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SEMANTIC INFORMATION ON THE FRANČEK EDUCATIONAL LANGUAGE PORTAL FOR SLOVENIAN

Abstract This article presents semantic information about contemporary standard Slovenian on the Franček educational language portal, which is aimed at primary- and secondary-school students. The portal's primary role is to enhance students' dictionary skills as part of the national language education program and to introduce users to other linguistic resources, such as school grammars. The portal offers a user-friendly environment tailored to meet the needs of its target users. Emphasis is placed on its innovative design and user-centric approach, which facilitate intuitive learning and engagement with lexicographic content. The lexicographic content of the Franček portal is organized in eight content modules altogether, and the semantic information discussed here is presented in meaning, synonymy, and phraseology modules. The article discusses the decision-making process, technical issues, and visualization strategies for adapting semantic information to three distinct age groups.

Keywords pedagogical lexicography; semantics; language portal; Slovenian language; dictionary linking

1. Introduction

Franček (www.francek.si) is a freely available educational language portal for Slovenian aimed at primary- and secondary-school students (Ahačič et al., 2021; Gliha Komac & Perdih, 2023; Perdih, 2022; Perdih et al., 2021). It is the first comprehensive interactive e-tool for Slovenian, and it has an original design not inspired by other language portals. It was developed to meet the basic objectives of the Slovenian primary-school and high-school curriculum because Slovenian linguists have repeatedly expressed the need for specialized high-quality educational language resources with reliable content, including grammars, dictionaries, e-tools, and portals (Godec Soršak, 2015; Rozman, 2010, 2012; Rozman et al., 2010; Stabej et al., 2008). The main goal of the portal is therefore to familiarize students with various types of dictionaries, grammars, and other language resources that they will later encounter as competent adult users. It aims to encourage young people to use dictionaries through intuitive practical use on a daily basis.

The portal's central component is a dictionary section with approximately 100,000 headwords. It is linked to the grammatical component (Ledinek, Ahačič, et al., 2022) and to the language consulting service for teachers. Teaching materials, a web application for automatically generating exercises (Godec Soršak et al., 2023), a corpus of Slovenian school texts (Ledinek, Jemec Tomazin, et al., 2022), and a mobile game

were also designed along with the portal. The portal was compiled in 2017–2021, but content updates and maintenance have been ongoing, albeit at a slower pace.

This article deals with semantic information on contemporary standard Slovenian on the Franček portal. It first presents the process of database compilation, then describes semantic information in individual modules, and also discusses the decision-making process with regard to adapting semantic information to target users.

2. Database Compilation

The dictionary section is organized not by individual dictionaries, but by content, based on the most common questions young people have about words. The presentation of dictionary data follows the principles of natural language learning. In each module, specific questions (e.g., *What does this word mean?*) commonly asked by language learners are explained with answers that meet the needs of the learning process and the cognitive and linguistic abilities of learners of different ages.[1] The portal gradually introduces learners to increasingly complex linguistic content.

One of the principal deficiencies of educational e-tools for Slovenian that were developed prior to the advent of the Franček portal, e.g., Pedagogical Grammar Portal (PSP) – was their limited scope. Consequently, users were unable to rely on them to contain the majority of the information they would expect, given the design of the e-tool. For the Franček portal, our objective was to provide users with answers to the majority of questions they would typically ask themselves.

Therefore, the headword list with 100,006 single-word headwords was constructed based on two general monolingual dictionaries: eSSKJ and SSKJ2. The lexicographic database was then constructed from preexisting monolingual dictionaries and databases for general (adult) users, as well as from new lexicographic data prepared specifically for creating the Franček portal. A total of thirteen dictionary databases were used.

Automatic linking was undertaken based on matching headwords' spelling, part-of-speech data, and stress.[2] Manual linking was required in other cases, especially in the case of homographs.

Dictionary databases were linked at the headword level, but no attempt was made to link them at the microstructural level, as in the case of the Estonian EKI Combined Dictionary (Tavast et al., 2020).[3] The portal also differs from other lexicographic

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[1] Adaptations are based on consultations and written and oral interviews with 72 primary and secondary schools teachers and their students, supplemented by insights from six experts in language didactics from the University of Ljubljana and the National Education Institute Slovenia.

[2] Historical dictionaries required thorough manual checking due to various changes caused by language development and orthographic changes.

[3] Although linking at the sense level between the synonym dictionary (SSSJ) and the general monolingual dictionary (SSKJ2) has been ongoing (cf. Treven, 2022), its full realization surpassed the possibilities within the project of compiling the Franček portal. Linking other dictionaries at the microstructural level, however, would offer little benefit to the end users.

resources constructed from various dictionaries and other lexicographic databases—for example, DWDS (Klein & Geyken, 2010)—in that the content and visualization have been adapted for school students.

Because students differ significantly in terms of age, cognitive abilities, and needs, the content and visualization of the dictionary data were further adapted to three age groups:

1. first through fifth grade (ages six to ten),

2. sixth through ninth grade (ages eleven to fourteen) of primary school, and

3. high school (ages fifteen to eighteen).

The large majority of dictionaries used for compiling the database have been (or are being) compiled at the ZRC SAZU Fran Ramovš Institute of the Slovenian Language. This is why we were able to develop the portal without complex legal procedures. However, there are some exceptions, such as historical dictionaries for which copyright has expired or rights were obtained from the author's descendants, and part of the morphological database obtained from the IT company Amebis, which handled the technical part of the portal. All resources created specifically for Franček portal are available under open licences.

3. Semantic Information on the Portal

The lexicographic data on the portal are organized into eight content modules: meaning, synonymy, morphology, pronunciation, phraseology, dialect, etymology, and history (Figure 1). All modules are presented to the second and third age groups (ages eleven to eighteen), whereas presentation to users six to ten years old is limited to meaning, synonymy, morphology, and pronunciation modules.
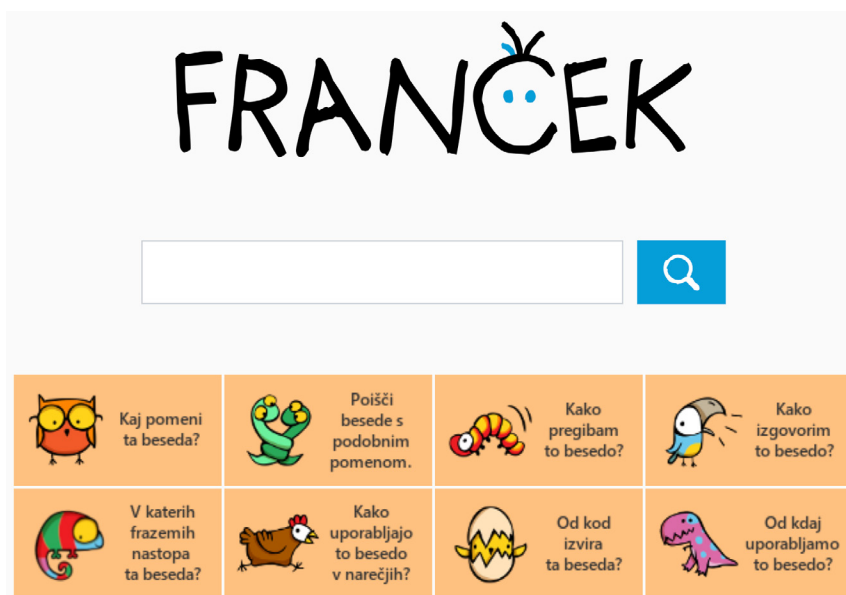

Fig. 1: The search field and eight lexicographic modules, second age group (https://www.franček.si/)

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This article focuses on the semantics of contemporary standard language presented in the meaning, synonymy, and phraseology modules, and semantic indicators offered in the search process. Content in other modules, including the dialect module, which was presented at a previous Euralex conference (Ježovnik et al., 2020), surpasses the scope of the topic.

3.1 Meaning Module

The meaning module answers the question *What does this word mean?* and includes definitions and illustrative material, and it may also contain labels, images, and multiword units (Figure 2).

Fig. 2: The word *tiger* in the meaning module, second age group (https://www.franček.si/beseda/s078836/tiger)

The lexicographic data were obtained from three dictionaries. Their priority was agreed as follows:

1. ŠSSJ for the first age group (ages six to ten) only,

2. eSSKJ, and

3. SSKJ2.

When an entry was not available in a dictionary with higher priority, data from a dictionary with lower priority were used. In this way, the youngest users were primarily given data from the new School dictionary of the Slovenian language (ŠSSJ; Godec Soršak, 2022; Petric Žižić, 2020, 2022), currently containing 3,087 entries. If an entry did not exist in this dictionary, data from eSSKJ were used, which is also the primary dictionary source for the second and third age groups (ages eleven to fourteen, and fifteen to eighteen). Because eSSKJ and the School Dictionary of the Slovenian language are still being compiled, the data from (the only completed) dictionary of standard Slovenian (SSKJ2) are provided when entries are not yet available in these dictionaries.

3.1.1 School Dictionary

The main purpose of ŠSSJ is pedagogical; its primary aim is to familiarize students with the structure of a dictionary, and it has therefore been designed taking into account the recommendations of teaching experts and surveys completed by fifth-grade students (ten years old) in class.[4] The source of materials for ŠSSJ is the Corpus of Slovenian school texts, which encompasses texts from textbooks, children's literature by select authors, and school essays. The lexis examined in the dictionary is thus taken from texts that are the main source of new standard vocabulary for students at this age (Petric Žižić, 2022, p. 128).

ŠSSJ provides sample terminology from fundamental subject fields that students are expected to learn by age ten. General lexis is included according to three principles. The basic, more frequently used lexemes familiarize the user with the structure of the dictionary and with the properties of the lexeme in general (e.g., pronunciation, inflection, meaning, and polysemy). The second principle of inclusion is based on the criteria of problem selection, which includes lexemes that are potentially difficult to inflect or spell. The third group of headwords contains lexemes with abstract meanings (e.g., *način* 'manner', *lastnost* 'property', and *logika* 'logic'). The dictionary also includes multiword lexical units with pedagogically adapted definitions.

All types of dictionary definitions in ŠSSJ come in the form of sentences.[5] In line with the established principles of Slovenian lexicography, the explanatory part of the sentence in autosemantic headwords is based on *genus proximum* and *differentia specifica*; for example, *notebook*: a **notebook** is a booklet with pages and binding used to write or draw in during class. The conditional-clause type of definition is used for explaining verbal set phrases and phraseological units; for example, *to keep company*: If someone **keeps company** with someone, it means they hang out and spend time together.[6]

ŠSSJ describes only the meanings that appear in the corpus; it therefore only includes meanings that are relevant to students. When defining a meaning, essential semantic features are complemented with additional circumstances of the denotatum's occurrence, as would normally be the case. The language of the definitions is less complex (especially at the lexical and syntactic levels), taking into account the principles of naturalness and comprehensibility (in terms of mimicking spontaneous speech, particularly in the syntactic structure of a definition, sometimes

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[4] The first type of question related to the structure of the dictionary and the basic vocabulary (e.g., *How many meanings does the word have? Where are the examples of the use of the word in the dictionary? Which multiword lexical units does the word appear in?*). The second type of question was used, for example, to determine whether the terminological labels were sufficiently understandable and meaningful (e.g., *Which school subject does the second meaning of the word point occur in?*), which type of definition is the most understandable (students deduced which word the definition referred to and formed their own definitions of the given words), whether certain implicitly given information (e.g., the distinction between possessive and ordinal adjectives), interferes with understanding the definition, and so on. The predominance of correct answers confirmed that the conceptual solutions were appropriate.

[5] Full-sentence definitions were introduced for the first time in Collins COBUILD English Dictionary (1987).

[6] The definitions are translated.

at the expense of its economy). Definitions emphasize the most typical aspect of the meaning from a student's point of view; the use of the first-person plural serves as a means to make the content of the definitions more accessible through the user's experiences (Petric Žižić, 2020, p. 393).

3.1.2 eSSKJ and SSKJ2

The general monolingual dictionaries eSSKJ and SSKJ2 are aimed at adult users and provide comprehensive microstructural information (Gliha Komac et al., 2015; Perdih & Snoj, 2015). Consequently, the data from the dictionaries were selected and abridged to better suit the target users. This solution was accepted even for the third age group because the volume of such data can be very extensive. The decision was made because the primary purpose of Franček is to facilitate young users' transition to using available unadapted dictionaries, and therefore a link is always provided to the original dictionary available on the Fran dictionary portal (Ahačič et al., 2015; Perdih, 2020).

The eSSKJ dictionary was partially adapted to achieve greater consistency with the data from SSKJ2, most notably by reducing the number of examples (collocations and example sentences) and omitting detailed information on syntactic structures.

In SSKJ2, minor semantic shifts and rare syntactic structures were omitted, and the amount of illustrative material was reduced similarly as in the case of eSSKJ. For the first two age groups, the scope of terminology was adjusted to the school curriculum, thus further reducing the amount of data presented. Labels that were abbreviated in SSKJ2 are written out in full.

Because eSSKJ and SSKJ2 (as well as Dictionary of Slovenian Phrasemes (SSF) in phraseological module) interpret labels differently, we conceptually harmonized them and presented their unified descriptions in the form of tooltips with links to the school grammar, where further information is provided.

Labels pertaining to all or to the majority of senses in SSKJ2 are presented in the head of the dictionary entry; that is, at the entry level. Because presentation of data from the head is limited, and to offer more understandable information to the end-user in the semantic module itself, entry-level labels were transferred to the sense level. Special treatment was necessary in the case of various combinations between the head-level label and sense-level label.

Designations of microstructural elements, such as definitions and illustrative material, are provided for the second age group (Figure 2) to help users obtain a clear idea about the main components of the dictionary structure. The third age group, on the other hand, may no longer need this help, therefore such information is omitted or limited, making the visualization closer to dictionaries for adult users. Similar approach can be observed in other modules (Gliha Komac & Perdih, 2023, p. 18).

3.1.3 Images

To better support understanding of meanings, 64,063 images are provided for 19,760 entries. The majority of images are license-free images obtained via the Bing search engine, and the Slovenian Ethnographic Museum gave permission to use photos from its gallery. All images were subsequently manually selected by a group of students for inclusion in the database. In cases of polysemy, an effort was made to find images for several senses. At the time of image selection activities, AI tools for image generation were not yet available.

3.2 Synonymy Module

The synonymy module provides answers to the question *Which words have similar meanings to the word X?* and contains definitions, synonyms, and icons and/or a textual description representing labels.
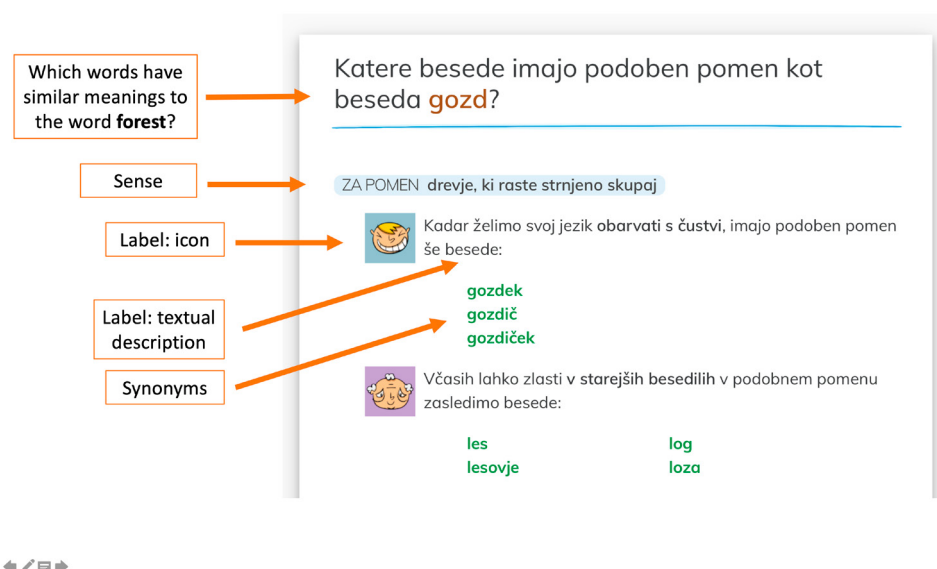

Fig. 3: The word *gozd* 'forest' in the synonymy module, second age group (https://www.franček.si/beseda/s018093/gozd)

To enhance students' awareness that a single meaning in standard Slovenian can be expressed with different words, taking into account the different circumstances of communication, the Franček portal introduces students to a number of synonyms of modern standard language. The source for this is the Synonym Dictionary of Slovenian Language (SSSJ). The synonymy module utilizes stylistic and register labels from the source dictionary to illustrate how the synonyms identified differ from each other and when it is appropriate to use them in different texts and language situations.

The information from the Slovenian synonym dictionary has been adapted for the educational portal in terms of both content and presentation. Lexemes are introduced with a dictionary definition, after which synonyms are assigned to

them. Subsequently, the synonyms are grouped according to the markedness of the synonym. For neutral unmarked lexemes such as *gozd* 'forest', all eligible synonyms are listed. For marked synonyms, the synonym module redirects the user to an unmarked synonym.

The source dictionary describes synonyms with a relatively detailed set of labels. For the Franček target users, some types of synonyms were omitted based on their labels, and the remaining labels were merged into broader groups. To reinforce the students' understanding of standard language, the following types of synonyms are given:

1. neutral synonyms (without stylistic markedness), which are not restricted in distribution and are used in everyday practical communication,

2. synonyms with a positive expressive value (i.e., endearing, childish, humorous, and elated expressions),

3. synonyms with a negative expressive value (i.e., derogatory and pejorative expressions), and

4. time- and frequency-marked synonyms (i.e., archaic, obsolete, and rare expressions).

The Franček educational portal primarily familiarizes users with the characteristics of the standard language. Because they are not part of the standard language, colloquial and jargon synonyms of the lexeme searched for are not shown in the synonym module. Similarly, the module does not include dialect synonyms (these are shown in a separate module) or terminological synonyms (terminology is a specific diasystem of language, and therefore the relationship between terminology and general language is not a matter of stylistic choice). Because the portal is intended for the school-age population, vulgar synonyms have also been excluded.

The presentation of data in the synonym module is adapted to students' cognitive abilities and varies for each age level. Markedness of synonyms from the above mentioned four groups is presented as icons and/or textual description. The visualization for students in the first age group includes only icons alongside the synonyms, which intuitively convey whether and in what circumstances the use of a synonym is acceptable (e.g., a thumbs-up on a green background indicates unmarked synonyms, and a frowning face on a red background indicates synonyms with negative expressive value). The visualization for the second age group includes both icons and typified descriptions with information about the stylistic value of the lexemes. The visualization for the third age group contains only a textual description.

3.3 Phraseology Module

The phraseology module provides answers to the question *Which phrasemes does the word appear in?* and contain definitions, illustrative material, and variations

in phraseological units. The primary aim of the phraseological module is didactic and informative. Therefore, adaptations required consideration of both macrostructural and microstructural aspects: which phraseological units are to be included, in which dictionary entries they are found, and how they are to be presented.

Fig. 4: The word *buča* 'pumpkin' in the phraseology module, second age group (https://www.franček.si/beseda/e000495/buča)

The phraseology module is available only for the second and third age groups. The first age group also encounters phraseological units, but only within the scope of the ŠSSJ in the meaning module. For this age group, we introduce students to some basic phraseological features, such as multiword fixed structures and figurative meanings. For the second age group (as shown on Figure 4), we present phraseology as a standalone module in more detail, including a higher number of phraseological units recognized as basic forms in source dictionaries, and their variants. For the third age group, we expand the set of variants to offer users a comprehensive picture of each phraseological unit.

The data for the phraseology module come from the SSF and eSSKJ. Various types of phraseological units are included and presented: nominal, adjectival, verbal, adverbial, and sentence phraseological units, including paremiological units. They are arranged alphabetically by the first component, with non-sentential phraseological units presented first, followed by sentence phraseological units, which, unlike the others, are formally recognizable due to notation with a capital letter. Each phraseological unit is shown in its basic dictionary form (phraseological lemma), accompanied by a semantic description, and variants of the phraseological units are also listed. This ensures that students receive the key information about the use of each phraseological unit and its variants.

3.4 Semantic Indicators

To help distinguish between homographs in the search process, semantic, part-of-speech, and other types of indicators[7] are provided (Perdih, 2021). Part-of-speech indicators are given to 1,165 headwords, but semantic indicators are predominantly used (3,268), and in the case of fifty-seven headwords other solutions were required. To differentiate between homographs pertaining to the same part of speech, semantic indicators are used, typically in the form of synonyms or hypernyms, and in some cases the specification of domain (e.g., *kubičen: v matematiki* 'cubic: in mathematics') or a prepositional phrase[8] is used (e.g., *akorden: o plačilu* 'jobbing: about payment').
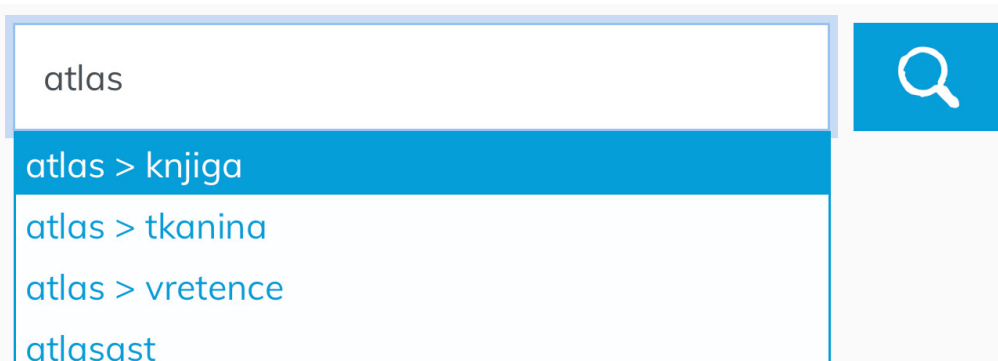

Fig. 5: The homonyms *atlas* with semantic indicators ('book', 'fabric', 'vertebra') in the search field (https://www.franček.si/)

4. Conclusion

The semantic information on contemporary standard Slovenian constitutes a central point of lexicographic description on the Franček educational language portal. The meaning and synonymy modules, as well as the phraseology module, provide users with definitions for single- and multi-word expressions, synonyms, examples, labels, links to grammar and other features. The data were sourced from existing explanatory, synonymy, or phraseology dictionaries and from a school dictionary that was specifically compiled for this project. The goal was to adapt the content and visualization to better suit the needs of the target users.

The primary objectives of the Franček educational portal are to provide students with language resources that would facilitate the initial steps in using dictionaries, assist students in comprehending the content of dictionaries, inform about fundamental language features, and to raise awareness of dictionaries as reliable companions for resolving language issues. The modifications of content and visualization were made gradually for three age groups with the intention of facilitating a more seamless transition from school dictionaries to dictionaries for adults.

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[7] In contrast to the common use of indicators, especially semantic ones, that are used for sense distinction and can be used to build sense menus of a single entry (cf. Kosem et al., 2013; Lew & Pajkowska, 2007), here the distinction between homographs is the main goal.

[8] Cf. Gantar (2015, pp. 168–169) for implementation of this type of indicators in the Slovene lexical database.

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