

ONLINE GERMAN LANGUAGE LEARNING TOOLS: A CASE STUDY OF STUDENT INSIGHTS INTO DICTIONARY USE

FERRAMENTAS ON-LINE DE APRENDIZAGEM DE LÍNGUA ALEMÃO: UM ESTUDO DE CASO DE INSIGHTS DO ESTUDANTE SOBRE O USO DO DICIONÁRIO

Oksana Storonska

ORCID 0000-0003-2348-0265

Lviv Polytechnic National University, LPNU

Lviv, Ukraine

oksana.s.storonska@lpnu.ua

Oksana Syvyk

ORCID 0000-0002-2329-8896

Drohobych Ivan Franko State Pedagogical University,
DSPU

Drohobych, Ukraine

ksenja241983@dspu.edu.ua

Halyna Palytsya

ORCID 0000-0002-6817-5232

Lviv Polytechnic National University, LPNU

Lviv, Ukraine

halyna.s.palytsia@lpnu.ua

Vitaliia Hrytsiv

ORCID 0000-0001-7424-0363

Lviv Polytechnic National University, LPNU
Lviv, Ukraine

vitaliia.b.hrytsiv@lpnu.ua

Abstract. The article focuses on the study of the didactic potential of online German language dictionaries, which is based on the feedback provided by students of Drohobych Ivan Franko State Pedagogical University (Ukraine). The aim of the present research is to investigate students' attitudes toward German language online dictionaries and their use in learning German as a foreign language. To accomplish this aim, a combination of theoretical, empirical, and statistical research methods is employed. Based on an online survey featuring 41 students of the Faculty of Ukrainian and Foreign Philology of Drohobych Ivan Franko State Pedagogical University, an information research base is formed. The study covers a wide range of student feedback on online German language dictionaries alongside their application in the process of language skill acquisition. The feedback analysis allows for revealing the respondents' mixed reviews regarding their experience of using online German language dictionaries. The students' feedback ranges from positive, highlighting the functional, content-related, and technical features of the lexicographic resources under investigation, to negative, criticizing the difficulties in using them. Based on these results, prerequisites are delimited for an effective use of modern online dictionaries as a tool of mastering German. Furthermore, based on the Ukrainian students' requests, recommendations are outlined of improving these didactic lexicographic resources.

Keywords: online German language dictionary; online dictionary type; online dictionary use; student feedback; content; ergonomics

Resumo. O artigo centra-se no estudo do potencial didático dos dicionários online de língua alemã, que se baseia no feedback fornecido por alunos da Universidade Pedagógica Estadual Drohobych Ivan Franko (Ucrânia). O objetivo da presente pesquisa é investigar a percepção do aluno sobre o potencial de uso do dicionário moderno online da língua alemã no domínio do alemão e no desenvolvimento e melhoria dos recursos lexicográficos didáticos. Para atingir esse objetivo, uma combinação de métodos de pesquisa teóricos, empíricos e estatísticos é empregada. Com base em uma pesquisa com 41 alunos da Faculdade de Filologia Ucrâniana e Estrangeira da Universidade Pedagógica Estadual Drohobych Ivan Franko, uma base de pesquisa de informações é formada. O estudo abrange uma ampla gama de comentários dos alunos sobre dicionários on-line da língua alemã, juntamente com sua aplicação no processo de aquisição de habilidades linguísticas. A análise de feedback permite revelar as opiniões mistas dos entrevistados relativamente à sua experiência de utilização de dicionários online de língua alemã. O feedback dos alunos varia de positivo, destacando as características funcionais, de conteúdo e técnicas dos recursos lexicográficos investigados, até negativo, criticando as dificuldades em utilizá-los. Com base nesses resultados, são delimitados pré-requisitos para uma utilização eficaz dos modernos dicionários online como ferramenta de domínio do alemão. Além disso, com base nos pedidos dos estudantes ucranianos, são delineadas recomendações para melhorar estes recursos lexicográficos didáticos.

Palavras-chave: dicionário on-line da língua alemã; tipo de dicionário online; uso de dicionário online; feedback dos alunos; conteúdo; design ergonômico.



1. INTRODUCTION

1.1 Background of research problem

The constant expansion and strengthening of political, economic, cultural, etc. ties in the modern world impose stiffer requirements for foreign language training of young generations in order to successfully adapt the latter to the life shaped by intensive integration and globalization processes. The customization and implementation of these standards involves continuous improvement of the foreign language teaching system by revising its goals, objectives, and content along with updating its methods, tools, and organization forms. A search for ways to solve these issues is the subject of numerous modern studies that address current target priorities in teaching foreign languages in the context of the realities and possibilities of communication in today's borderless world (Mambu, 2022; Cheng, 2023; Dai, 2023), offer constructive approaches to designing curricula based on the actual needs and requirements for foreign language proficiency (Rouffet et al., 2022; Emilia & Sukyadi, 2023; Liao, 2023), identify effective methods of forming the students' foreign language communicative competence (Anisa et al., 2020; Resmi et al., 2023; Nisha, 2024), etc.

One of the solutions to these problems is the introduction of the latest information and communication technologies into teaching foreign languages, which makes it possible to reorganize the educative process on an innovative methodological basis and progressive technological approaches. According to the results of recent studies in this area, modern information and communication technologies have a great potential in solving the issues of raising motivation to learn foreign languages and developing a full range of students' foreign language knowledge and skills primarily by using unique authentic materials, original virtual formats and innovative teaching methods (Ayotunde et al., 2023; Kim et al., 2023; Ludwig & Tassinari, 2023; Storonska et al., 2023). A number of experimental studies in this vein corroborate the effectiveness of interactive teaching of foreign language phonetics with the help of Twitter (Mompean & Fouz-González, 2016), game-based teaching of foreign language vocabulary by means of Kahoot! (Quiroz et al, 2021), improvement of foreign language speaking skills through TED Talks video hosting (Shouket et al., 2022), development of foreign language listening competence through the Netflix video streaming service (Dizon & Thanyawatpokin, 2021), etc.

The rapid development of information technologies opens up extensive prospects for optimizing foreign language teaching, primarily due to the modernization of the learning tools, including dictionaries as an additional source of information about the language word stock in terms of its semantics, orthography, articulation, etymology, pragmatics, etc. Modern online dictionaries often surpass their printed counterparts, especially in terms of the volume and comprehensiveness of the information alongside the diversity of its presentation forms, the hypertext structure of the content, the variability of the search algorithms, etc. These parameters significantly simplify the majority of logical operations involved in dictionary use, and, therefore, constitute an integral part of the corpus-based software development process (Ambarwati & Mandasari, 2020; Dziemianko, 2020; Karami & Riasati 2023; Shrestha & Murano, 2022).

1.2 Literature review

The compliance of online dictionaries with the requirements of the modern digital world and the extensive prospects for using the former as state-of-the-art foreign language learning tools have led to the emergence of a number of educational publications on the subject. The works in question highlight both the theoretical outlook on the nature and typology of online dictionaries, their functionality, quality parameters, design technologies, etc. as well as the

applied perspective on their efficiency in foreign language learning and teaching (Alharbi, 2022; Ambarwati & Mandasari, 2020; Edbadi et al., 2022). Along with the theoretical description of online dictionaries as foreign language learning tools and the experimental verification of their effectiveness in the formation of foreign language knowledge, abilities, and skills, it is quite natural that the researchers equally focus on the respondents' direct experience and impressions of using this type of lexicographic resources.

The study conducted by Dashtestani (2013), one of the objectives of which presupposed surveying students mastering English as a foreign language at higher education institutions in Iran about the goals, methods, advantages, and disadvantages of using various English-language online dictionaries, delves deeply into this issue. The research results testify to the students recognizing the importance of using online lexicographic resources as a tool of language acquisition, which manifests itself in their frequent and multipurpose use, in particular for identifying lexical meanings ($M=3.93$), checking pronunciation ($M=2.59$), verifying morphological characteristics ($M=3.09$), establishing etymology ($M=1.71$), etc. At the same time, the data obtained by the author indicate the respondents' mixed feedback on this type of lexicographic sources. It manifests itself, on the one hand, in the respondents praising the software accessibility and user-friendliness, its detailed definitions and audio-visual content, and, on the other, in the learners criticizing the high costs of the full versions, the lack of definitions and examples, and the low quality of the audio materials offered by the online English language dictionaries under investigation.

The focus of another research, by Jin and Deifell (2013), is the reception of exclusively bilingual online dictionaries by US college students in the process of mastering foreign languages. The participants of the study are learners of 18 different foreign languages. Such a sample of the respondents enables the authors to reveal a complex and heterogeneous picture of the quality of these resources as well as to examine the students' attitudes to online dictionaries within each language. The survey results suggest that bilingual online dictionaries prove to be an important foreign language learning tool. The authors note the predominantly positive feedback provided by the respondents (74.9%) and observe the multiple uses of the resources in mastering reading, speaking, writing, and listening. At the same time, L. Jin and E. Deifell identify a number of challenges, related in particular to lack of high-quality online dictionaries in some of the languages, incomprehensiveness, lack of grammatical explanations and information on word usage, etc., which accounts for the neutral (20.4%) and negative (4.7%) feedback on these foreign language learning tools given by the rest of the respondents.

The article by Aslan (2016) revolves around mobile dictionaries as an innovative type of modern digital lexicographic resources that has gained widespread popularity in recent years as a foreign language learning tool. The aim of this study is to determine the benefits and limitations of mobile dictionary use in mastering foreign language vocabulary by Marmara University translation students majoring in French, German, and English. As a result of the survey, the respondents indicate a number of advantages of mobile dictionary use, such as sufficient entry number (90%), information accessibility (54%), user-friendliness (27%), portability (15%), and regular updates (4%). At the same time, they highlight several disadvantages of this type of lexicographic resources, namely dependence on the Internet (51%), non-reproducible content (37%), screen and keyboard size limitations (4%), etc. According to the findings of the study, the respondents most often claim to have experienced difficulty translating polysemantic words (46%), understanding idiom definitions (19%), searching for synonyms or antonyms (13%), etc.

The study conducted by Márkus et al. (2024) added a new perspective to research on online dictionary use in foreign language learning, inasmuch as they tried to emphasise its importance in the context of comparing it with other types of lexicographic resources. In order to study the habits of using additional types of dictionaries, the researchers surveyed Hungarian university

graduates who studied different foreign languages. The study findings showed that online dictionaries were much more popular ($M=4.63$; $SD=0.78$), even if the respondents had printed lexicographic editions ($M=2.68$; $SD=1.35$). The researchers explain this fact by two features of online dictionaries that the study participants consider to be their key advantages, as well as additional content using corpora ($M=3.53$; $SD=1.45$) and multimedia support ($M=3.25$; $SD=1.36$). Thus, according to the findings of the study by Márkus et al. (2024), Hungarian university graduates most frequently used online dictionaries of major international publishers (Cambridge Online Dictionary, Oxford Online Dictionary Macmillan Dictionary Online, Duden Online, Langenscheidt Online Dictionaries, etc.), which possess such characteristics and properties.

Yet another research, by Li and Xu (2015), is restricted to Chinese university students' reception of a single online resource, the Macmillan English Dictionary Online (MEDO), as a reference source of phrasal verb meanings. The intro- and retrospective surveys conducted are indicative of both the advantages and the disadvantages of using it. In their feedback, the majority of the philology students (93.75%) praise the overall effectiveness of the MEDO for clarifying English phrasal verb meanings, with special emphasis placed on the usefulness of the definitions (75%) and examples (84.38%) provided, but underestimate the additional options of the software, such as the thesaurus (6.25%) or special functions (3.13%). In addition, the respondents elaborate on the incomprehensiveness of the definitions, the inadequacy of the examples, the impossibility of distinguishing the phrasal verb meanings, etc., which often leads to mistakes made in the identification of the semantic features of English phrasal verbs.

1.3 Significance of the study

The overview of the academic literature above testifies to the diversity of the approaches and research questions delving into the didactic potential of modern online dictionaries through the prism of student feedback. The works referenced above feature various lexicographic online sources, both monolingual and bilingual, electronic and mobile, explanatory and translation dictionaries, as the object of student feedback in all their functional, content-related, and technical properties. Despite the focus on online English language dictionaries and student perception of their application in learning English, the relevance of these research results to the framework of the present paper manifests itself in the presentation of students' general approaches to providing feedback on the goals and potential of the practical application of this innovative type of dictionary resources in the course of mastering a foreign language, complemented by respondents' opinions about the software content and function as well as technical advantages and disadvantages.

At the same time, there is a general lack of research into the current state of online German language lexicographic resources, especially considering their technical diversity and didactic potential as well as possible applications in students' mastery of German. With these ideas in place, it seems appropriate to investigate modern online German language dictionaries as a learning tool in the light of student feedback. It would significantly complement the general picture of the research results available on online lexicographic didactics, providing additional information about the German language segment of such sources and their reception by students learning German as a foreign language. In an attempt to fill this gap, our article is aimed at investigating the didactic characteristics of German-language online dictionaries in the context of university students' feedback. In order to achieve this, the study attempts to answer the following research questions:

- RQ1. Which online dictionaries of the German language are most popular among Ukrainian students mastering it as a foreign language?
- RQ2. How often do students use online German language lexicographic resources?
- RQ3. What are the goals of students using online German language dictionaries?



- RQ4. What are the advantages of online German language dictionaries according to students?
- RQ5. What difficulties do students encounter when consulting online German language dictionaries?

2. METHODOLOGY

2.1 Research design

Answering the research questions addressed in the present article necessitates a combination of theoretical and empirical methods in compliance with our objectives. Firstly, content analysis and a comparative method are used to determine and characterize the features shared by modern online German language dictionaries. Secondly, an online survey method is utilized to study the respondents' hands-on experience of and feedback on using online German language dictionaries. Thirdly, statistical methods are employed for the calculation and presentation of the quantitative parameters of the students' answers to the questionnaire. Fourthly, systematization and generalization methods serve the purpose of substantiating the prospects for the further improvement of online German language dictionaries, based on the respondents' feedback. All in all, the combination of these quantitative and qualitative methods is seen as a reliable basis for achieving the aim of our investigation and addressing the research questions provided above. In our opinion, their integrated use contributes to a holistic research of Ukrainian students' attitudes toward German language online dictionaries and their use in learning German as a foreign language: the quantitative analysis will produce concrete results through statistical calculations whereas the qualitative analysis will provide an in-depth understanding of the study problem.

2.2 Participants and procedure

The survey involves 42 students (Years 3 and 4) of the Faculty of Ukrainian and Foreign Philology of Drohobych Ivan Franko State Pedagogical University (Speciality 014 Secondary Education. Language and Literature (English and German)), who, given the duration of their studies, have gained sufficient hands-on experience of using diverse educational online German language resources and have volunteered to participate in our study. The respondents are obtaining the qualification of an English/German teacher in compliance with the requirements for the First (Bachelor) Level of Higher Education, which provides for the study of the German language as a second major starting from Term 3. The purpose of the research was explained to the respondents and they were informed that the participation in the study was completely voluntary. As the questionnaire is declared anonymous, no questions allowing for the participants' identification based on their personal data are included. They were made sure of the confidentiality of their responses. The survey is preceded by providing its participants with the full information regarding diverse online German language dictionaries along with a visual presentation of their possible applications. At the same time, in order to ensure the objectivity of the students' answers, an explanation of the tasks of the questionnaire and the algorithms for filling it out is carried out during the survey itself. As a result, 41 completely filled questionnaires are obtained.

2.3 Instruments

The questionnaire aimed at identifying the students' feedback on online German language dictionaries as a learning tool is designed electronically, using the Google Forms application. We chose this data collection tool and format because it is convenient and easy to implement, and does not require special skills from either the researchers or the participants. An online



survey in Google Forms helps to promptly collect the required information, regardless of the number of respondents, time or place of their location, level of education or training, etc. The questionnaire created in this app contained 5 questions ranging from the type of online German language dictionaries most often utilized by the respondents to the purposes and frequency of consulting the resources as well as the advantages and disadvantages of using them. The questionnaire content is presented below in an abridged and schematic form (see Table 1).

Table 1. Structure and content characteristics of the questionnaire

No	Content of the question	Examples of suggested answer options
1.	Which online German dictionary do you use most often?	PONS, Duden, DWDS, Langenscheidt, etc.
2.	How often do you use an online German dictionary?	From 0 to > 16 times per week.
3.	What do you use an online German dictionary for most often?	Lexical meaning identification, grammatical meaning identification, word usage check, etc.
4.	What do you think is the main advantage of an online German dictionary?	Auto-fill option availability, multimedia content, word search variability, etc.
5.	What do you think is the main disadvantage of an online German dictionary?	Complicated interface configuration, obscure definitions, nonreproducible content, etc.

Source: developed by the authors

In addition to the proposed options for answering the questions, the questionnaire provided an opportunity to offer your own answer to each question in order to obtain the most complete data on the students' specific habits of using online German language dictionaries and their unique view of their advantages and restrictions.

2.4 Data analysis

The data collected were examined using the descriptive statistics, which makes it possible to identify trends and relationships based on quantitative information. This research procedure is relevant to our study as it provides a comprehensive overview of the quantitative data in a concise schematic form, reflecting the entire range of regularities and irregularities in the participants' answers to the questionnaire. The processing of our survey results based on descriptive statistics involves the calculation, systematization, and visual summarization of the data obtained by using Microsoft Excel, which has the functionality to perform formula calculations, structure data, present it in the form of diagrams, create consolidated tables, etc.

Processing of the survey data obtained by using the Microsoft Excel programmable spreadsheet calculator involved frequency analysis to identify the degree of repetition of the questionnaire answers, and determine their percentages to better understand the relative frequency of certain respondents' answers in the overall survey data set. Therefore, due to the availability of relevant mathematical and statistical functions, as well the convenience of this software, we could quickly process all of the different answers given by our research participants.

3. RESULTS

3.1 General characteristics of online German language dictionaries

Modern German language lexicographic resources represent an imposing array of dictionaries that are quite miscellaneous in terms of their quality and volume in order to appeal to a wide range of users, namely students, teachers, philology researchers, etc. A special place within this product line is held by online dictionaries. They constitute Internet databases that either present corpora of formally, semantically, functionally, etc. standardized German lexical items, or provide translation equivalents in other languages. This software is generally



characterized by convenient high-yield algorithms to search for and select the necessary lexicographic information.



Figure 1. Logos of popular online German language dictionaries
Source: compiled by the authors

According to their key purpose, which consists in either defining German words and phrases or translating them into foreign languages, online German language dictionaries are divided into monolingual, bilingual, and multilingual ones.

Monolingual online German language dictionaries are mostly universal. Firstly, they provide comprehensive information about the meaning of standard German lexical items from a pragmatic perspective. Secondly, these resources present vocabulary in the light of its main linguistic characteristics, including grammar properties, stress, spelling, etc. Thirdly, the software features stylistic limitations on word usage along with lexical and grammatical valency. The online resources belonging to this group are DWDS, Duden Online, Elexiko, Wortbedeutung.info, and others. They provide not only a detailed description of the meanings and usage of German words, but also supply valuable additional information concerning the etymology, derivation, synonymy, stylistic colouring, etc. of the latter.

Bilingual and multilingual online German language dictionaries are instead designed on the purely translational principle. In the case of unidirectional resources, equivalents of the listed word-stock in one language are provided in another language or other languages. With respect to bidirectional resources, Langenscheidt, for instance, offers 27 bidirectional bilingual dictionaries, which enable lexeme translation in both directions. Due to their wide functionality, online lexicographic resources of the latter type include databases of more than two languages with the option of changing the translation direction. These include such Internet dictionaries as PONS, whose database contains 30 languages, or LEO, whose multilingual repertoire amounts to 10 languages. In addition to providing lexical equivalents from different languages as well as their grammatical characteristics and examples of their use, the software often features audio content in the source language and the target language.

3.2 Ukrainian students' feedback on online German language dictionaries use

All in all, modern online German language dictionaries are characterized by significant variability, which is the reason why their users from different countries all over the world can

efficiently obtain the required information about lexical items in terms of their origin, spelling and pronunciation, stylistic and territorial usage limitations, foreign language equivalents, etc. In order to specify the key characteristics and features of using online German language dictionaries, we surveyed Ukrainian students who studied it as a foreign language. The results allowed us to generate answers to the questions stated in our research.

In particular, the first question “Which online dictionaries of the German language are most popular among Ukrainian students mastering it as a foreign language?” was aimed at finding out the degree of popularity of well-known modern online German language dictionaries in the student environment. The students’ answers to the corresponding questionnaire question, which offered the possibility to select one of the proposed options or suggest their own, were distributed as follows (see Table 2):

Table 2. Types of online dictionaries most frequently used by students

Response	Frequency	%
1. PONS	7	17.1
2. Duden	13	31.7
3. DWDS	10	24.4
4. Langenscheidt	5	12.2
5. Hueber Online-Wörterbuch	4	9.8
6. Other (Wortbedeutung.Info, Elexiko)	2	4.8

Source: developed by the authors

According to Table 2, the majority of the respondents prefer the Duden and DWDS online resources, which provide comprehensive and reliable information not only about the form and semantics of the items but also about their lexical and grammatical valencies. This monolingual dictionaries prove to be in higher demand among Ukrainian students than their bilingual counterparts. This data contradicts the results of previous studies on students’ preferences for bilingual dictionaries when learning a foreign language (Jin & Deifell, 2013; Karczewska & Sharp, 2018). In our opinion, the opposite trend among Ukrainian students is primarily due to lack of comprehensive bilingual high-quality online dictionaries featuring the German-to-Ukrainian and Ukrainian-to-German translation options. As a result, the learners resort to using German-English or German-Russian dictionaries, which entails substantial inconvenience for native speakers of Ukrainian, making the translation process more labour- and time-consuming.

Our second research question “How often do students use online German language lexicographic resources?” was aimed at identifying the frequency with which Ukrainian students consult online German language dictionaries when studying German as a foreign language. The corresponding question contained answer options from 0 to more than 16 times per week. Their answers were distributed as follows (see Table 3):

Table 3. Frequency of students’ use of online German language dictionaries

Response	Frequency	%
1. 0	0	0
2. 1-5	1	2.4
3. 6-10	2	4.9
4. 11-15	7	17.1
5. > 16	31	75.6
6. Other	0	0

Source: developed by the authors

According to the results of the respondents’ self-observations of the approximate number of times they consult the resources per week, the majority of the learners claim to use the dictionaries more than 16 times a week, which represents a fairly high frequency rate. Conversely, none of the students has chosen the zero-value option. This data testify to the

generally high frequency of Ukrainian students' use of online dictionaries, which is typical for students in other countries as well (Le & Dao, 2019; Udry & Berthele, 2023; Le, 2023). In addition to the above, these findings imply that the students assess the resources as accessible and usable as well as containing comprehensive, reliable, and updatable information about German lexicon in its entirety, which proves to be especially useful in distance education. Another factor at play is a relatively limited choice of the high-quality printed lexicographic resources.

The third question of our study “What are the goals of students using online German language dictionaries?” was aimed at identifying the priority goal why Ukrainian students turn to this type of lexicographic resources. The corresponding question contained a fairly wide range of answer options – from elementary search for a word meaning to specifying its grammatical features, as well as generating their own answer. All students' positions on the goals of using German online dictionaries are presented in Table 4.

Table 4. Students' purposes in using online German language dictionaries

Response	Frequency	%
1. Lexical meaning identification	18	44
2. Word usage check (through examples)	11	26.8
3. Synonym/antonym search	3	7.3
4. Standard pronunciation verification	1	2.4
5. Grammatical meaning identification	6	14.6
6. Other (spelling check, collocation search)	2	4.9

Source: developed by the authors

According to Table 4, Ukrainian students, like students from other countries (Alharbi, 2022; Karami & Riasati, 2023; Márkus et al., 2023), provide a wide variety of reasons for the use of the resources, the most important being: identifying or specifying the semantic features of unfamiliar or partially familiar lexical items; clarifying the syntagmatic, paradigmatic, and epidigmatic word characteristics based on the illustrative examples provided in the dictionary entry exploring the grammatical properties of vocabulary items. The obtained data reveal significant quantitative discrepancies between the percentages of the options chosen by the respondents. In our opinion, the imbalance above indicates that the learners are aware of the multifunctionality of these resources, which makes it possible for the former to effectively confront various didactic challenges in the course of mastering German, for example, by learning lexical items in the unity of their form and meaning, syntagmatic, paradigmatic, and epidigmatic relations, usage contexts, etc.

Our fourth research question “What are the advantages of online German language dictionaries according to students?” required identifying the advantages of lexicographic resources of this type according to their users, notably Ukrainian students. The answer options included content informativeness, multimedia content, etc. Students could also give their own answer. Table 5 presents their ideas on the advantages of online German language dictionaries.

Table 5. Benefits of using German-language online dictionaries as learning tools

Response	Frequency	%
1. Word search variability	7	17.1
2. Auto-fill option availability	7	17.1
3. Content informativeness	9	21.9
4. User-friendly dictionary entry structure	6	14.6
5. Multimedia content	8	19.5
6. Other (accessibility, search efficiency)	4	9.8

Source: developed by the authors



According to Table 5, the respondents praise the informativeness and multimodality of the content, which largely correlates with the results of previous studies (Tulgar, 2017; Le & Dao, 2019; Trinh et al., 2021). In addition to the above, Ukrainian students emphasize the availability of an auto-fill option as well as the accessibility and search efficiency of the software. This data demonstrate the students' relatively even assessment of the key advantages of online German language dictionaries. Such distribution balance indicates, in our opinion, that both the informative and technical aspects of these resources are of equal importance for the respondents. It is the combination of these aspects that ensures the quality of the resources in terms of their content diversity and information accessibility alike.

Finally, the fifth question of our study "What difficulties do students encounter when consulting online German language dictionaries?" aimed at identifying particular difficulties that Ukrainian students encounter when consulting this type of lexicographic sources. The options for answering the question included, for example, non-reproducibility of the content, unclear interface, etc. There was also an option to provide your own answer in order to identify the full range of difficulties that students encountered when working with online dictionaries. The table below shows their answers to this question.

Table 6. Difficulties in using German-language online dictionaries

Response	Frequency	%
1. Internet connection quality limitation	17	41.5
2. Nonreproducible content	5	12.2
3. Complicated interface configuration	1	2.4
4. Obscure definitions	7	17.1
5. Difficulty differentiating confusable senses	4	9.7
6. Other (advertisements, lack of translation dictionaries from and into Ukrainian)	7	17.1

Source: developed by the authors

The data in Table 6, like the results of previous studies (Levy & Steel, 2015; Farina, et al., 2019; Alharbi, 2022), point to various challenges that Ukrainian students face when using online dictionaries. Based on their feedback, the main challenges include Internet connection quality limitation, which, apparently, also impedes the reproduction of certain content elements, as well as lack of translation dictionaries from and into Ukrainian and excessive advertising. According to this data, the obstacles tend to be caused by the external factors, such as poor Internet connection, rather than by the shortcomings of the lexicographic resources per se, such as, for example, excessive advertising. At the same time, these difficulties do not have any serious impact on the students' willingness to consult online German language dictionaries, which is corroborated by the evidence from the previous four tables.

3.3 Discussion of survey findings

The results of the present research demonstrate that Ukrainian students view modern online German language dictionaries as a valuable source of heterogeneous information as well as an efficient learning tool. The answers to the questionnaire testify to the popularity of primarily academic explanatory dictionaries, since the latter provide reliable and multifaceted data about German lexicon in its entirety and diversity. The resources aptly combine significant volume of information with user-friendliness, as confirmed by the respondents' equally positive feedback on the software content and technical specifications. At the same time, the functionality of these dictionaries is claimed to be limited by both the external conditions and the internal shortcomings, which prompts a search for the analogues or a development of the offline counterparts if necessary.

Our findings largely correlate with the conclusions of the previous educational studies on using Internet dictionaries for didactic purposes. University students from all over the world recognize online lexicographic resources as an important foreign language learning tool, which is reinforced by the rapid spread of education digitization (Alharbi, 2022; Ambarwati & Mandasari, 2020; Karami & Riasati, 2023). In our research, these results are confirmed by the high frequency of the respondents' use of online German language dictionaries and the variability of the learners' purposes, which include lexical and grammatical meaning identification, standard pronunciation verification, synonym search, word usage check, etc.

The Ukrainian students' feedback is similar to the comparable survey results from the other countries (Le, 2023; Le & Dao, 2019; Udry & Berthele, 2023) and indicates the undeniable benefits of using German-language online dictionaries as learning tools, which include, first and foremost, variable information accessibility and user-friendliness. The interaction of these two factors contributes to a significant facilitation of mastering heterogeneous German language material. The participants of our investigation, identically to the students from Iran (Dashtestani, 2013), Turkey (Tulgar, 2017), Hungary (Márkus et al., 2023), and Vietnam (Trinh, 2021) note the importance of proper multimedia content representation in online dictionaries, which makes it possible not only to organize lexical items in the unity of their form and meaning in the text format, but also to supply them with illustrative images, audio recordings, etc.

However, according to the data of our survey and in consonance with the results of the other investigations on the topic, the students do not idealize online dictionaries as a foreign language learning tool, which manifests itself in a number of the shortcomings, limitations, or use-related difficulties identified. Similarly to the Turkish (Aslan, 2016), Swiss (Udry & Berthele, 2023), and Slovenian (Farina et al., 2019) students, the participants of our study emphasize the technical issues related to poor Internet connection quality and nonreproducible content. In addition, the Ukrainian respondents note the content shortcomings of the online dictionaries they consult, namely obscure definitions and insufficiently differentiated confusable senses. The latter faults were also previously reported by the students from Vietnam (Li & Xu, 2015), the USA (Jin & Deifell, 2013), and Australia (Levi & Steel, 2015).

The processing of the collected data allows us not only to draw obvious parallels with the results of the previous studies in the field but also to identify how online German language dictionaries are viewed specifically by Ukrainian students. The previously unmentioned benefits include content informativeness, word search variability, and auto-fill option availability. Regarding the limitations, the lack of high-quality German-Ukrainian and Ukrainian-German dictionaries on the Internet as well as on the book market of Ukraine compels the respondents to mostly resort to using authentic monolingual online dictionaries instead. The other critical remarks concern the annoying advertisements and confusable senses.

All in all, based on our survey results, the respondents' feedback on using online German language dictionaries proves to be mixed. On the one hand, the collected data feature numerous favourable student reviews concerning the informativeness, multifunctionality, accessibility, user-friendliness, etc of the software. On the other hand, the survey results equally contain a number of critical remarks regarding the complicated information presentation patterns, Internet connection quality limitation, excessive advertising, lack of translation dictionaries from and into Ukrainian, etc. Thus, our approach to assessing modern online German language dictionaries shows that the respondents are both active and conscious users possessing a proper understanding of the advantages and disadvantages of the lexicographic resources under scrutiny.

Our research findings allow for outlining several proposals for improving online German language dictionaries in accordance with the students' requests. Firstly, we consider it relevant for some of the web resources analyzed to reduce the number of advertisements, since the latter



greatly complicate the perception of the information from the dictionary entries. Secondly, we consider it expedient for software developers to create up-to-date bilingual online German-Ukrainian and Ukrainian-German dictionaries, which would provide accurate lexical equivalents and user-friendly word search algorithms. Thirdly, we think it appropriate for lexicographers to develop special online German language dictionaries intended for learners (for example, following the content and interface of the English online resources Oxford Learners' Dictionary or Cambridge Learners' Dictionary), which would be characterized by the simple, concise, and clear definitions and exemplifications of the lexical items in view of the users' non-identical linguistic competence.

4. CONCLUSION

The present article is written in the vein of didactic methodology with a focus on online lexicography in the light of student users' experience and feedback. The data analysis provides answers to all the research questions addressed and contributes to complementing the general picture of the research results available on the academic issue. Our article contains detailed information about the modern online German-language dictionaries that are most popular among Ukrainian students (Duden, DWDS, PONS); the high frequency rate of their use (amounting, according to 92.2% of the respondents, to more than 10 times a week); the most typical purposes of consulting them (identifying lexical meanings, studying word usage examples, clarifying grammatical properties, etc). Based on their hands-on experience of using online German language dictionaries as a learning tool, the participants of our survey point to a number of their advantages, the most important being content informativeness, multimedia content, accessibility, and word search variability. At the same time, the respondents equally note the difficulties encountered when using these lexicographic resources, which primarily boil down to Internet connection quality limitation, information presentation complexity, lack of a translation dictionary from and into Ukrainian, and excessive advertising.

All the evidence collected and analyzed in the present investigation points to the didactic need for teachers to provide students with opportunities to effectively use modern online German language dictionaries, including, but not limited to, detailed preliminary familiarization of learners with the types, functions, and features of such resources; highlighting the content-related, functional, technical, and other advantages as well as disadvantages of modern online German language lexicographic sources; providing support and guidance inside and outside the classroom to help students cope with potential difficulties. In addition, our research data allow for outlining a number of prospects for improving modern online German language dictionaries and further developing the existing software in consonance with the challenges reported by the respondents, including content adaptation to different German language mastery levels; creation of special educational explanatory online dictionaries; compilation of a bilingual online German-Ukrainian dictionary; reduction of the number of advertisements to facilitate word search and entry perception. Further research into this academic area should involve an experimental verification of the impact of using various types of online German language dictionaries on the students' lexical, phonetic, and grammatical knowledge as well as their communication and translation skills.

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