language, Glagolitic script, problem-solving, reverse dictionary

1 INTRODUCTION

The Glagolitic script is the oldest Slavic script and predates the Cyrillic script. It was created in the 9th century by St. Cyril (originally named Constantine) from Thessaloniki, Greece, following the initiative of Rastislav of Moravia to promote

Christianity among the people of Great Moravia in Central Europe. Cyril devised a new alphabetic-phonological script, the Glagolitic script. He also developed the literary language called Old Church Slavonic in 863. Cyril's closest collaborator was his older brother, Methodius. Through their efforts, the foundations of Slavic written culture and civilization were established (Bratulić et al. 2009, pp. 36–46). The Glagolitic script and Old Church Slavonic language were subsequently spread by the disciples of Cyril and Methodius. However, following the banishment of their disciples in the late 9th century, the use of Glagolitic gradually declined, as it was increasingly replaced by the Latin and Cyrillic scripts (Mihaljević et al. 2024, p. 17). The Glagolitic script has historically been used in several parts of Europe, including the territories of present-day Slovakia, the Czech Republic, Bulgaria, North Macedonia, Slovenia, and Croatia (Japundžić 1998). However, it persisted the longest in Croatia, where it remained in use for religious and legal documents until the 19th and early 20th centuries (Mihaljević et al. 2024, pp. 17–18). The Glagolitic script is significant for Croatian history as the first script used to record the Croatian language. Its development, adaptation, and preservation by the Croats underscore its importance in the cultural and religious life of the region.

The Old Church Slavonic Institute is the leading institution in Croatia dedicated to the study, preservation, and promotion of the Glagolitic script, the Croatian Church Slavonic language, and other aspects of the Glagolitic heritage. The Institute's recent focus has been on the creation of digital content on its website (stin.hr). Currently, the website has two virtual exhibitions,[1, 2] a program for creating images based on the custom Glagolitic font FSGLA[3] created by the Institute, a database for Glagolitic chants,[4] games for learning the Glagolitic scripts, Croatian Church Slavonic words, and other Glagolitic content.[5] There are also plans to develop an interactive timeline that records the historical facts connected with the usage of the Glagolitic script, an e-grammar, an interactive map for Glagolitic monuments, new virtual exhibitions, and games. This content is developed within the project *Development of the Digital Infrastructure Model of the Old Church Slavonic Institute* (DigiSTIN).[6] *The Dictionary of the Croatian Redaction of Church Slavonic* is a long-term lexicographic project dedicated to documenting the vocabulary of the oldest Croatian literary language. It is based on a corpus of Glagolitic texts spanning from the 11th to the 17th century and includes detailed entries with equivalents in Latin, Greek, Croatian, and English. The content of each dictionary entry clearly and concisely presents orthographic, syntactic, morphological, semantic, stylistic, distributional, usage-related, illustrative, and inter-

[1] https://stin.hr/novakov-misal/ [14/02/2025]
[2] https://stin.hr/zgombicev-zbornik/ [14/02/2025]
[3] https://stin.hr/stvori-sliku-s-tekstom-na-glagoljici/ [14/02/2025]
[4] https://stin.hr/repozitorij-glagoljaskoga-pjevanja/ [14/02/2025]
[5] https://stin.hr/obrazovne-igre/ [14/02/2025]
[6] https://stin.hr/en/content/digistin-en/ [14/02/2025]

lingual information about the word (Badurina-Stipčević et al. 2012, pp. I–II). In addition to the printed volumes, the project now includes the development of a digital edition, as well as interactive content such as educational games and a reverse dictionary to support linguistic research and public engagement.

2 WHAT IS A REVERSE DICTIONARY?

Depending on classification criteria, dictionaries are classified in various ways (Tab. 1). Based on the scope of the lexicon they cover, dictionaries are categorized as general or specialized. General dictionaries contain words that are in common language and frequently used terms. Specialized dictionaries, on the other hand, contain words that are limited to a specific field (e.g. terminological dictionaries that include only terms from a particular profession), a specific functional style (e.g. jargon dictionaries), words of a particular origin (e.g. dictionary of foreign words), or words having a particular relationship (e.g. dictionaries of synonyms, antonyms, or homonyms). Based on the number of languages they include, dictionaries can be monolingual, bilingual, or multilingual. The content in a dictionary is organized into dictionary or lexicographic entries (Mihaljević and Hudeček 2024, p. 448). According to their relationship to the corpus, dictionaries are divided into corpus-illustrated dictionaries (a classical dictionary but illustrated by examples from the corpus), corpus-based dictionaries (where the editor uses the corpus as a reference but has the freedom to decide what to include and can modify the dictionary as needed), and corpus-driven dictionaries (where the dictionary records everything present in the corpus and does not include anything that is not found within it) (Štrkalj Despot and Möhrs 2015, p. 342). Based on the period they cover, dictionaries are divided into historical and contemporary dictionaries. According to the arrangement of the entries, dictionaries can be alphabetical, systematic, or frequency-based. According to the criteria of order, alphabetical dictionaries can be alphabetical (alphabetized from the beginning) and reverse alphabetical (Hudeček, Mihaljević and Jozić 2024, p. 593).

Classification criteria	**Type**			
Scope	general		special	
Number of Languages	monolingual	bilingual		multilingual
Relation to Corpus	classical (not based on a corpus)	corpus-illustrated	corpus-based	corpus-driven

Time Period Covered	contemporary		historical
Arrangement of Dictionary Entries	systematic	alphabetical (alphabetized from the beginning or from the end)	frequency-based

Tab. 1. Criteria for Dictionary Classification (Hudeček, Mihaljević and Jozić 2024, p. 593)

A reverse dictionary or inverted dictionary is a specialized linguistic resource where words are organized in reverse alphabetical order, based on their endings rather than their beginnings (Lewis and Mihaljević 2018, p. 21). For example, in a reverse dictionary, instead of searching for words that start with a given string, we can type *-tic* to find words that end with it, such as *linguistic*, *phonetic*, *didactic*, *mystic*, *arctic*, *hectic*, etc. The term *reverse dictionary* is also used for another type of dictionary, such as the reversedictionary.org[7] and OneLook Dictionary,[8] where a definition, phrase, or example is entered into the search bar, and the search results display a list of words that best match the meaning of the given expression. However, this paper will focus solely on the first type of reverse dictionaries, which orders words by their endings.

This arrangement allows for the analysis of word formation processes, such as derivation and inflection, by facilitating the identification of words sharing common suffixes. Additionally, reverse dictionaries are valuable tools for poets seeking rhyming words and for linguists conducting phonological studies (Hudeček, Mihaljević and Jozić 2024, p. 601). Reverse dictionaries have been used in the study of morphological relationships between words, the analysis of gender noun pairs, and the examination of suffixal derivatives (Mihaljević and Hudeček 2024, p. 448).

The *Dictionary of the Croatian Redaction of Church Slavonic* is an alphabetical, general, historical, corpus-driven multilingual dictionary. The reverse dictionary based on it is a reverse alphabetical, specialized, historical, corpus-driven, monolingual dictionary in two alphabets. It is designed to assist dictionary editors and linguists in finding specific words, analyzing word-formation patterns, and tracing linguistic evolution within the Croatian redaction of Church Slavonic. Currently, it includes only the base forms (lemmas) of the headwords from the source dictionary. Inflected forms are not included at this stage, although such an extension is being considered for the future to improve morphological coverage and search functionality.

[7] https://reversedictionary.org/ [17/02/2025]
[8] https://www.onelook.com/ [17/02/2025]

3 PREVIOUS WORK

Reverse dictionaries were difficult to compile until the invention of computers, which facilitated their creation, and they are now commonly produced (UKEssays 2018). The first computer-produced reverse dictionary by Stahl and Scavnicky, *Reverse Dictionary of the Spanish Language*, was published in 1973. Reverse dictionaries exist in many languages, such as English, French, German, Russian, Slovenian, Serbian, Italian, and Ukrainian (Grčević 2017, p. 2). However, most of these reverse dictionaries are not available online in the form of a web page where their contents can be directly searched. Reverse dictionaries in electronic form are mostly published as computer files (usually scanned books in PDF format) that need to be opened using pre-installed software (Mihaljević 2022, p. 52). This is also the case with the Croatian language. The first Croatian reverse dictionary is *Rückläufiges Wörterbuch des Serbokroatischen* by Josip Matešić (1965–1967), which is available online on the University of Innsbruck's website as an .mdb (Microsoft Database) file that can be accessed through Microsoft Access. There is also an option to perform a reverse search for words in the Croatian Collocation Database.[9]

Several other reverse dictionaries are available online, e.g. *MyStilus reverse dictionary* for English and Spanish,[10] *Cronopista diccionario de rimas*[11] for Italian, and *Reimlexikon*[12] for German. The *OneLook Thesaurus Search tool*[13] enables users to find English words ending with specific letters by using the asterisk (*) wildcard. For example, searching for ***tion* will display words that end in *-tion* (Fig. 1). There are also tools and online resources for finding words that end in a certain sequence, e.g. *Rhymer*,[14] *RhymeZone*[15] can be used to find rhymes for words in English, and the *Word Finder tool* from *YourDictionary*[16] can be used to find words starting and ending with certain letters for a game called Scrabble. Users who are familiar with the programming language Python can also use *Natural Language Toolkit (NLTK)* library[17] for creating their personal reverse dictionaries.

[9] http://ihjj.hr/kolokacije/english/ [26/02/2025]
[10] https://www.mystilus.com/ [17/02/2025]
[11] https://www.cronopista.com/dict-fe/ [26/02/2025]
[12] https://www.reimlexikon.net/ [26/02/2025]
[13] https://www.onelook.com/thesaurus/ [17/02/2025]
[14] https://www.rhymer.com/that.html [26/02/2025]
[15] https://www.rhymezone.com/ [26/02/2025]
[16] https://wordfinder.yourdictionary.com/ [26/02/2025]
[17] https://www.nltk.org/ [26/02/2025]

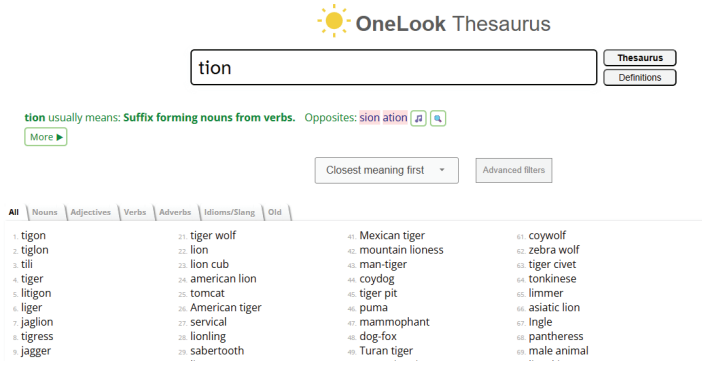

Fig. 1. Using *OneLook Thesaurus* as a reverse dictionary to find words ending with *-tion*

Within the *Croatian Web Dictionary – Mrežnik* project,[18] a demo version of a reverse dictionary for the Croatian language has been developed and published.[19] This dictionary includes words currently present in *Mrežnik*. At this stage, the reverse dictionary features a functional search bar that retrieves words ending with a specified string. The search results are displayed in a structured list, with the matching suffixes visually highlighted for clarity. Additionally, each word in the results is hyperlinked to its corresponding dictionary entry, enabling seamless access to further lexical information (Fig. 2).

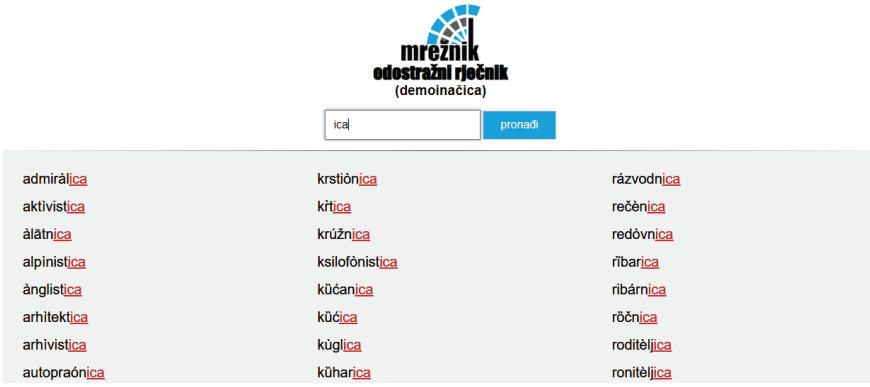

Fig. 2. Demo version of the reverse dictionary for *Mrežnik*, e.g. searching for words that end with *-ica*

[18] The project *Croatian Web Dictionary – Mrežnik* aims at creating a free, monolingual, easily searchable hypertext online dictionary of Standard Croatian. It will be the first web-born dictionary of the Croatian language. More about the dictionary in *Anatomija rječnika Hrvatski mrežni rječnik – Mrežnik* (Hudeček, Mihaljević and Jozić 2024).

[19] https://rjecnik.hr/mreznik/wp-content/odostrazni/ [17/02/2025]

A specialized reverse dictionary has been compiled within the project *Croatian Linguistic Terminology – Jena*. A reverse dictionary has been created based on the alphabetical index of the *Jena* database, allowing users to search for terms based on their endings, including multi-word terms (Fig. 3).[20] This dictionary is used as a tool for making certain normative decisions (e.g. determining whether an adjective derived from a noun ending in *-ica* should take the suffix *-ni* or *-ski*) (Mihaljević et al. 2023, p. 122).

Fig. 3. Demo version of the reverse dictionary for *Jena*, e.g. searching for multi-word terms that end with *-ični*

Another specialized reverse dictionary was made for the project *Male and Female in the Croatian Language*.[21] This reverse dictionary is used to gather information that can be useful in standardizing male-female word pairs in the Croatian language.

However, there are no reverse dictionary options available for the Croatian Church Slavic language, making such resources rare and valuable for linguistic research. This is why the reverse dictionary for the Croatian Church Slavic language is useful and innovative.

4 THE PROCESS OF CREATING THE REVERSE DICTIONARY

The creation of a reverse dictionary involves compiling a comprehensive list of words from a language and systematically reversing their letter sequences. These

[20] https://jena.jezik.hr/wp-content/odostrazni-jena/ [17/02/2025]
[21] https://muskozensko.jezik.hr/odostrazni/ [17/02/2025]

reversed words are then sorted alphabetically, enabling users to search for terms based on their suffixes or endings. This method is particularly useful in languages with rich morphological structure and word formation, as it aids in the systematic study of word formation and the identification of patterns within the language system. In the case of the previously mentioned online Croatian reverse dictionaries, they were not developed using standard dictionary systems (e.g. TshwaneLex) or content management systems (e.g. WordPress), as existing frameworks did not provide functionalities for searching and systematizing words in reverse order. Thus, the only solution was to create a custom code that would enable such functionalities. The development process primarily relied on jQuery, .txt files, and HTML5. The reverse dictionary website was designed as a Single-page application,[22] meaning that all necessary components and functionalities were loaded dynamically within a single web page. The design was entirely custom using handwritten HTML and CSS code for structural and stylistic elements. The wordlist for searchable words was placed inside a simple .txt file, where each word occupied a separate line. When a user enters a search query, such as *-ample*, the jQuery script first determines the length of the input string (e.g. *-ample* has the length of five characters). The script then accesses the .txt file and processes its contents line by line. During this process, the algorithm applies a series of filtering steps:

1. **Preliminary filtering** – words shorter than the input string are excluded from further analysis. For instance, in the case of *-ample*, any words containing fewer than five characters are ignored.
2. **Reverse matching** – the script extracts the final segment of each remaining word, corresponding to the length of the input string (e.g. the last five characters in this case). To achieve this, the length of the entire word is first determined, and the length of the input string is subtracted from it. This calculation provides the starting index from which the script begins analyzing the word in reverse order. The substring extracted from this index onward is then compared to the user's query. If a match is found, the word is retained for the final output. In the case of searching through multi-word terms, such as those found in the *Jena* dictionary (Fig. 3), each line of text is first split into individual words using empty spaces as delimiters. Each word is then processed separately, applying the reverse matching steps described above.
3. **Normalization** – to enhance search flexibility and increase the number of results, the system incorporates diacritic and case insensitivity. This ensures that variations of the same letter, such as *À*, *Á*, *Â*, *Ã*, *Ä*, *Å*, *à*, *á*, *â*, *â*, *ã*, *ä*, *å*, *ā*, and *ä*, are

[22] A single-page application (SPA) is a web application or website that loads a single HTML page and dynamically updates content as the user interacts with the app, without refreshing the entire page. This approach provides a more fluid user experience, like that of a desktop application (Mozilla Developer Network 2024).

all treated as *a* during the search process when users search for terms ending with *-a*. However, if the user explicitly includes a diacritic in the search query, e.g. *-á*, it will not automatically convert to its simpler form *-a*. This approach provides a balance between broader search inclusivity and precision, allowing users to obtain more comprehensive results while still enabling specific queries when necessary.

The final search results are presented in a structured list format, displaying all matching words. Entries are sorted alphabetically but based on their initial letters rather than their endings. After a new search query, the previous results are cleared, and the search process is restarted from the initial steps, ensuring that each query is processed independently.

5 CHALLENGES IN CREATING A REVERSE DICTIONARY FOR ENTRIES IN THE GLAGOLITIC SCRIPT

The development of a reverse dictionary for the *Dictionary of the Croatian Redaction of Church Slavonic* posed much greater challenges compared to the previously mentioned reverse dictionaries. While the general dictionary is currently available in PDF format, its web version is still in development. The key complexity lies in the fact that dictionary entries are written in multiple scripts, including Glagolitic, Latin, Cyrillic, and Greek. Headwords are written in Glagolitic and Cyrillic. Cyrillic script is also used for inflectional endings. Greek script is used for Greek equivalents and, in some cases, for original source texts from which translations were made. The remainder of the entry content is written in the Latin script. Although a structured data format for dictionary entries has recently been implemented,[23] the initial phase of online dictionary development adopted a simpler approach, where headwords were linked directly to their corresponding PDF pages. For example, clicking on the entry ⱂⰰⰱⰰ (lat. baba) would redirect users to page 107 of the dictionary PDF version, where the corresponding entry is located (Fig. 4).

During the development of the reverse dictionary, it was decided that headwords would be searchable in both Latin and Glagolitic scripts. In both the printed and digital versions of the *Dictionary of the Croatian Redaction of Church Slavonic*, headwords are written in the Glagolitic script, so the same principle was retained in the reverse dictionary, with the only addition being that the Latin counterpart is displayed alongside the Glagolitic form. One of the challenges in searching the Glagolitic script is that, although it is available in the Unicode format,[24] the existing Unicode Glagolitic symbols are not specific to the Croatian Glagolitic script, which primarily uses the Angular Glagolitic variant. Additionally, another issue with these

[23] More about dictionary content structure in Mihaljević and Mihaljević (2024).
[24] https://en.wikipedia.org/wiki/Glagolitic_(Unicode_block) [20/02/2025]

Unicode symbols is that they are not mapped to standard keyboard layouts, making input and text processing more complex. This further complicates the process of text input, search functionality, and digital representation of Croatian Angular Glagolitic within modern computing systems.

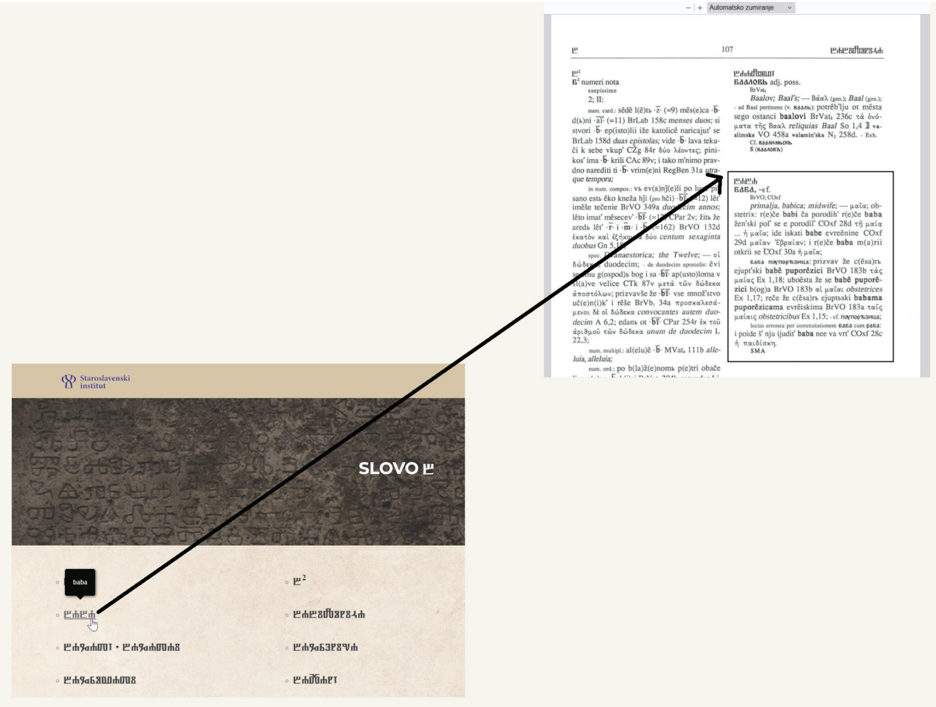

Fig. 4. Linking dictionary headwords to their corresponding PDF pages

5.1 Solutions for the challenges

One solution that effectively addresses most of the major challenges is the use of a custom font for the Glagolitic script, specifically designed to be mapped to a standard keyboard layout. This approach allows for more accessible text input and processing while ensuring accurate representation of Croatian Angular Glagolitic characters. The Old Church Slavonic Institute has developed its own Angular Glagolitic font, known as FSGLA[25], created by Frane Paro. The font was first developed in the early 2000s. However, an initial issue arose as certain letters were incorrectly mapped—for instance, the letter Ⱍ was not mapped to *č* on a Croatian keyboard but instead to */*. This misalignment was likely due to technical constraints

[25] https://stin.hr/wp-content/uploads/2025/01/fsgla.ttf [20/02/2025]

related to specific keyboard layouts of the time. To address this issue, FontForge,[26] an open-source font editing software, was utilized to correctly map characters such as *č*, *ć*, *š*, *ž*, *đ*, and other diacritic signs used in the Croatian language. However, even after enabling users to input symbols into the search bar, a challenge remained with specific letters such as ѣ (ь), ѹ (û), and ѣ̂ (ê), as these characters are not included in standard Croatian keyboard layouts. To resolve this issue, a set of on-screen buttons was implemented below the search bar, allowing users to manually insert these symbols into the search query as needed (Fig. 5). In the search bar, the input text is displayed in Latin script. However, directly below it, a real-time transliteration into the Glagolitic script is also shown, allowing users to visually confirm how their input is being converted and ensuring accuracy in the search process.

Fig. 5. Search bar for the reverse dictionary of the *Dictionary of the Croatian Redaction of Church Slavonic*

Another challenge was that certain dictionary entries contained an apostrophe (’), so an exception was implemented to ignore this symbol during the search process. Additionally, the Latin letters *ć* and *ĉ* are written as ѡ in the Glagolitic script. However, to enhance clarity and consistency within the search process, a deliberate decision was made to convert *ć* into *ĉ* during the searches and add an on-screen button for *ĉ*. Since searchable words were displayed in both Latin and Glagolitic scripts, this meant presenting duplicate search results (Fig. 6). However, this did not pose any issues for the search algorithm, as the display of each search result was simply duplicated and the FSGLA font applied to one of them to render it in the Glagolitic script. Since the characters were correctly mapped within the font, this approach ensured accurate representation without causing any display or processing issues.

[26] https://fontforge.org/en-US/ [20/02/2025]

Fig. 6. Search results for *elь* in the *Reverse Dictionary of the Croatian Redaction of Church Slavonic*

6 FUTURE PLANS

The reverse dictionary based on the *Dictionary of the Croatian Redaction of Church Slavonic* is currently in its demo version, and not all words have been included yet. The current demo version of the dictionary contains 18,078 entries, but the final version is expected to include more entries once the word list for the dictionary is fully complete. As more words are added, it is likely that additional input buttons for special characters (e.g. *ĵ* to be used as ⰔⰒ) will need to be introduced to accommodate for the full range of symbols used in the Glagolitic and Latin scripts. The dictionary is currently publicly available on a GitHub repository[27] and will be available later on the *Dictionary of the Croatian Redaction of Church Slavonic* website[28] through the main navigation menu. The plan also includes linking the words from the reverse dictionary with the processed entries in the web version of the *Dictionary of the Croatian Redaction of Church Slavonic*. Another plan is to use the reverse dictionary to facilitate the acquisition of various morphological content. There are plans to create educational games, which will be available on the Institute website,[29] aimed at learning the lexicon of the Croatian Church Slavonic language. In this process, a reverse dictionary proves to be a valuable resource, as it simplifies the search for and selection of words that belong to the same derivational and declensional/conjugational type.

[27] https://borna12.github.io/odostrazni-gla/ [24/02/2025]
[28] https://stin.hr/crkvenoslavenski-rjecnik [24/02/2025]
[29] https://stin.hr/obrazovne-igre/ [24/02/2025]

7 CONCLUSION

Reverse dictionaries serve as important tools in the field of linguistics, providing unique insights into the structure and formation of words within a language. Their applications extend beyond academic research, offering practical benefits in areas such as poetry, language education, game development, and computational linguistics. The reverse dictionary based on the *Dictionary of the Croatian Redaction of Church Slavonic* may be the first web-based reverse dictionary specifically designed for an ancient script. Having a reverse dictionary written in historical scripts such as Glagolitic is essential for linguistic research, paleography, and lexicography. It enables scholars and researchers to analyze word formation patterns, morphological structures, and suffix-based derivation, which are particularly significant in languages with rich inflectional systems like Church Slavonic. Additionally, it facilitates the deciphering of historical texts, aids in comparative linguistic studies, and supports digital humanities projects by making historical lexicons more accessible and searchable in modern digital environments.

ACKNOWLEDGEMENTS

This work was created within the project Development of a Digital Infrastructure Model of the Old Church Slavonic Institute – DigiSTIN, funded by the European Union – NextGenerationEU. The views and opinions expressed are solely those of the author and do not necessarily reflect the official positions of the European Union or the European Commission. Neither the European Union nor the European Commission can be held responsible for them.

References

Badurina-Stipčević, V., Dürrigl, M.-A., Klenovar, M., Kovačević, A., Mihaljević, M., Miličić, I., Mulc, I., Šimić, M., Turkalj, L., and Vela, J. (2015). Rječnik crkvenoslavenskoga jezika hrvatske redakcije. Svezak II: vrêdьnь – zapovêdnica. Zagreb: Staroslavenski institut.

Bratulić, J., Damjanović, S., Frančić, A., Kuzmić, B., Lisac, J., Matasović, R., Mihaljević, M., and Žagar, M. (2009). Povijest hrvatskoga jezika 1. knjiga: Srednji vijek. Zagreb: Croatica.

Cronopista. (2009). Dict-FE. Accessible at: https://www.cronopista.com/dict-fe/ [accessed 26/02/2025].

FontForge. (2012). FontForge – An Outline Font Editor. Accessible at: https://fontforge.org/en-US/ [accessed 21/02/2025].

GitHub. (2025). Odostražni rječnik RCJHR. Accessible at: https://borna12.github.io/odostrazni-gla/ [accessed 24/02/2025].

Grčević, M. (2017). Hrvatski odostražni rječnik. Hrvatski studiji. Zagreb.

Hudeček, L., Mihaljević, M., and Jozić, Ž. (eds.). (2024) Anatomija rječnika – Hrvatski mrežni rječnik Mrežnik. Zagreb: Institute of Croatian Language.

IHJJ. (2016). Kolokacije – English. Accessible at: http://ihjj.hr/kolokacije/english/ [accessed 26/02/2025].

Japundžić, M. (1998). Hrvatska glagoljica. Zagreb: AGM. Accessible at: https://www.croatianhistory.net/etf/japun.html#*.

JENA. (2022). Odostrazni JENA. Accessible at: https://jena.jezik.hr/wp-content/odostrazni-jena/ [accessed 17/02/2025].

Lewis, K., and Mihaljević, J. (2018). Odostražni rječnik – što je, kako ga izraditi i čemu služi. Hrvatski jezik, 5(2), pp. 21–24.

Matešić, J. (1965–1967). Rückläufiges Wörterbuch des Serbokroatischen, Vols. 1–4. Wiesbaden: Otto Harrassowitz.

Mihaljević, A., and Mihaljević, J. (2024). Mrežna inačica Rječnika crkvenoslavenskoga jezika hrvatske redakcije. Slovo: časopis Staroslavenskoga instituta u Zagrebu, 74, pp. 169–194.

Mihaljević, J. (2022). Igrifikacija hrvatskoga mrežnog rječnika. Zagreb: Institut za hrvatski jezik i jezikoslovlje.

Mihaljević, M., and Hudeček, L. (eds.). (2024). Rječnik jezikoslovnoga nazivlja, Zagreb: Institut za hrvatski jezik.

Mihaljević, M., Hudeček, L., and Jozić, Ž. (eds.). (2023). Hrvatsko jezikoslovno nazivlje. Zagreb: Institut za hrvatski jezik i jezikoslovlje.

Mozilla Developer Network. (2024). Single-page application (SPA). Mozilla. Accessible at: https://developer.mozilla.org/en-US/docs/Glossary/SPA [accessed 19/02/2025].

Mrežnik. (2022). Odostrazni rječnik. Accessible at: https://rjecnik.hr/mreznik/wp-content/odostrazni/ [accessed 17/02/2025].

Muško i žensko u hrvatskome jeziku. (2022). Odostrazni rječnik. Accessible at: https://muskozensko.jezik.hr/odostrazni/ [accessed 17/02/2025].

MyStilus. (2019). MyStilus. Accessible at: https://www.mystilus.com/ [accessed 17/02/2025].

NLTK. (2008). Natural Language Toolkit (NLTK). Accessible at: https://www.nltk.org/ [accessed 26/02/2025].

OneLook. (2010). OneLook Dictionary Search. Accessible at: https://www.onelook.com/ [accessed 17/02/2025].

OneLook. (2016). OneLook Thesaurus. Accessible at: https://www.onelook.com/thesaurus/ [accessed 17/02/2025].

Reimlexikon. (2006). Reimlexikon. Accessible at: https://www.reimlexikon.net/ [accessed 26/02/2025].

Reverse Dictionary. (2006). Reverse Dictionary. Accessible at: https://reversedictionary.org/ [accessed 17/02/2025].

Rhymer. (2017). That Rhymes. Accessible at: https://www.rhymer.com/that.html [accessed 26/02/2025].

RhymeZone. (2006). RhymeZone Dictionary and Thesaurus. Accessible at: https://www.rhymezone.com/ [accessed 26/02/2025].

Stahl, F. A., Scavnicky, G. E. A. (1973). A reverse dictionary of the Spanish language. Urbana, IL: University of Illinois Press.

STIN. (2021). Novakov misal. Accessible at: https://stin.hr/novakov-misal/ [accessed 14/02/2025].

STIN. (2021). Žgombićev zbornik. Accessible at: https://stin.hr/zgombicev-zbornik/ [accessed 14/02/2025].

STIN. (2023). Repozitorij glagoljaškog pjevanja. Accessible at: https://stin.hr/repozitorij-glagoljaskoga-pjevanja/ [accessed 14/02/2025].

STIN. (2024). DigiSTIN. Accessible at: https://stin.hr/en/content/digistin-en/ [accessed 14/02/2025].

STIN. (2024). FSGlA.ttf Font File. Accessible at: https://stin.hr/wp-content/uploads/2025/01/fsgla.ttf [accessed 20/02/2025].

STIN. (2024). Obrazovne igre. Accessible at: https://stin.hr/obrazovne-igre/ [accessed 14/02/2025].

STIN. (2024). Stvori sliku s tekstom na glagoljici. Accessible at: https://stin.hr/stvori-sliku-s-tekstom-na-glagoljici/ [accessed 14/02/2025].

STIN. (2025). Crkvenoslavenski rječnik. Accessible at: https://stin.hr/crkvenoslavenski-rjecnik [accessed 24/02/2025].

Štrkalj Despot, K., and Möhrs, C. (2015). Pogled u e-leksikografiju. Rasprave 41(2), pp. 329–353.

UKEssays. (2018). Efficient Database Driven Reverse Mapping Dictionary. Accessible at: https://www.ukessays.com/essays/computer-science/efficient-database-driven-reverse-mapping-1315.php?vref=1 [accessed 05/03/2025].

Wikipedia. (2020). Glagolitic (Unicode block). Accessible at: https://en.wikipedia.org/wiki/Glagolitic_(Unicode_block) [accessed 20/02/2025].

WordFinder. (2023). WordFinder by YourDictionary. Accessible at: https://wordfinder.yourdictionary.com/ [accessed 26/02/2025].