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### **Presenting and Linking Grammatical Data on the Franček Educational Language Portal**

*Slovenski jezik / Slovene Linguistic Studies 14/2022. 152–179.*

DOI: <https://doi.org/10.3986/sjsls.14.1.06>



ISSN tiskane izdaje: 1408-2616, ISSN spletne izdaje: 1581-127

<https://ojs.zrc-sazu.si/sjsls>

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## **PRESENTING AND LINKING GRAMMATICAL DATA ON THE FRANČEK EDUCATIONAL LANGUAGE PORTAL**

This article presents how grammatical data are treated and presented in the first specialized lexicographic and grammatical learning e-tool for Slovenian, the Franček portal, and how these data are linked across the portal's dictionary, advisory, and teaching components. By displaying grammatical material in an innovative manner and linking it effectively, this interactive portal – which offers reliable content and is designed following modern educational principles – is intended to contribute to motivating students to learn grammatical material. The article also draws attention to the fact that effectively linking grammatical data on the portal can play an important role in the development of language teaching and influence the methodology of language resource design.

**KEYWORDS:** school grammar, educational language portal, language e-tool, linking language data, pedagogical lexicography, language teaching, Slovenian

V prispevku sta predstavljena obravnava in prikaz slovničnih podatkov na prvem specializiranem pedagoškem slovarsko-slovničnem portalu za slovenščino Franček, članek pa prikazuje tudi, kako so slovnični podatki povezani s slovarskimi, svetovalnimi in didaktičnimi viri na portalu. Vsebinsko zanesljivo in po sodobnih didaktičnih pristopih oblikovano interaktivno učno e-orodje Franček lahko zaradi inovativnega prikaza slovničnih vsebin in njihovega učinkovitega povezovanja pomembno prispeva k motiviranju učencev za usvajanje slovničnih vsebin. Članek opozarja tudi na dejstvo, da lahko ima učinkovito povezovanje slovničnih podatkov na portalu pomembno vlogo pri razvoju jezikovne didaktike in vpliva na metodologijo oblikovanja jezikovnih virov.

KLJUČNE BESEDE: pedagoška slovnica, pedagoški jezikovni portal, jezikovno e-orodje, povezovanje jezikovnih podatkov, pedagoška leksikografija, jezikovna didaktika, slovenščina

## 1 INTRODUCTION

In recent years, Slovenian linguists have repeatedly expressed the need for specialized high-quality educational language resources with reliable content, including grammars, dictionaries, e-tools, and portals (Weiss 1994, 2001; Stabej et al. 2008; Rozman 2010, 2012; Rozman et al. 2010, 2015; Čebulj 2013; Godec Soršak 2015, 2019; Ahačič et al. 2015a; Kosem et al. 2020) because a characteristic of the Slovenian language situation compared to other languages, especially languages with a large number of speakers, is that there was no educational language infrastructure for Slovenian. Such infrastructure has only recently begun to develop. In 2017, after several decades, two modern school Slovenian grammars were published for primary and secondary education (Ahačič 2017a, 2017b), designed based on current language material and in line with current curricula. The first research-based school dictionary of Slovenian (Petric Žižić 2020), *Šolski slovar slovenskega jezika* (School Dictionary of the Slovenian Language) with about two thousand entries, was published in the fall of 2021 and will be further developed in the coming years.<sup>1</sup> The *Developmental corpus Šolar* (Kosem et al. 2011, 2016) was developed in 2011 to identify typical learner errors and grammatical difficulties, and *Korpus šolskih besedil slovenskega jezika* (Corpus of School Texts of the Slovenian Language;<sup>2</sup> Ahačič et al. 2021a) was recently created specifically for the purposes of pedagogical lexicography. In 2021 an interactive e-learning environment for learning Slovenian<sup>3</sup> was created

<sup>1</sup> For Slovenian, four school dictionaries for different age levels of schoolchildren were created about two decades ago: *Moj mali slovar* (My Little Dictionary; Bitenc 1996), *Moj slovar* (My Dictionary; Hanuš et al. 2000), *Moj prvi slovar* (My First Dictionary; Šubic & Sivec 2002), and *Besede nagajivke* (Troublesome Words; Kokalj 2002), but due to their small size and inadequacy in terms of lexicographic solutions (Godec Soršak 2019: 280, 2015) they did not fully meet users' requirements.

<sup>2</sup> <<http://hdl.handle.net/11356/1413>>.

<sup>3</sup> <<https://slo-na-dlani.si/prijava>>.

as part of the project *Slovenščina na dlani* (Slovenian in the Palm of your Hand), which offers students exercises in spelling, grammar, and other areas. Before that, a decade earlier, the portal *Pedagoški slovnici portal* (Educational Grammar Portal;<sup>4</sup> Arhar Holdt et al. 2011; Kosem et al. 2020; Kosem and Može 2011) was developed as a model for interactive treatment of grammatical topics within the project *Sporazumevanje v slovenskem jeziku* (Communicating in Slovenian), but the model was not further developed into a portal covering a sufficient range of grammatical topics, and so it did not really take hold in language teaching.

Based on previous studies (Kosem et al. 2020; Rozman et al. 2020), the lack of comprehensive and extensive specialized language resources specifically targeted at school populations has been one of the main obstacles to the use of such resources in the school system. To fill the gap in the infrastructure, schoolteachers have turned to language resources aimed at adult native speakers, such as basic explanatory dictionaries of Slovenian. In recent years, these resources have primarily been accessed through the Fran portal<sup>5</sup> (Ahačič et al. 2015a, 2015b; Perdih 2020), the largest Slovenian dictionary portal,<sup>6</sup> but there was no comprehensive interactive e-tool to encourage students to engage with dictionaries and grammars independently and in the classroom with minimal time investment as part of their Slovenian language learning.

The fact that purposeful, extensive, and comprehensive educational resources are needed for successfully teaching Slovenian was the main motivation for creating the first lexicographic-grammatical e-tool for Slovenian, the Franček Portal<sup>7</sup> (Ahačič et al. 2021b; Perdih et

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<sup>4</sup> <<https://slovnica.slovenscina.eu/>>.

<sup>5</sup> <<https://fran.si/>>.

<sup>6</sup> The Fran portal was set up in 2014 and is referred to in all recent Slovenian language textbooks. Its use is also promoted by the Slovenian National Education Institute. In its 9.0 version, the portal combines forty dictionaries (with a total of 707,782 dictionary entries), a dialect atlas, and an online language advisory service and terminological advisory service, all searchable through a single search engine and displaying results from all the different sources at once.

<sup>7</sup> <[www.franček.si](http://www.franček.si)> or <[www.francek.si](http://www.francek.si)>.

al. 2021; Perdih 2021; Ježovnik et al. 2020). The portal was created at the Fran Ramovš Institute of the Slovenian Language of the Research Centre of the Slovenian Academy of Sciences and Arts as part of the project the Franček Portal, the Language Advisory Service for Teachers of Slovenian, and the Slovenian School Dictionary (hereinafter: the Franček project) in cooperation with experts in teaching and language technologies, and teachers of Slovenian in primary and secondary schools. The portal is freely available online. It has an original design, not inspired by other language portals, and is conceived as an organically interconnected whole consisting of dictionary, grammar, advisory, and teaching components. It is the first comprehensive interactive e-tool for Slovenian, and it is suitable for meeting the basic objectives of the Slovenian primary-school and high-school curriculum. Its main goal is to familiarize students with various types of dictionaries, grammars, and other language resources they will later encounter as competent adult users of reference works.

This article describes how grammatical data are presented in the first lexicographic-grammatical e-tool for Slovenian, Franček, and how grammatical information is linked between the various components of the portal. The innovative presentation of grammatical data on the Franček portal and linking grammatical data between the different components of the portal are important because they allow easy navigation through the displayed content, which is intended to give users greater motivation to learn about the Slovenian language system, and the quality of linguistic content, meaningfully linked, also facilitates language teaching for teachers. Linking grammatical data is also important from the point of view of language teaching and the development of methodology of language resource design and linguistic research. The portal can also serve as a model for building educational portals for other languages.

## 2 THE FRANČEK PORTAL

The innovative learning e-tool known as the Franček portal has been conceived as an organically interconnected whole comprised of several components that provide information on meaning, usage,

semantic connections, stylistic characteristics, pronunciation, inflection, origin, dialect use, and historical context for Slovenian vocabulary as well as the characteristics of the (standard) Slovenian language system all in one place. It has been designed for simple (but not trivial) presentation of complex language material. The portal is divided into three parts. A central component is an educational dictionary portal, which serves as an entry point for the e-tool and includes a search engine. The second component of the portal is a grammar component designed as the dedicated website *Kje je kaj v slovnici?* (Where's What in the Grammar?). The third component of the e-tool is a special online teacher advisory service. Franček is also linked to the Fran portal and the smartphone game *Besedoboj*. This interconnected material is further complemented by teaching materials and a description of modern learning and teaching methods that can make Slovenian language instruction easier and enrich it. The main users of the dictionary and grammar component of the portal are primary- and secondary-school students (six to eighteen years old), and the teaching content and the language advisory service were primarily designed for teachers.

The Franček portal is also visually adapted to young users and uses modern teaching approaches and options provided by modern technologies to motivate young users to also use the Franček portal outside school. The portal offers users an interactive application and further motivates users through game-design elements, including a system of moving between levels and rewards in the form of points, and the option to connect with other users.

## 2.1 THE DICTIONARY PORTAL

The main component of the entire innovative e-tool Franček is the dictionary portal, which provides lexicographic data on approximately 100,000 single-word headwords. The dictionary portal combines data from current lexicographic databases of the Fran Ramovš Institute of the Slovenian Language, adapted for teaching, and data from new databases created as part of the Franček project.<sup>8</sup> The portal's

<sup>8</sup> The process of preparing lexicographical data for the Franček portal is presented in Ahačič et al. (2021b).

conceptual and visual design is flexible and adapts to the needs of each of the three student age groups covered: six to ten, eleven to fourteen, and fifteen to eighteen years old. Lexicographic data are displayed in eight sections and are developed in the form of answers to the questions presented below.

The presentation of dictionary data on the portal follows the principles of natural language learning. In each section, 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. The portal gradually introduces learners to increasingly complex linguistic content and, thanks in particular to the links established and the teaching tools used, it allows for a sufficient interpretation of the linguistic data, even if users are not familiar with the exact structure of the original dictionaries that the descriptions are based on.

**FRANČEK**

roka

Kaj pomeni ta beseda?	Poišči besede s podobnim pomenom.	Kako preglbam to besedo?	Kako izgovorim to besedo?
V katerih frazernih nastopa ta beseda?	Kako uporabljajo to besedo v narejih?	Od kod izvira ta beseda?	Od kdaj uporabljamo to besedo?

Ogledaš si lahko še podobne besede:

rogač rak rak raka rakar reka roba rock roča roja

rojak rak rok rakav rola rosa rota roza roža

Kje je kaj v slovnici? Fran Jezikovna svetovalnica

FIGURE 1: Homepage of the Franček portal

The dictionary portal provides answers to the following questions:

1. *What does this word mean?* The meaning is displayed differently for each age group. For the first age group, the portal displays data from Šolski slovar slovenskega jezika (School Dictionary of the Slovenian Language, SD),<sup>9</sup> which features simple and clear semantic explanations of two thousand single-word headwords. For the middle age group and high-school students, adapted dictionary entries from basic general explanatory dictionaries are available, including the second edition of *Slovar slovenskega knjižnega jezika* (Dictionary of the Slovenian Standard Language, 2<sup>nd</sup> Edition, SSKJ<sup>2</sup>) and its third edition *eSSKJ: Slovar slovenskega knjižnega jezika* (Dictionary of the Slovenian Standard Language, 3<sup>rd</sup> Edition, eSSKJ).
2. *Find words with a similar meaning.* The portal offers students a selection of standard Slovenian synonyms from *Sinonimni slovar slovenskega jezika* (Dictionary of Slovenian Synonyms).
3. *How is this word inflected?* The portal displays the entire declension or conjugation paradigm, highlighting examples that draw attention to issues users face.
4. *How do I pronounce this word?* The portal provides an audio recording or machine-generated pronunciation of the selected word.
5. *Which idioms does this word appear in?* A phraseological section based on SD is available to the youngest users, and for the two older groups phraseology is presented based on data from *Slovar slovenskih frazemov* (Dictionary of Slovenian Phrasemes, SSF) and eSSKJ.
6. *How is this word used in dialect?* The portal shows dialect synonyms of the selected word and its use in various Slovenian dialects based on data from *Slovenski lingvistični atlas* (Slovenian Linguistic Atlas).

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<sup>9</sup> The idea of a Slovenian school dictionary, which served as the basic source for developing the SD concept, is presented in Godec Soršak (2019).

7. *What is the origin of this word?* The portal introduces students to reading etymological reference works. A description was produced based on data from *Šolski etimološki slovar slovenskega jezika (Learner's Etymological Dictionary of Slovene, LED)*, eSSKJ, and *Slovenski etimološki slovar (Slovenian Etymological Dictionary, SES)*.
8. *How long has this word been used?* The portal provides information on when a word was first recorded in 16<sup>th</sup> century Slovenian literature or later Slovenian dictionaries, and it shows how it was described in historical Slovenian dictionaries.

## 2.2 THE ONLINE TEACHER ADVISORY SERVICE

To provide instructional support to teachers, a special language advisory service was set up as part of the Franček project. This advisory service is joining the institute's two current online language advisory services: one for general users (Dobrovoljc et al. 2018) and one for resolving terminological issues (Žagar Karer 2017). As of the beginning of 2022, the teacher advisory service offers answers to approximately 1,200 user questions.

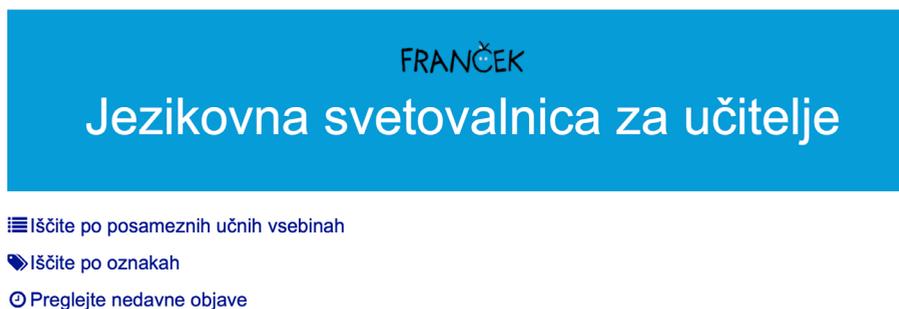


FIGURE 2: Homepage of the online teacher advisory service

## 2.3 THE WEBSITE WHERE'S WHAT IN THE GRAMMAR?

To help students learn how the Slovenian language system works – that is, to help them develop the ability to connect various grammatical

content into a logical whole – the website *Kje je kaj v slovnici?* (Where's What in the Grammar?, WWG) has been designed as the main grammatical component of the innovative learning e-tool Franček. The website's content-related framework has been designed based on two modern Slovenian school grammars: *Kratkoslovnica* (Short Grammar; Ahačič 2017a), which presents Slovenian grammar at the primary-school level, and *Slovnica na kvadrat* (Grammar Squared; Ahačič 2017b), intended for high-school students and other users.

On the WWG website, grammatical material is visually displayed according to its place in the description of specific linguistic levels within the standard Slovenian system and is arranged as a hierarchical clickable list. Users can access the detailed description of this material by clicking the individual main topic (e.g., the umbrella topic *Beseda* 'word' covers Slovenian morphemes and words, the word-formation mechanisms of Slovenian and morphophonemic alterations, inter- and intra-lexeme relations, and morphological characteristics of Slovenian words), in which the material presented is vertically subdivided in increasing detail, with grammatical subdivisions presented in drop-down menus displayed when clicking a main topic. Thanks to such comprehensive and hierarchically designed systematic graphics, which also draw attention to the paradigmatic and syntagmatic relations in Slovenian from the visual perspective, users obtain a clear idea of where a specific linguistic feature can be found within the systemic description of the language.

FRANČEK Kje je kaj v slovnici?

JEZIKOVNE ZVRSTI	GLAS	BESEDA	STAVEK	PRAVOPIŠ
Družbene vrste Besedilne vrste	Glasovi Naglas	Zlog Tvorba besed (besedotvorje) Odnosi med besedami (besedoslovje) Oblikoslovje	<b>Besedna zveza</b> Skladnja stavka Skladnja povedi	Velika in mala začetnica Ločila Deljenje besed Premi govor

Stavek → **Besedna zveza**

	KRATKO-SLOVNICA	Slovnica NA KVADRAT
● Besede se lahko v stavku povezujejo v besedne zveze. Znotraj besedne zveze so lahko posamezne besede enakovredne (priredna besedna zveza), lahko pa so podrejene jedru besedne zveze (podredna besedna zveza).	65	148
● Znotraj besednih zvez (pa tudi med stavčnimi členi) imenujemo razmerje med pridevnikom in samostalnikom ujemanje, razmerje med glagolom/pridevnikom/predlogom in samostalniško besedno zvezo ali samostalnikom vezava, razmerje med prislovom in besedo, na katero se nanaša, pa primik.		149
● Nekatero besedne zveze rabimo zelo pogosto. Imenujemo jih stalne besedne zveze.		150
● Kadar takšna besedna zveza dobi nov pomen, na katerega ne moremo sklepati iz njenih sestavin, dobimo frazem.		151
● Frazem je lahko tudi cel stavek ali cela poved. Tak frazem imenujemo pregovor.		152

FIGURE 3: Hierarchical display of grammatical features on the WWG website

Individual grammatical features on the WWG website are described in short paragraphs introduced by a black circle with an arrow in the middle. By clicking the number to the right of the paragraphs, users get to know the issue described in even greater detail, based on how the grammatical feature is presented in *Kratkoslovnica* and *Slovnica na kvadrat* (see FIGURE 5).

Stavek → **Besedna zveza**

	KRATKO-SLOVNICA	Slovnica NA KVADRAT
● Besede se lahko v stavku povezujejo v besedne zveze. Znotraj besedne zveze so lahko posamezne besede enakovredne (priredna besedna zveza), lahko pa so podrejene jedru besedne zveze (podredna besedna zveza).	65	148
● Znotraj besednih zvez (pa tudi med stavčnimi členi) imenujemo razmerje med pridevnikom in samostalnikom ujemanje, razmerje med glagolom/pridevnikom/predlogom in samostalniško besedno zvezo ali samostalnikom vezava, razmerje med prislovom in besedo, na katero se nanaša, pa primik.		149
● Nekatero besedne zveze rabimo zelo pogosto. Imenujemo jih stalne besedne zveze.		150
● Kadar takšna besedna zveza dobi nov pomen, na katerega ne moremo sklepati iz njenih sestavin, dobimo frazem.		151
● Frazem je lahko tudi cel stavek ali cela poved. Tak frazem imenujemo pregovor.		152

FIGURE 4: Display of grammatical features in the form of paragraphs on the WWG website

148 Besede se lahko v stavku povezujejo v besedne zveze. Znotraj besedne zveze so posamezne besede bodisi enakovredne (priredna besedna zveza) bodisi so podrejene jedru besedne zveze (podredna besedna zveza). Besedne zveze se imenujejo po svojem jedru (samostalniška, pridevniška, glagolska itd.), edino zveza samostalnika s predlogom se imenuje predložna besedna zveza.

priredna besedna zveza	
<i>oče in mati</i>	samostalniška
<i>lep, a neumen</i>	pridevniška
<i>lepo in prav</i>	prislovna

podredna besedna zveza	
<i>lepa hči</i>	samostalniška
<i>materin oče</i>	
<i>sin slovenskega naroda</i>	
<i>sir s poprom</i>	
<i>pisati nalogo</i>	glagolska
<i>prost skrbi</i>	pridevniška
<i>jutri zjutraj</i>	prislovna
<i>pred mestom</i>	predložna

FIGURE 5: A more detailed explanation of grammatical features in *Slovnica na kvadrat*

The grammatical description on the WWG page is further extended by an account of typical grammatical errors made by students when writing texts (as evidenced in the Developmental corpus Šolar) and by teaching materials of two types. The first type of material can be created using Črkozmed, a special tool developed within the Franček project that generates various language exercises based on linguistic data in the Fran Ramovš Institute of the Slovenian Language dictionary

databases, which teachers can print out in the form of worksheets. The second type of material consists of language exercises created by experts in Slovenian language teaching to reinforce the material taught in the first six years of primary school.

The screenshot shows a webpage titled 'Stavek → Besedna zveza'. It features a list of five grammatical topics, each with a description and a count. Below the list are two sections: 'O tej temi poglej še' (See also on this topic) and 'Povezave in gradiva' (Links and materials). The 'Pogoste napake' section includes 'Vsebine v jezikovni svetovalnici' and 'Vaje'. The 'Povezave in gradiva' section includes 'Jezikovna svetovalnica', 'Črkozmed', 'Fran', and 'Franček'.

Topic	Count
Besede se lahko v stavku povezujejo v besedne zveze. Znotraj besedne zveze so lahko posamezne besede enakovredne (priredna besedna zveza), lahko pa so podrejene jedru besedne zveze (podredna besedna zveza).	65
Znotraj besednih zvez (pa tudi med stavčnimi členi) imenujemo razmerje med pridevnikom in samostalnikom ujemanje, razmerje med glagolom/pridevnikom/predlogom in samostalniško besedno zvezo ali samostalnikom vezava, razmerje med prislovom in besedo, na katero se nanaša, pa primik.	149
Nekatere besedne zveze rabimo zelo pogosto. Imenujemo jih stalne besedne zveze.	150
Kadar takšna besedna zveza dobi nov pomen, na katerega ne moremo sklepati iz njenih sestavin, dobimo frazem.	151
Frazem je lahko tudi cel stavek ali cela poved. Tak frazem imenujemo pregovor.	152

FIGURE 6: Teaching and other materials crosslinked to the WWG website

### 3 LINKING GRAMMATICAL DATA ON THE FRANČEK PORTAL

A key feature of the Franček comprehensive learning e-tool is that the division of grammatical topics into paragraphs as presented on the WWG website is also used as a kind of a coding table, through which various resources or components of this new learning e-tool are crosslinked based on the grammatical information they contain. The goal is to logically crosslink the grammatical, lexicographic, and teaching data of the various components of this e-tool, so that, when discussing a specific linguistic feature, teachers can present the material to their students as comprehensively and effectively as possible. For instance, if teachers are discussing declension patterns in Slovenian with their students, they can use the grammatical data presented on the WWG website to first explain what declension is

and which declension patterns are used in Slovenian, after which they can access data, with only a few clicks, on which Slovenian lexemes are declined following a specific pattern, take a look at the paradigms of specific words under the tab *How is this word inflected?* on the dictionary portal, draw their students' attention to typical mistakes in declining words as attested in language usage, use another few clicks to access teaching materials connected with declension, quickly check whether users have any issues in relation to declensions that have been highlighted in the online teacher advisory service, and so on. Users can begin exploring linguistic features under any e-tool component and, because the data are crosslinked effectively and clearly, they can quickly and easily access the sections of these components that describe the selected linguistic feature from various perspectives (e.g., typical mistakes, user or normative issues, lexical perspective, grammatical perspective, etc.).

For users to be able to access data connected with a specific linguistic feature in the manner described above, a basic taxonomy of grammatical topics was first developed presented in the form of a clickable list on the WWG website. Then every grammatical feature described on this website in a special paragraph was assigned a unique tag, based on which a uniform typology of grammatical material for the entire e-tool was produced.<sup>10</sup> After this, a spreadsheet was created in which data required for linking the grammatical material in the e-tool are recorded systematically and in a uniform way. In terms of the comprehensive presentation of grammatical data on the Franček portal, the following components are currently linked to the WWG:

1. SD, SSKJ2, eSSKJ, SSF, LED and SES as presented under the tabs *What does this word mean? Which idioms does this word appear in?* and *What is the origin of this word?*
2. The presentation of typical grammatical errors in students' texts from the *Developmental corpus Šolar*;

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<sup>10</sup> A special tag was used for grammatical features that proved relevant during the analysis for preparing components of the Franček portal but are not yet described in the paragraphs on the WWG website. Based on data tagged this way, the grammatical descriptions on this site can be improved in the future.

3. Teaching materials; and
4. The online teacher advisory service.

### 3.1 CROSSLINKS BETWEEN THE WWG WEBSITE AND THE DICTIONARY PORTAL

Linking grammatical data in the dictionaries to the WWG website was conducted in two stages. In the first stage, the dictionary's microstructural elements with predictable content related to grammatical features in the XML dictionary database were identified. These include data on part of speech, gender, countability, multiword lexical unit type, labels, and so on. Based on the content of these elements in the dictionary database (e.g., data on the gender of the noun within the part of speech designation; <PoS><noun>masculine</noun></PoS>; see FIGURE 7), we manually defined which paragraphs in the uniform grammatical typology refer to specific lexicographic elements, after which data on the unique tags of all the relevant appertaining paragraphs were machine-generated to all the relevant XML elements of the dictionary database. In the specific example presented, the lexicographic data showing that the headword in question is a masculine noun were linked to the section on morphology or, specifically, the section on nouns and masculine declensions on the WWG website.

Kvalifikator	Razvezava na Frančku	Tooltip (pojasnilo)	Povezava na Kje je kaj v slovnici? 1	Paragraf 1	Paragraf 1 podkategorija
m	moški spol		Poglej, kaj vemo o %kategoriji spol%.	3.4.1	1
mat.	matematika	Beseda, zveza, ki se uporablja predvsem v strokovnih besedilih s področja matematike.	Poglej, kaj vemo o %odnosih med besedami%.	3.3	7
med.	medicina	Beseda, zveza, ki se uporablja predvsem v strokovnih besedilih s področja medicine.	Poglej, kaj vemo o %odnosih med besedami%.	3.3	7
med. žarg.	medicinski žargon	Beseda, zveza, ki se uporablja pri manj formalnem sporazumevanju med strokovnjaki s področja medicine.	Poglej, kaj vemo o %družbenih zvrsteh%.	1.1	1
medm.	medmet		Poglej, kaj vemo o %medmetu%.	3.4.10	1
mest.	mestnik		Poglej, kaj vemo o %kategoriji sklon%.	3.4.1	1
metal.	metalurgija	Beseda, zveza, ki se uporablja predvsem v strokovnih besedilih s področja metalurgije.	Poglej, kaj vemo o %odnosih med besedami%.	3.3	7
metal. žarg.	metalurški žargon	Beseda, zveza, ki se uporablja pri manj formalnem sporazumevanju med strokovnjaki s področja metalurgije.	Poglej, kaj vemo o %družbenih zvrsteh%.	1.1	1
meteor.	meteorologija	Beseda, zveza, ki se uporablja predvsem v strokovnih besedilih s področja meteorologije.	Poglej, kaj vemo o %odnosih med besedami%.	3.3	7
min.	mineralogija	Beseda, zveza, ki se uporablja predvsem v strokovnih besedilih s področja mineralogije.	Poglej, kaj vemo o %odnosih med besedami%.	3.3	7
mitol.	mitologija	Beseda, zveza, ki se uporablja predvsem v strokovnih besedilih s področja mitologije.	Poglej, kaj vemo o %odnosih med besedami%.	3.3	7
mn.	množina		Poglej, kaj vemo o %kategoriji število%.	3.4.1	1
mn. in dv.	množina in dvojina		Poglej, kaj vemo o %kategoriji število%.	3.4.1	1
mont.	montanistika	Beseda, zveza, ki se uporablja predvsem v strokovnih besedilih s področja montanistike.	Poglej, kaj vemo o %odnosih med besedami%.	3.3	7
mont. žarg.	montanistični žargon	Beseda, zveza, ki se uporablja pri manj formalnem sporazumevanju med strokovnjaki s področja montanistike.	Poglej, kaj vemo o %družbenih zvrsteh%.	1.1	1
nam.	namenilnik		Poglej, kaj vemo o %namenilniku%.	3.4.5	9
nar.	narečno	Beseda, zveza, ki se uporablja predvsem v narečjih.	Poglej, kaj vemo o %narečjih%.	1.1.3	
nar.	narečno belokranjsko	Beseda, zveza, ki se uporablja predvsem v belokranjskem narečju.	Poglej, kaj vemo o %narečjih%.	1.1.3	
nar. briško	narečno briško	Beseda, zveza, ki se uporablja predvsem v briškem narečju.	Poglej, kaj vemo o %narečjih%.	1.1.3	

FIGURE 7: Links between labels in SSKJ2 and the specific paragraphs of the uniform grammatical typology as documented in the spreadsheet

Based on such data included under all the relevant elements of the XML structure for every dictionary headword, the selected microstructural elements of the dictionary as visualized on the Franček portal were linked to the WWG website. For some dictionary data, labels in particular, linking to the WWG website was done by displaying a tooltip with an explanation of what the label designates as well as links to the appropriate paragraphs in the uniform grammatical typology. Thus, while browsing the Franček portal, if students would like to know what the label indicating an uncountable noun in SD under the tab *What does this word mean?* designates, they can simply click the appropriate microstructural element of the dictionary as visualized on the portal to obtain information about certain Slovenian nouns only used in the singular.

In the second stage, the SD headwords were also manually linked to the WWG website. Already during editing, every dictionary headword was ascribed the grammatical issues it is connected

with or which of its grammatical features may cause problems for students, after which the data on unique tags of the relevant paragraphs according to the uniform grammatical typology were entered in a special element in the XML structure of the dictionary database as well as in the spreadsheet mentioned above. Data on the set of headwords for which a specific grammatical feature is characteristic will be available to users in the form of lists under a separate section on the WWG website.

### 3.2 CROSSLINKS BETWEEN THE WWG WEBSITE AND THE TYPICAL USER ERRORS

The WWG website also features typical grammatical errors connected with specific grammatical features that students most commonly make while writing texts. These errors were identified through a manual analysis of the Developmental corpus Šolar,<sup>11</sup> a collection of texts written by primary-school and high-school students, with visible teachers' edits (Kosem et al. 2011, 2016). Data on the typical user errors were entered into a spreadsheet, including the sentence as originally written by the student from the Šolar corpus, the sentence with a marked error and a corresponding correction, the corrected sentence, and information on which paragraph from the uniform grammatical typology the error refers to. Examples of typical errors presented on the WWG website are shown in FIGURE 8. The database of typical grammatical errors serves as a basis for illustrating errors, and in the future it can also be used to further improve the grammatical component of the learning e-tool.

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<sup>11</sup> <<http://www.korpus-solar.net/>>.

Glas → **Glasovi**

● Glasove delimo na samoglasnike in soglasnike.	1	1 11 12
● Zapisujemo jih s črkami slovenske abecede (a b c č d e f g h i j k l m n o p r s t u v z ž), v kateri vsak glas, ki vpliva na pomen, nima svoje črke.	2	2
● Vseh glasov ne zapisujemo, kakor jih izgovarjamo.	3	3 4 15

O tej temi poglej še

Pogoste napake

Vsebine v jezikovni svetovalnici

Vaje

**Pogoste napake iz korpusa ŠOLAR**

Človek ne sme **vrjeti** → **verjeti** vsega, kar sliši.

Pojem slasten **zajterk** → **zajtrk** in se odpravim v šolo.

Za **zajterk** → **zajtrk** vedno jem kosmiče z mlekom.

Ko je pisatelj prišel **h** → **k** nam v šolo, je povedal dve zgodbi, ki sta bili zelo smešni.

Besedilo pripoveduje o tem, kako se mož po dolgih letih vrne **domol** → **domov** k svoji družini.

Tega **dogotka** → **dogodka** ne bom nikoli pozabil.

**Usak** → **Vsak** ima svoje probleme, ki jih velikokrat želi rešiti sam.

Spretnosti se ne razvijejo spontano, tako kot navade, ampak z **vstrajnim** → **vztrajnim** učenjem in vajo.

Knjiga pripoveduje o najstniškem dekletu Fatimi, ki se s svojo revno družino **u** → **v** Slovenijo zateče kot begunka.

FIGURE 8: Typical errors found in students' texts from the Šolar corpus as presented on the WWG website

### 3.3 CROSSLINKS BETWEEN THE WWG WEBSITE AND THE TEACHING MATERIALS

The Franček portal also offers teaching materials designed by language teaching specialists. Two types of materials are available. The Črkozmed interface<sup>12</sup> allows machine generation of language-related exercises (e.g., fill in the appropriate form of the word, find the odd man out by looking at the grammatical number, or select the right feminine noun). These exercises are especially suitable for the lower primary-school grades and are generated based on machine-extracted and, if needed, subsequently manually reviewed data from dictionary and other databases of the Fran Ramovš Institute of the Slovenian Language. Users can select the type of exercises they want to generate and the number of examples they want to include in each

<sup>12</sup> <<https://crkozmed.francek.si/>>.

exercise, they can replace the default examples with others, they can edit the instructions, and so on, after which they export the exercises (with or without answers) in PDF format or save them for later. Each exercise also has a unique tag according to the uniform grammatical typology in the Franček e-tool so that users can quickly identify the exercises related to individual grammatical topics.

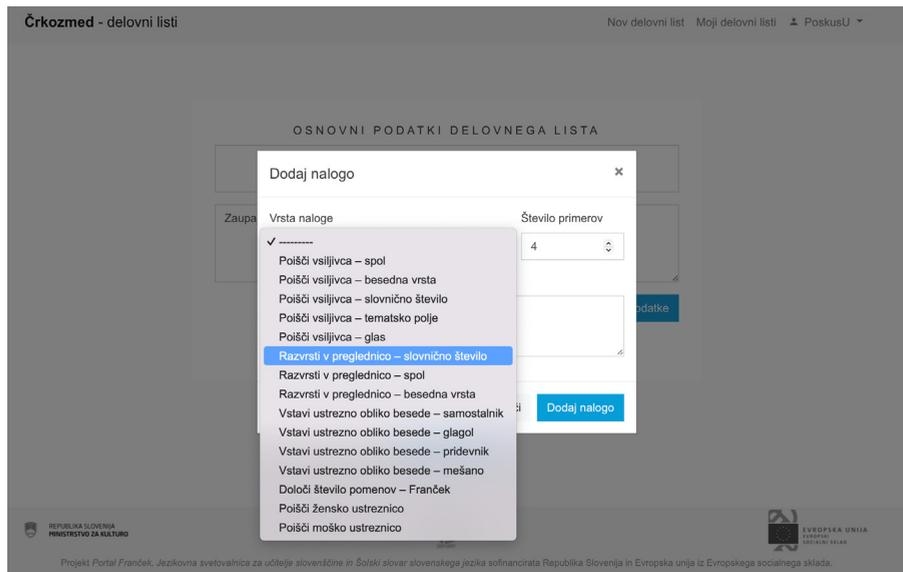


FIGURE 9: Machine generation of language-related exercises using the Črkozmed interface

The second type of teaching material comprises about 110 typologically diverse language exercises prepared in advance by specialists in Slovenian language teaching, primarily intended for reviewing subject matter for children in first through sixth grade. To link them with other components of the e-tool, these exercises were also suitably documented in the spreadsheet, in which data on the unique tags of the paragraphs in the uniform grammatical typology were entered alongside information on which primary-school grade each exercise is meant for, the learning objectives it is intended to meet, and so on. Keywords (e.g., diminutives, antonyms, nouns, and grammatical number) were also added, which tell the teacher, in particular, which

grammatical feature the exercise is related to. The predesigned exercises are available to users with the presentation of individual grammatical topics on the WWG website. In addition, users are able to search for suitable exercises using a simple interface.

### 3.4 CROSSLINKS BETWEEN THE WWG WEBSITE AND THE ONLINE TEACHER ADVISORY SERVICE

The online teacher advisory service was also linked to the WWG website. For the purposes of crosslinking the material in the e-tool, every user question posted on this service's website was tagged not only with a set of keywords that users can use to search through the service's website, but also with the unique tags of the relevant paragraphs within the uniform grammatical typology. This not only makes it possible to identify each user issue and crosslink it to specific grammatical content on the WWG website, but also to use the database of user issues to improve the WWG website in the future.

## 4 THE ROLE OF LINKING DATA ON THE FRANČEK PORTAL

Linking grammatical data, as established on the Franček portal, is important both from the point of view of language teaching and from the point of view of developing a methodology for creating language resources and interpreting language phenomena within theoretical and practical linguistics.

The language resources crosslinked according to a unified model have a direct effect on Slovenian language teaching; teachers can present the subject matter to students more comprehensively and systematically because they can quickly switch between different language resources (e.g., dictionaries, grammars, corpora, teaching materials, etc.), whereby they can easily explain the same grammatical phenomenon from different aspects (e.g., lexical, grammatical, normative, stylistic, etc.). At the same time, thoughtfully displayed grammatical data is designed to make it easier for teachers to present to students where a specific grammatical phenomenon is located in terms of a systematic description of the standard language and how grammatical and lexical elements in the language are related. Due

to the links established, the material already learned can be quickly refreshed, which allows the students to more effectively integrate the grammatical material into a meaningful whole. For example, when teachers introduce students to the structure of a dictionary entry, such as presented in the tab *What does this word mean?* on the dictionary part of the Franček portal, while presenting labels of part of speech and other features, types of set phrases, and so on, in a few clicks they can easily switch from the dictionary to an educational grammatical description on Franček so that the students can refresh basic concepts of morphology, typology of set phrases, and linguistic stylistics in a short time, all this with the intention to make it easier for them to connect and learn the subject matter more comprehensively. Uniform crosslinking of data on the dictionary portal and on the WWG page is useful in both respects: users can interpret dictionary data more easily and appropriately due to established links; on the other hand, the grammatical description is expanded and illustrated with more material due to the dictionary data.

Uniform linking of grammatical data in various resources on the Franček portal is also important for the development of language teaching and Slovenian linguistics as such. For example, it can help more effectively identify a comprehensive architecture of user issues (linking questions in the language advisory service and the most common errors identified, as shown in corpora with marked corrections, with specific grammatical paragraphs), which is an important starting point for creating more appropriate teaching materials focusing on the most common user mistakes, and more appropriate linguistic descriptions. However, the long-term goal of linking, as imagined within the Franček portal, is not only to create teaching materials based on identified user issues, which are aimed at eliminating typical mistakes, or to improve the pedagogical grammatical description. Because links are established in a uniform way between different resources, we want the effects of linking to be multiplied. Based on the user issues identified, in the first phase we have created the types of teaching exercises, and then used the established links to automatically generate worksheets based on data

from the dictionaries of the Fran Ramovš Institute of the Slovenian Language. The multiplicative effect of linking is thus reflected in the fact that new material can be added to exercises very quickly. A similar effect is expected in forming other language resources. With a single coding mechanism, it is possible to connect other language resources; for example, questions in the language advisory service for general users and individual spelling rules, and through it dictionary entries of the spelling dictionary, normative data in the general explanatory dictionary, and so on. Due to the links established, the created sources will be more uniform, and at the same time additional data make possible the establishment of new interpretative mechanisms.

The uniform coding mechanism for linking language data in various language resources, as established on the Franček portal, thus allows extensive interconnection of various resources, which, on the one hand, can have a significant impact on the methodology of creating new language resources (the achievements of such integration are shown in particular in the design and integration of dictionary databases and other semantic resources – see, e.g., Ahmadi et al. 2020; less established on a broader scale, it seems, is the integration of grammatical and dictionary resources or grammatical and corpora resources). On the other hand, linking can have a decisive influence on interpretive mechanisms, which has an impact on both language teaching and linguistic research. Franček is the first and only Slovenian language portal in which diverse language resources are connected in a uniform way. The scope of linking is currently limited, but it establishes a model of integration for other, more extensive and non-educational resources.

## 5 CONCLUSION

This article presents the Franček portal, the first comprehensive lexicographic-grammatical learning e-tool for Slovenian, which will help make primary- and high-school Slovenian instruction more interesting to students and allow them to grow accustomed to regular and systematic use of a wide range of linguistic reference works. The article focuses on how grammatical data are displayed in the e-tool

and how they are crosslinked within its different components. The goal is to meaningfully crosslink the grammatical, lexicographic, and teaching data of the various components, so that, when discussing a specific linguistic feature, teachers can present the material to their students as comprehensively and clearly as possible, from various aspects, and by taking into account modern teaching approaches, whereby they can access diverse high-quality material in a simple manner. Crosslinks are also important from the point of view of language teaching and the development of methodology of language resource design and linguistic research.

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Received March 2022, accepted May 2022.

Prispelo marca 2022, sprejeto maja 2022.

#### ACKNOWLEDGEMENTS

The publication of article was made possible by programme *Slovenski jezik v sinhronem in diahronem razvoju* (P6-0038), which is financially supported by the Slovenian Research Agency.

The Portal Franček project, the Language Counseling for Slovene Teachers and the School Dictionary of the Slovene Language were

co-financed by the Republic of Slovenia and the European Union from the European Social Fund.

## SUMMARY

### PRESENTING AND LINKING GRAMMATICAL DATA ON THE FRANČEK EDUCATIONAL LANGUAGE PORTAL

The Franček portal is the first specialized educational lexicographic-grammatical portal for Slovenian, designed as an organically connected whole of several components, which provide information on the meaning, usage, pronunciation, inflection, origin, dialect usage, and historical circumstances of Slovenian words. The central component is the educational dictionary portal, which also serves as an entry point in the form of a search engine and provides dictionary data on approximately 100,000 single-word entries. The portal also includes a language advisory service for teachers and a special grammar component, the website *Where's What in the Grammar?*.

This article describes in greater detail the grammar component of the portal, the website *Where's What in the Grammar?* It is structurally based on the new school grammars by Kozma Ahačič, namely *Kratkoslovnica* (Short Grammar) for primary school and *Slovnica na kvadrat* (Grammar Squared) for secondary school. It is designed to help pupils link various grammatical content into a logical whole. The grammatical content is displayed according to its place within the description of a particular grammatical level of standard Slovenian and is hierarchically arranged in the form of a clickable list through which users can access more detailed grammatical descriptions from the grammars. The hierarchical display thus provides users with a clear idea of where each linguistic feature is located in the description of the language system.

The grammatical descriptions are accompanied by examples of typical errors made by learners in writing texts, as given by the Šolar corpus, and by two types of language materials (the first type is automatically generated by the *Črkozmed* tool on the basis of the dictionary data, and the second type of language material has been prepared by experts in Slovenian language teaching).

The grammatical data on the Franček portal are linked to dictionary, advisory, and teaching resources. The division of grammar sections into paragraphs, which is shown on the website *Where's What in the Grammar?*, serves as a coding table through which the various resources and components of the

portal are linked. This article provides a detailed description of how all these units are linked. Logically linked grammatical, dictionary, and teaching data serve as a tool for teachers to deliver learning material in an integrated way. Users can start exploring linguistic features in any of the components and, thanks to the logical links between the sources and the components, they can access data from the other components from anywhere, thus shedding light on the linguistic phenomenon from all angles (e.g., from the point of view of typical errors, from the lexical or grammatical point of view, etc.).

The Franček portal is a content-oriented, interactive learning e-tool, designed according to modern teaching approaches, which, thanks to its innovative presentation of grammatical content and its effective linking, is intended to make an important contribution to motivating learners to acquire grammatical content. The effective linking of grammatical data on the portal can also play an important role in the development of language teaching and has an impact on the methodology of the design of linguistic resources.

#### PRIKAZ IN POVEZOVANJE SLOVNIČNIH PODATKOV NA PEDAGOŠKEM JEZIKOVNEM PORTALU FRANČEK

Portal Franček je prvi specializirani pedagoški slovarsko-slovniki portal za slovenščino, ki je zasnovan kot organsko povezana celota več komponent, ki prinašajo mdr. podatke o pomenu, rabi, izgovarjavi, pregibanju, izvoru, narečni rabi in zgodovinskih okoliščinah slovenskih besed. Osrednjo komponento predstavlja pedagoški slovarski portal, ki služi tudi kot vstopna točka v obliki iskalnika in prinaša slovarske podatke o približno 100.000 enobesednih iztočnicah. Portal vključuje tudi jezikovno svetovalnico, namenjeno učiteljem, ter posebno slovnico komponento, spletno stran *Kje je kaj v slovnici?*.

V prispevku je podrobneje opisana slovnici komponenta portala, spletna stran *Kje je kaj v slovnici?*. Strukturno se naslanja na novi šolski slovnici K. Ahačiča, in sicer na *Kratkoslovnico* za osnovno in *Slovnico na kvadrat* za srednjo šolo. Zasnovana je tako, da učencem pomaga pri povezovanju različnih slovnici vsebin v logično celoto. Slovnici vsebine so namreč prikazane glede na svoje mesto znotraj opisa na določeni slovnici ravni slovenskega knjižnega jezika in hierarhično urejene v obliki klikljivega seznama, prek katerega uporabniki dostopajo do natančnejših slovnici opisov iz omenjenih slovnici. Uporabniki s pomočjo hierarhično urejenega prikaza tako dobijo jasno predstavo o tem, kje se posamezna jezikovna značilnost nahaja v opisu jezikovnega sistema.

Slovničnemu opisu so dodani primeri tipičnih napak učencev pri pisanju besedil, kot jih najdemo v korpusu Šolar, in dve vrsti jezikovnih vaj (prvi tip se na podlagi slovarskih podatkov na portalu avtomatsko generira s pomočjo orodja Črkozmed, drugi tip jezikovnih vaj pa so pripravili strokovnjaki za didaktiko slovenskega jezika).

Slovnični podatki so na portalu Franček povezani s slovarskimi, svetovalnimi in didaktičnimi viri. Delitev slovničnih poglavij na odstavke, ki so prikazani na strani *Kje je kaj v slovnici?*, namreč služi kot kodirna tabela, prek katere so medsebojno povezani različni viri in komponente portala. Prispevek prinaša natančen popis načina povezovanja vseh naštetih enot. Logično povezani slovnični, slovarski in didaktični podatki učiteljem služijo kot orodje za celostno podajanje učne snovi. Uporabniki lahko namreč začnejo jezikovne značilnosti raziskovati pri kateri koli komponenti, zaradi logičnih povezav med viri in komponentami pa lahko od koder koli dostopajo do podatkov iz drugih komponent in si tako jezikovni pojav osvetlijo z vseh vidikov (npr. z vidika tipičnih napak, z leksikalnega ali slovničnega vidika ipd.).

Portal Franček je vsebinsko zanesljivo in po sodobnih didaktičnih pristopih oblikovano interaktivno učno e-orodje, ki zaradi inovativnega prikaza slovničnih vsebin in njihovega učinkovitega povezovanja pomembno prispeva k motiviranju učencev za usvajanje slovničnih vsebin. Učinkovito povezovanje slovničnih podatkov na portalu ima lahko tudi pomembno vlogo pri razvoju jezikovne didaktike in vpliva na metodologijo oblikovanja jezikovnih virov.