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Špela Arhar Holdt
Centre for Language Resources and Technologies, University of Ljubljana
Večna pot 113, SI-1000 Ljubljana
spela.arhar@cjvt.si

HOW USERS RESPONDED TO A RESPONSIVE DICTIONARY: THE CASE OF THE THESAURUS OF MODERN SLOVENE

The *Thesaurus of Modern Slovene* is a responsive dictionary: it is compiled automatically from existing language resources while further developments of the dictionary include user participation. Many of the features introduced by the responsive model are new to the Slovene language community (e.g. data is extracted automatically and includes some errors; non-experts are involved in dictionary compilation; the resource is never truly finished). With financial support from the Slovene Ministry of Culture, a survey was conducted to gauge (potential) user opinions on the new features. The paper presents the results of the survey (N = 671) including statistical analyses of dependencies between the respondents’ opinions and their reported familiarity with the new dictionary, their age, and their professional occupation.

1. Introduction

In March 2018, the Centre for Language Resources and Technologies of the University of Ljubljana published the *Thesaurus of Modern Slovene* (https://viri.cjvt.si/sopomenke/eng), the largest automatically generated a collection of Slovene synonyms. The Thesaurus introduced a new type of dictionary called the *responsive dictionary* (Arhar Holdt et al. 2018): it is designed from the onset to be entirely digital, is initially compiled through automatic extraction methods, and is openly available both as an online language resource and as a database for the development of tools and resources (Krek et al. 2017a). Its most defin-

ing characteristic is its ability to quickly and flexibly respond to both language change and the feedback provided by its users: in the case of the Thesaurus, users can contribute by adding suggestions of missing synonyms and by up- or downvoting existing synonym candidates.

As the first example of a responsive dictionary, the Thesaurus differs in many aspects from traditional Slovene lexical resources, which raises the question of how these novelties are perceived (e.g. data is extracted automatically and includes some errors; non-experts are involved in dictionary compilation; the resource is never truly finished). Has the community embraced the new concept or are they apprehensive? With financial support from the Slovene Ministry of Culture,[1] a survey was conducted to gauge user opinions and collect suggestions for future dictionary improvements. The paper presents the results of the survey together with the discussion on how the gathered opinions can help prioritize the upcoming upgrades of the dictionary.

2. The Thesaurus of Modern Slovene

In its current version, the Thesaurus of Modern Slovene contains 105,473 keywords and 368,117 synonyms. The dictionary was created automatically from two language resources: The Oxford®-DZS Comprehensive English-Slovenian Dictionary and the Gigafida Reference Corpus of Written Slovene (Logar et al. 2012). Both resources contain texts written after 1991 and as such offer a description of modern, standard Slovene. The data extraction and structure for the Thesaurus were based on the manner in which words co-occur in translation strings of the Oxford-DZS Dictionary. In the following step, an approach combining balanced co-occurrence graphs and the Personal PageRank algorithm divided the synonyms into subgroups and ranked them according to the degree of semantic relatedness to the keyword, as well as their frequency in language use. For a more detailed description of this methodology, see Krek et al. 2017b.

Understanding synonymy requires context, which is why the Thesaurus provides the option to compare the use of different synonyms with the help of collocations. In addition, corpus examples are imported into the dictionary using GDEX for

[1] Project *Thesaurus of Modern Slovene: From the Community to the Community*, 2018–2019, website (in Slovene): www.cjvt.si/promocija-sopomenk.

Slovene (Kosem et al. 2011). Collocations and examples of use are included in most entries, while all of them also provide links to the Gigafida corpus. Furthermore, domain labels were added from the Oxford-DZS Comprehensive English-Slovenian Dictionary, which help explain the context of use for individual synonyms. The current version of the Thesaurus contains no other type of labels. More detailed information on the Thesaurus, its structure and features is available on the dictionary webpage (which includes a list of related papers).

3. Methodology

3.1. Research Questions and Hypotheses

The main purpose of the survey was to identify the opinions of the community on the novelties introduced by the responsive dictionary as well as to discover any potential correlations between respondents' opinions, and their reported familiarity with the new dictionary, their age and their professional occupation. The statements included in the survey were as follows:

– S1: The dictionary exists only in the digital form.

– S2: The dictionary is never truly finished.

– S3: The dictionary content is frequently updated.

– S4: The dictionary is available free of charge.

– S5: The dictionary database is openly available for developing new products.

– S6: The dictionary includes corpus examples and links to corpus data.

– S7: The dictionary includes collocations.

– S8: The dictionary comprises primarily standard and contemporary language.

– S9: The dictionary only includes domain labels (e.g. *botany*), no other labels.

– S10: The dictionary was created by an institution that is not primarily lexicographic.

– S11: The dictionary data are acquired automatically.

– S12: The data are not entirely reliable.

– S13: Users can rate existing synonyms.

– S14: Users can add their suggestions for synonyms.

Our hypotheses pertaining to the listed statements were as follows:

– [h1]: Respondents are most positively inclined towards S3 and S4 and most negatively inclined towards S2, S10, S11, and S12.

– [h2]: Respondents that are more familiar with the Thesaurus are more positively inclined towards the introduced novelties, are less critical towards the existing gaps, and have less doubt when evaluating the new features.

– [h3]: Younger respondents are more positively inclined towards the novelties than older respondents, esp. with features pertaining to the digital format and interactivity (S1, S13, S14).

– [h4]: Respondents who benefit from the Thesaurus professionally are more positively inclined towards the novelties pertaining to the up-to-datedness and inclusion of different types of lexical data (S3, S6, S7) and more critical towards their perceived unreliability (S9, S10, S11, S12, S14).

3.2. The Questionnaire

The questionnaire was prepared in digital form using the One Click Survey Web Tools.[2] The survey was open from 20 August 2018 to 20 November 2018. It consisted of seven questions; the average response time was 2:36 minutes. The survey was completed by 671 respondents and partially completed by an additional 285 respondents.[3] The questionnaire was structured into four parts:

a) Questions to establish the familiarity of the respondents with the Thesaurus of Modern Slovene.

b) A question concerning the evaluation of the 14 dictionary features (S1–S14).

c) An open question collecting suggestions for further improvements.

d) Questions to collect the metadata on the age and status/professional occupation of the respondents.

[2] www.1ka.si/d/en.

[3] The main dropout was after the first page where some of the respondents probably realized the topic was of no relevance or interest to them.

The questionnaire was distributed through various digital channels, including language-oriented newsletters and Facebook groups. It was sent via e-mail to institutions, associations, and individuals that might be interested in the topic. Although the sample was not pre-structured, we aimed at addressing all the relevant user groups (Arhar Holdt et al. 2016) with the assumption that the survey would interest mostly translators, teachers of Slovene at different levels of education, and professionals that prepare various types of texts in their work environment. From this perspective, it should be noted that the results reflect the opinions of (potential)[4] dictionary users who were interested in the topic and willingly prepared to cooperate, and were thus probably more informed and positively inclined towards the presented novelties than the general population.

3.3. Data Analysis

In this paper, we focus on section b) of the questionnaire. The results are presented and discussed in 4.1. Moreover, we ran statistical tests to search for possible dependencies between the respondents' opinions and their reported familiarity with the new dictionary, their age, and their professional occupation. We prepared contingency tables including respondents' opinions and the selected metadata. We ran a chi-square test of independence, then calculated Pearson residuals to see if there are any statistically significant differences between the groups. Pearson residuals below -1.96 or above 1.96 indicate a statistically significant difference. We report on the findings in chapters 4.2, 4.3, and 4.4. For every set of data, we present the calculated residuals and the significance information. If any cell of the corresponding contingency table presents counts that are lower than 5, we mark the results with an asterisk *.

4. Results and Discussion

4.1. Evaluation of the New Features

Table 1 presents how the respondents evaluated selected dictionary features. The number of replies is provided together with the corresponding percentage. As

[4] It will be shown later (Table 2) that not all respondents were familiar with the Thesaurus at the time of the survey. The group thus consists of actual and potential dictionary users.

can be seen, most of the listed features were generally perceived as positive. The features liked most were free availability and frequent updates. The ones disliked most were limited reliability of the data and limited inclusion of labels in the dictionary. Respondents were most often indifferent towards the institution behind the dictionary and most often unsure about the automatic compilation of the dictionary.

Table 1: "What is your opinion on the following features?"

Statement/Answers	*It bothers me.*	*I'm indifferent.*	*I like it.*	*I don't know.*	Valid answers
The dictionary exists only in the digital form.	64 (9%)	224 (33%)	**346 (51%)**	49 (7%)	683 (100%)
The dictionary is never truly finished.	35 (5%)	149 (21%)	**442 (64%)**	70 (10%)	696 (100%)
The dictionary content is frequently updated.	7 (1%)	37 (5%)	**606 (88%)**	42 (6%)	692 (100%)
The dictionary is available free of charge.	2 (0%)	6 (1%)	**661 (96%)**	19 (3%)	688 (100%)
The dictionary database is openly available for developing new products.	7 (1%)	48 (7%)	**584 (85%)**	45 (7%)	684 (100%)
The dictionary includes corpus examples and links to corpus data.	6 (1%)	70 (10%)	**539 (79%)**	65 (10%)	680 (100%)
The dictionary includes collocations.	8 (1%)	104 (15%)	**459 (68%)**	109 (16%)	680 (100%)
The dictionary comprises primarily standard and contemporary language.	64 (9%)	122 (18%)	**428 (63%)**	67 (10%)	681 (100%)
The dictionary only includes domain labels (e.g. *botany*), no other labels.	**249 (37%)**	225 (33%)	82 (12%)	125 (18%)	681 (100%)
The dictionary was created by an institution that is not primarily lexicographic.	99 (15%)	**354 (52%)**	111 (16%)	117 (17%)	681 (100%)
The dictionary data are acquired automatically.	76 (11%)	184 (27%)	**259 (38%)**	161 (24%)	680 (100%)
The data is not entirely reliable.	**383 (56%)**	152 (22%)	18 (3%)	129 (19%)	682 (100%)
Users can rate existing synonyms.	26 (4%)	128 (19%)	**489 (72%)**	38 (6%)	681 (100%)
Users can add their own suggestions for synonyms.	67 (10%)	74 (11%)	**470 (69%)**	69 (10%)	680 (100%)

The positive inclination towards free availability and up-to-datedness and the criticism towards unreliability partially confirm [h1] and are aligned with previous studies on Slovene dictionary users. As described in Arhar Holdt (2018), the 619 Slovene respondents who participated in a cross-European study on monolingual dictionary use (Kosem et al. 2018) valued the reliability of the data above all other features, followed by free availability, ease of use, and up-to-datedness.

Data reliability was also identified as a top priority in user research by Müller-Spitzer (2014: 143–188).

In [h1], it was also our assumption that the status of the institution behind the dictionary would have an important impact on the attitude of the respondents, as it can be directly connected with the perceived reliability of the results. The data, however, demonstrates that many respondents were indifferent to the fact that the dictionary was prepared by an institution that is not primarily lexicographic (52%), with a balanced portion of respondents who liked this fact (16%), disliked it (15%) or felt that they do not know enough about the topic to provide an opinion (18%). Similarly, we assumed in [h1] that automated lexicographic procedures would suggest lower reliability and would thus be evaluated as negative. On the contrary, the results show that the attitude towards the automatic compilation of lexical data were mostly positive (38%) or indifferent (27%), only 11% of the respondents stated they were bothered by their inclusion. It is noteworthy that this feature had the highest percentage of *I don't know* replies, indicating that the respondents recognized the need to understand more about the nature of the procedures to provide an informed opinion.

On the other hand, the attitude towards the open availability of the database for the development of new products was above our expectations. 85% of respondents expressed that they liked this feature while only 7% were indifferent or chose *I don't know*. With these results, open access made it to the top three most liked features in the survey, indicating that the general public is ready to support the scientific community in highlighting the necessity of open data for the development of contemporary and future language infrastructure.

Furthermore, the responsive dictionary evolves dynamically, which means frequent updates on the one hand and open-endedness on the other: the dictionary is never truly finished. In [h1], we assumed that while the first feature would be perceived as straightforwardly positive, the second would be perceived more negatively by the community. As it turns out, the percentage of respondents bothered by the endless dictionary development was indeed slightly higher (5% vs. 1%), however, the majority liked the feature (64% vs. 88%) or were indifferent towards it (21% vs. 5%). The results indicate that the user community is prepared to accept lexical resources as dynamic and ever-changing. It is nevertheless important that transparent development (timestamping, version archiv-

ing, continued accessibility) is among the defining features of the responsive dictionary to avoid user confusion and data loss.

Pertaining to the question of format, the results are in accordance with previous findings. Arhar Holdt (2018) reports that in Slovenia, over 90% of dictionary users access the data in digital form and the majority of users (73.7%) also prefer the digital form, while 13.2% prefer printed dictionaries. In the current survey, 51% of the respondents explicitly liked the fact that the Thesaurus is exclusively digital, 33% were indifferent to it, and 9% were bothered by it.

Almost no respondents were bothered by the inclusion of corpus examples and collocations. Corpus examples and links had a slightly higher percentage of likes (79% vs. 68%), while with collocations respondents more often chose that they were indifferent (15% vs. 10%) or unsure (16% vs. 10%). These results can be explained by the fact that collocations as a type of lexical data remain relatively new to the Slovene language community. The *Collocations Dictionary of Modern Slovene* (Kosem et al. 2018), for example, was first published while the survey was still ongoing.

The fact that the Thesaurus comprises standard and contemporary language was liked by 68% and disliked by 9%. The dislikes can be interpreted as a wish for more heterogeneous data, including non-standard, colloquial, dialectal, or non-contemporary lexica. On the other hand, the limited inclusion of labels is liked by 12% and disliked by 37%. The open part of the survey (see section c) in 3.2) highlighted that the lack of labels is a two-fold problem. Firstly, the respondents miss the option to label the synonyms they add. Secondly, pertaining to the labels in the automatically acquired part of the Thesaurus, the priority must be given to lexica that could be derogatory or even fall under the category of hate speech.

Most of the respondents liked the possibility of users rating the existing content (72%) as well as of users adding their suggestions (69%). However, the portion of respondents uncertain about the user-generated input was higher (10% vs. 6%) as was the portion of respondents bothered by it (10% vs. 4%). These results indicate that not all types of user involvement are perceived equally by the community: the controlled ratings of existing data raise less doubt than open (and potentially erroneous/malicious) user suggestions. Therefore, facilitating agile

editorial control over such problems seems to be important for further development of the dictionary concept.

4.2. Familiarity with the Thesaurus

Table 2: "How familiar are you with the Thesaurus of Modern Slovene?"

All answers	954 (100%)
I'm very familiar with the dictionary.	78 (8%)
I'm only familiar with the main features of the dictionary.	269 (28%)
I've heard about this dictionary, but I haven't used it yet.	322 (34%)
This is the first time I hear about this dictionary.	285 (30%)

In section a) of the questionnaire (see Chapter 3.2), the respondents were asked about their familiarity with the Thesaurus of Modern Slovene. Table 2 shows the results. Statistically significant differences between the groups (see Chapter 3.3) are[5]:

4.2.1. **Frequently updated** [$\chi^2 = 21.737$, N = 690, df = 3, p ~ 0]*: The respondents who are familiar with the Thesaurus are less likely to be uncertain about the frequent updates ($r_P = -3.249$), while the ones unfamiliar with it are more often uncertain about them ($r_P = 2.824$).

4.2.2. **Corpus examples** [$\chi^2 = 26.569$, N = 678, df = 3, p ~ 0]*: The respondents who are unfamiliar with the Thesaurus are more frequently undecided ($r_P = 2.910$) about whether the inclusion of corpus examples in the Thesaurus is good or not. The opposite is true of the respondents who are familiar with it ($r_P = -3.345$).

4.2.3. **Collocations** [$\chi^2 = 44.071$, N = 678, df = 3, p ~ 0]*: The respondents who are unfamiliar with the Thesaurus rarely like the fact that the Thesaurus includes collocations ($r_P = -2.393$) and are either indifferent ($r_P = 2.028$) or undecided ($r_P = 3.023$) about it. On the other hand, the respondents who are familiar are rarely indifferent ($r_P = -2.325$) or undecided ($r_P = -3.465$) and are more in favor of collocations ($r_P = 2.744$).

5 In this set of data, low numbers in contingency tables were due to the fact that few respondents were bothered by the inclusion of corpus examples and collocations in the dictionary.

4.2.4. **Standard language** [$\chi^2 = 8.441$, N = 679, df = 3, p = 0.038]: The respondents who are familiar with the Thesaurus are slightly more frequently bothered by the fact that the Thesaurus only includes standard and contemporary lexica ($r_P = 1.976$).

4.2.5. **Labels** [$\chi^2 = 19.972$, N = 679, df = 3, p ~ 0]: The respondents who are unfamiliar with the Thesaurus are less frequently bothered ($r_P = -2.148$) by the fact that the Thesaurus contains only domain labels. The respondents who are familiar with the Thesaurus, on the other hand, are rarely undecided about it ($r_P = -2.120$) and more frequently bothered by it ($r_P = 2.456$).

4.2.6. **User votes** [$\chi^2 = 9.407$, N = 679, df = 3, p = 0.024]: The respondents who are familiar with the Thesaurus are rarely undecided whether user votes are good or not ($r_P = -2.244$).

4.2.7. **User suggestions** [$\chi^2 = 17.38$, N = 678, df = 3, p = 0.001]: The respondents who are familiar with the Thesaurus are rarely undecided whether user suggestions are good or not ($r_P = -2.285$). The opposite is true for the respondents not familiar with the Thesaurus ($r_P = 1.993$).

4.2.8. **Other opinions** (on the exclusively digital format; free availability; open access to the database; the automaticity of the approach; the reliability of the data; the institution behind the dictionary; the fact that the dictionary is never finished) show no correlations: the familiarity with the dictionary does not play a role.

Hypothesis [h2] was only partially confirmed. Respondents who were familiar with the Thesaurus were less uncertain about corpus examples, user votes and suggestions, they were more positive towards the inclusion of collocations, and more bothered by the lack of labels and non-standard, non-contemporary lexica. Our assumption that familiarity with the Thesaurus might help the respondents recognize that errors in the automatically extracted data are predictable – and thus less problematic – was not confirmed: the attitude towards automaticity and (un)reliability of the data remained the same whether the respondents had seen the actual dictionary or not.

4.3. Age of the Respondents

Table 3: "What is your age?"

All answers	668 (100%)
15 years or younger.	0 (0%)
From 16 to 25.	133 (14%)
From 26 to 35.	159 (17%)
From 36 to 45.	191 (20%)
From 46 to 55.	115 (12%)
From 56 to 65.	57 (6%)
66 or older.	13 (1%)

Table 3 shows the distribution of respondents by age. Statistically significant differences between the groups (see Chapter 3.3) are the following[6]:

4.3.1. **Only digital** [$\chi^2 = 36.65$, N = 657, df = 15, p = 0.001]*: The 46-55 age group is more frequently undecided ($r_P = 2.757$) on whether a digital-only dictionary is good or not.

4.3.2. **Never finished** [$\chi^2 = 39.283$, N = 660, df = 15, p = 0.001]*: Compared to other age groups, the respondents between the ages of 16 and 25 are either indifferent ($r_P = 3.714$) to the fact that the Thesaurus is never truly finished or are bothered by it ($r_P = 2.214$). They rarely like it ($r_P = -2.928$).

4.3.3. **Frequently updated** [$\chi^2 = 27.832$, N = 662, df = 15, p = 0.023]*: The 16-25 age group is more frequently indifferent ($r_P = 3.876$) to the fact that the Thesaurus is frequently updated.

4.3.4. **Corpus examples** [$\chi^2 = 27.844$, N = 656, df = 15, p = 0.023]*: The 16-25 age group is more frequently indifferent ($r_P = 3.289$) to the fact that the Thesaurus includes corpus examples.

4.3.5. **Labels** [$\chi^2 = 41.497$, N = 657, df = 15, p ~ 0]*: The 16-25 age group likes ($r_P = 3.503$) the fact that the Thesaurus contains only domain labels and is rarely

[6] In this dataset, low numbers in contingency tables were mainly due to the fact that few respondents were 66 or older. We nevertheless decided to maintain the categories from the questionnaire.

bothered by it (r_P = -3.164). The 36-45 age group rarely likes the lack of labels (r_P = -2.020).

4.3.6. **Institution** [χ^2 = 32.35, N = 657, df = 15, p = 0.006]*: The 16-25 age group likes (r_P = 2.596) the fact that the Thesaurus was made by an institution that is not primarily lexicographic.

4.3.7. **Automatically compiled** [χ^2 = 31.45, N = 656, df = 15, p = 0.008]*: The 36-45 age group is rarely indifferent (r_P = -2.310) to the fact that the Thesaurus has been compiled automatically.

4.3.8. **User suggestions** [χ^2 = 28.07, N = 656, df = 15, p = 0.021]*: The 16-25 age group is often indifferent (r_P = 2.581) to user suggestions in the Thesaurus or bothered by them (r_P = 2.582).

4.3.9. **Other opinions** (on free availability; open access to the database; the inclusion of collocations; standard and contemporary lexica; the reliability of the data; user votes) show no correlations: the age of the respondents does not play a role.

Hypothesis [h3] was not confirmed. While younger respondents (16-25 years) demonstrated the biggest difference in opinion, they were not more positive towards the digital format and interactivity. On the contrary, they were more frequently indifferent towards up-to-datedness, corpus examples, user suggestions, and the fact that the dictionary is never finished than other age groups. They were also more often bothered by the inclusion of user suggestions and the fact that the dictionary is never truly finished. One possible explanation for these differences would be that respondents of this age (e.g. high school students) participated by the direction of a teacher, which would make them less interested in the topic than the age groups who participated voluntarily.

4.4. Professional Occupation of the Respondents

Respondents were asked in which domains of their (professional) occupation language played an important role. 644 respondents chose one or more categories presented in Table 4.

Table 4: "If language plays, played or will play an important role in your professional occupation, mark all the relevant categories."

Proofreading	352
Translation	332
Teaching Slovene as L1 – primary school	120
Teaching Slovene as L1 – secondary school	75
Teaching Slovene as L2/foreign language	112
Lecturing linguistics at the tertiary level	69
Journalism	73
Marketing	84
Law	32
Librarianship	41
Public administration	60
Administration	81
Management	32
Fiction writers	46
Creative writing, blogging	154
Academic writing	184
Language research	101
Lexicography	47
Amateur language research	182
Other	30

We calculated statistically significant differences between the groups (see Chapter 3.3). Due to the space limitations, we present here only the results that are significant for respondents pertaining to an individual group.[7]

4.4.1. Compared to other groups, respondents who **proofread** are rarely indifferent about open access [$r_P = -2.495$; $\chi^2 = 19.697$, N = 635, df = 3, p ~ 0]* and the inclusion of collocations [$r_P = -2.268$; $\chi^2 = 25.44$, N = 633, df = 3, p ~ 0]*. They are also rarely indifferent ($r_P = -2.242$) or uncertain ($r_P = -2.464$) about the inclusion of corpus examples and links [$\chi^2 = 29.941$, N = 633, df = 3, p ~ 0]*. Finally, they are more often bothered by the lack of labels in the dictionary [$r_P = 2.135$; $\chi^2 = 16.677$, N = 634, df = 3, p = 0.001].

[7] For example, only for the respondents who *are* translators, and not for the respondents who are *not* translators. In this set of data, low numbers in contingency tables were mostly due to the fact that few respondents in a given category were bothered by the feature in question.

4.4.2. Respondents who **translate** are rarely indifferent (r_P = -2.359) or uncertain (r_P = -2.054) about the inclusion of collocations, and they more often like it [r_P = 2.129; χ^2 = 30.307, N = 633, df = 3, p ~ 0]*. They are also rarely indifferent to the inclusion of corpus examples and links [r_P = -2.142; χ^2 = 20.388, N = 633, df = 3, p ~ 0]*.

4.4.3. Respondents who **teach Slovene in elementary schools** are rarely bothered by the fact that the dictionary is automatically compiled [r_P = -2.211; χ^2 = 9.844, N = 632, df = 3, p = 0.02].

4.4.4. Respondents who **teach Slovene in secondary schools** are often bothered by the fact that the dictionary only comprises standard and contemporary lexica [r_P = 2.330; χ^2 = 10.227, N = 634, df = 3, p = 0.017]. They are also rarely indifferent to the lack of labels [r_P = -2.438; χ^2 = 11.649, N = 634, df = 3, p = 0.009].

4.4.5. Respondents who **teach Slovene as a second/foreign language** are rarely bothered by the inclusion of user suggestions [r_P = -2.007; χ^2 = 9.732, N = 633, df = 3, p = 0.021]. They are rarely uncertain about collocations [r_P = -2.098; χ^2 = 8.527, N = 633, df = 3, p = 0.036]* and corpus examples [r_P = -2.376; χ^2 = 11.176, N = 633, df = 3, p = 0.011]*.

4.4.6. Similarly to translators, respondents who **lecture linguistics** are rarely indifferent (r_P = -2.264) or uncertain (r_P = -1.998) about the inclusion of collocations, and they more often like it [r_P = 2.081; χ^2 = 15.83, N = 633, df = 3, p = 0.001]. They are also rarely uncertain about the inclusion of corpus examples and links [r_P = -2.014; χ^2 = 11.945, N = 633, df = 3, p = 0.008]*.

4.4.7. Respondents active in the field of **journalism** are rarely indifferent towards the lack of labels (r_P = -2.131) and more often like it [r_P = 2.907; χ^2 = 16.34, N = 634, df = 3, p = 0.001].

4.4.8. Respondents in **marketing** are less often uncertain about the automatic procedures behind the dictionary creation [r_P = -2.180; χ^2 = 8, N = 632, df = 3, p = 0.046].

4.4.9. Respondents dealing with **librarianship** are more often indifferent to the fact that the dictionary is never finished [r_P = 2.181; χ^2 = 7.938, N = 637, df = 3, p = 0.047]* and more often uncertain about the inclusion of user votes [r_P = 2.698; χ^2 = 8.163, N = 633, df = 3, p = 0.043]*.

4.4.10. Respondents in **public administration** are more often uncertain about the frequent updates [$r_P = 2.296$; $\chi^2 = 8.284$, N = 637, df = 3, p = 0.04]*, the inclusion of collocations [$r_P = 2.358$; $\chi^2 = 10.951$, N = 633, df = 3, p = 0.012]*, and corpus examples [$r_P = 2.158$; $\chi^2 = 10.951$, N = 633, df = 3, p = 0.012]*.

4.4.11. Respondents in **management** are more often indifferent about the frequent updates [$r_P = 3.372$; $\chi^2 = 12.971$, N = 637, df = 3, p = 0.005]* and open access [$r_P = 3.357$; $\chi^2 = 13.96$, N = 635, df = 3, p = 0.003]*.

4.4.12. **Fiction writers** are less often uncertain about the dictionary never being truly finished [$r_P = 2.024$; $\chi^2 = 7.947$, N = 637, df = 3, p = 0.047]*.

4.4.13. Respondents who partake in **academic writing** are less often uncertain about the frequent updates [$r_P = -2.043$; $\chi^2 = 12.558$, N = 637, df = 3, p = 0.006]*.

4.4.14. Respondents who conduct **language research** are rarely uncertain about the inclusion of user suggestions [$r_P = -2.453$; $\chi^2 = 12.632$, N = 633, df = 3, p = 0.006]. They are rarely indifferent toward collocations ($r_P = -2.766$) and more often in support of them [$r_P = 1.987$; $\chi^2 = 16.468$, N = 633, df = 3, p = 0.001]*.

4.4.15. **Lexicographers** are rarely uncertain about collocations [$r_P = -2.230$; $\chi^2 = 13.133$, N = 633, df = 3, p = 0.004]*. They are more often bothered by the lack of labels [$r_P = 2.657$; $\chi^2 = 12.448$, N = 634, df = 3, p = 0.006].

4.4.16. Finally, respondents who conduct **amateur language research** are slightly more likely to be uncertain about the automated procedures [$r_P = 1.979$; $\chi^2 = 8.413$, N = 632, df = 3, p = 0.038].

4.4.17. Groups of respondents from the fields of law and administration and of respondents whose work involves creative writing and blogging produced no statistically relevant findings.

Hypothesis [h4] that professional occupation would play an important role regarding the attitude of the respondents towards the new features was not confirmed. Most of the findings were pertaining to the respondents' indifference towards the features or their (un)familiarity with them. The results demonstrate that (several groups of) language professionals are less often uncertain of or indifferent about the inclusion of collocations and corpus examples, while the opposite is true of public administrators. On the other hand, the groups most

bothered by the lack of labels are proofreaders and lexicographers, while journalists more often like it. Secondary school teachers are often bothered by the inclusion of (solely) standard and modern Slovene, which was also not foreseen and can be explored in our future user studies.

5. Conclusion and Future Work

The results show that most (potential) users rate the innovations introduced by the responsive dictionary as positive but are more apprehensive when it comes to data reliability, which is in line with the findings of similar studies on user preferences and digital dictionaries. The concept of the responsive dictionary aims at a continued increase of reliability, while the relevant questions for our future work are whether it can have a positive effect: (a) if the data is openly and predictably unreliable (as is usually the case with the results of automated procedures) and (b) if the community is given tools to immediately react to the noise and the gaps in the data. As demonstrated by the results of the survey, the attitude towards reliability is not affected by the respondent's familiarity with the dictionary: using the dictionary does not change the perspective on reliability. It does, on the other hand, change the perspective on the inclusion of collocations (towards the positive), and the lack of labels and non-standard, non-contemporary lexica (towards the negative).

For the upcoming upgrade, we intend to include the obtained user feedback in two manners. Firstly, we will improve the quality of the data by removing the noisy multi-word units (Čibej and Arhar Holdt 2019). Secondly, we intend to label derogatory lexica and upgrade the editorial control of user-generated suggestions to prevent hate speech and malicious content. We will furthermore facilitate labels that users can add to their suggestions, e.g. to mark derogatory suggestions. Further user studies are planned to establish the quantity and the quality of user-generated suggestions. Last but not least, educational material will be prepared to explain the features which were highlighted in the survey as most unknown to the respondents.

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Kako korisnici reagiraju na odzivni rječnik: slučaj *Slovara sopomenk sodobne slovenščine*

Sažetak

Slovar spomenk sodobne slovenščine odzivni je rječnik koji je automatski generiran iz postojećih jezičnih resursa, a daljnji razvoj rječnika uključuje sudjelovanje korisnika. Mnoge značajke odzivnoga rječnika nove su slovenskoj jezičnoj zajednici (npr. podatci se crpe automatski i imaju određene pogreške, nestručnjaci sudjeluju u sastavljanju rječnika koji nikad nije u potpunosti završen). Uz financijsku potporu Slovenskoga ministarstva kulture provedeno je istraživanje kako bi se utvrdili stavovi korisnika o tim novim značajkama. U radu se prikazuju rezultati istraživanja (N = 671) uključujući statističku analizu zavisnosti stavova sudionika istraživanja i njihova poznavanja novoga rječnika, dobi i zanimanja.

Keywords: e-lexicography, responsive dictionary, user survey, user opinion, Thesaurus of Modern Slovene

Ključne riječi: e-leksikografija, odzivni rječnik, istraživanje korisnika, stavovi korisnika, *Slovar spomenk sodobne slovenščine*