ASIALEX 2023

The Asian Association for Lexicography

" Lexicography,
        Artificial Intelligence,
                and Dictionary Users "

Date: **June 22-24**, 2023

Venue: The Commons, Yonsei University

Host 한국사전학회 KOREALEX 연세대학교 국어국문학과 | BK FOUR 21 한국 언어·문학·문화 미래선도 글로벌인재 양성 교육안

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FOREWORD

The theme of ASIALEX 2023 is Lexicography, Artificial Intelligence, and Dictionary Users. While proposals on any other topics related to the study and use of dictionaries are also welcome, ASIALEX 2023 aims to provide opportunities to discuss the changes and challenges that go beyond the realms of traditional lexicography and seek new directions and prospectives for lexicography and dictionaries to cope with social problems and changes. Dictionaries, including their accompanying resources and tools, technologies, platforms, and publication formats, have been continuously developing according to changes in the trends and cultural contexts of the times. As lexicography undergoes periods of transition, researchers have questioned the future of dictionaries and dictionary-maker, and even the EURALEX 2010 roundtable discussion on the theme 'Will there be people who make dictionaries in 2020?'. Now that we are well beyond 2020, fortunately, the activities of many associations and researchers in the field of lexicography remain strong and ongoing. Although commercial models based on profit structures of print dictionaries no longer exist, the demand for refined language resources and the power of language information seem to have become even stronger. The questions we are faced with are thus related to what opportunities as well as crises dictionaries and lexicography face. With this in mind, we look forward to discussing the cultural roles of lexicography and lexicographers, the value of language information in the AI era, and dictionary users themselves as major topics. The following points detail our intention to propose the theme of Lexicography, Artificial Intelligence, and Dictionary Users for ASIALEX 2023.

Dictionaries in the Age of Artificial Intelligence

In the current era of AI, dictionaries exist not just for human beings, but also for machines, and this shift urges us to deepen the discussion of theoretical lexicography and to expand the scope of dictionaries more flexibly. While the word has long been considered the basic unit of dictionary entries, it is now necessary to consider how to better adopt typically unregistered categories, such as neologisms, non-standard forms, loanwords, hate speech, slang, and pragmatic or nonverbal information, which have often been neglected in traditional lexicography. As Sinclair et al. (2004) referred to an ideal dictionary as containing all semantic units, it is time to consider the useful extensions and forms of a dictionary containing all such semantic units used in everyday communication.

Implication and Significance for and of Dictionary Users

Not only have the boundaries of what is considered a dictionary expanded. but the definitions of dictionary users have expanded as well. As the term 'machine readable' shows, nowadays dictionary users include machines as well as humans. Nonetheless, even dictionaries designed for machines ultimately aim to represent human intuition. For a dictionary to properly function as a medium connecting human intuition and machines, it is necessary to think about how to represent knowledge of the world more precisely.

Popularization of Lexicography and the Role of Professionals

Finally, we hope that this conference will lead to discussions on popularizing dictionaries and fostering subsequent generations of lexicographers. Dictionaries are found all around us, and they are used everywhere in our daily lives, although we may not be aware of their presence. Despite the achievements of lexicography throughout human history and the relatively recent corpus revolution (Rundell and Stock 1992, Rundell 2008, Hanks 2012), the study of dictionaries does not seem to be widely appreciated by the public. For the public in general, dictionaries are still difficult to use, and lexicography is an unknown area. Scholars and professionals in lexicography thus need to seek out the desired identity of dictionaries as required in modern times by approaching and interacting with the public. We hope that ASIALEX 2023 will present opportunities to diagnosing modern social communication problems by gaining a better understanding of the public use of language, and listening to the needs of a new, modern era with a more flexible attitude toward the structures, forms, and boundaries of lexicography and dictionaries

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Don't throw your paper dictionary away! Using different types of dictionaries for improving EFL vocabulary learning

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Abstract

The digitalization has revolutionized L2 acquisition and fostered a great diffusion of online dictionaries (Müller-Spitzer 2014). But experiments comparing online to paper-based dictionaries provide mixed results (Lew&DeSchryver 2014): Chen (2010) did not find significant differences for vocabulary acquisition between the two kind of dictionaries, while Allharbi (2016) and Dziemianko (2010) found that students using online dictionaries could learn more words compared to paper-based dictionaries. In contrast Li-Ling&Liu (2013) and Ferrett&Dollinger (2021) brought data in favour of the printed dictionary.

The present study was carried out in order to see if there were any significant differences between online and paper dictionaries in the context of EFL learning with regard to: a) vocabulary acquisition; b) memorization of (15) new words; c) reading comprehension d) long-term retention of new words. Fifty-four students carried out the experiment in 4 sessions at a language centre run by a German university; they were randomly assigned to the online, paper and a control group. Based on the results, in the short-term test users vs paper dictionaries performed slightly better on an exercise on the correct spelling of words than the control group. Another statistically significant difference was that students rated the user-friendliness of the paper dictionary slightly better.

Keywords: digital reading, reading comprehension, reading behaviours, reading habits, vocabulary acquisition, second language

1. Theoretical background

Vocabulary acquisition is an important subject in the didactic of a foreign language. Once learners are familiar with the basic structures of the target language, they want to start saying and understanding more words. Learners need to notice language features in order to acquire them (Schmidt, 2001). When students want to learn new vocabulary, for instance, they need to notice unknown words and pay sufficient attention to them. Retention of new words is further determined by the way in which these words are processed, whereby deeper and more elaborate processing results in better words. Dictionary use represents one of the main useful and easily accessible sources learners address to. The digitalization fostered a great diffusion of online dictionaries. Nowadays students, instead of getting lost in leafing through a heavy paper dictionary, just need to insert the unknown word in the internet using their smartphone, tablet, computer or laptop to find its meaning or synonym, antonym, as well as its pronunciation.

One of the first scholars working on the use of dictionary in the didactic of a foreign language was Knight (1994). She investigated the practice of using dictionaries while reading. Her results showed that "subjects who used the dictionary not only learned more words but also achieved higher reading comprehension scores than those who guessed from context. In addition, correlations between actual number of words looked up and recall scores reinforce the finding that comprehension does not suffer as a result of dictionary use" (Knight, 1994: 295). In their experiment, Alharbi (2016) and Al-Shehri and Gitsaki (2010) let subjects read passages on a computer with access to an online dictionary. In both experiments, participants using the online dictionary had better results on the subsequent vocabulary test compared to the group that did not use a dictionary. Experiments comparing online to paper-based dictionaries provide mixed results. Dziemianko (2011, 2012) and Chen (2012) did not find significant differences for vocabulary acquisition between the two kind of dictionaries, but Dziemianko (2010, 2017) found that students using online dictionaries could learn more words, phrases, and collocations compared to paper-based dictionaries. Liu and Lin (2011) and Alharbi (2016) reported that subjects acquired the meanings of words faster when accessed through a pop-up dictionary as opposed to a type-in dictionary.

Some studies suggest that learners have a better text comprehension when they use an online or paper dictionary compared to not using a dictionary at all (Chun, 2001; Goyette, 1997; Knight, 1994). According to other studies there is no significant difference in term of comprehension when different types of dictionaries are used (Aust, Kelly & Roby, 1993; Liu & Lin, 2011; Prichard & Matsumoto, 2011), although Alharbi (2016) found that the passage comprehension for participants who used a pop-up dictionary was higher than for participants who used a type-in dictionary, paper dictionary, or no dictionary. To our knowledge, there has not been a study that compares the effects on comprehension when learners completely transfer their attention away from a long literary text (short novel) to access unknown words by typing to an online dictionary smartphone versus looking for the words in a paper dictionary.

In the dictionary filed, there are numerous controversial discussions related to the advantages or disadvantages of paper vs.

contribution of paper dictionaries and online dictionaries to German EFL learners' vocabulary learning. Given the above presented findings, the following research questions will be analysed in this study:

1. Is there a difference between the effect of online dictionaries and paper dictionaries on the learning of new vocabulary in an EFL context?

   Specifically, we are interested to what extent the paper and online conditions differ in their effect on learners':

   a) vocabulary acquisition: recognition and meaning of target words;

   b) memorization of those words;

   c) comprehension of a reading passage;

   d) long-term retention of target words (after one and two weeks);

2. Does the paper dictionary carry social prestige?

3. What is students experience in using dictionaries?

2. Experimental setup

2.1 Participants

The participants in this study were students of various university faculties of the University of Göttingen attending a B2 CEFR English class at the Language Centre of the same university. In total 89 students were recruited for the experiment.

Before entering the English class, all participants had to perform a language placement test measuring listening and reading comprehension. Thirty-five students were excluded from the study, because they couldn't complete their participation in the study. Consequently, 54 subjects have taken part actively in the study and will be analysed in the following. Two-thirds of the students in the sample are female, one third male. The most frequently studied fields are Economics (10 students), Agriculture, Biology and Social Sciences (5 students each). 87 percent of all students named German as their native language. Among the other native languages were Arabic (2) and Spanish (2). 13 percent of all students stated that they had learnt another language before the age of six.

2.2. Procedures

The experiment was structured in 4 sessions:

2.2.1 Session I

In the first session (pre-treatment), participants performed a vocabulary test to determine whether they had previous knowledge of the target words, that were chosen for the experiment. Additionally, they were asked to fill in a questionnaire on their habits and preferences in dictionary use and their personal information.

Target word selection and preliminary vocabulary test

The preliminary vocabulary test comprised of 40 English words, with 25 distracters alongside the 15 target words. The 15 target words for the B2 level were substantives, adjectives, adverbs and verbs selected through a previous test conducted with 80 participants. In addition, a LexTale test was administrated, in order to further asses the lexical competences of the participants. At the end of the first session, participants had to answer a questionnaire related to on their dictionary use habits and preferences.

2.2.2 Session II, III, IV

In the second session (experiment main session), participants were asked to read the short story *The Model Milionnaire* (1887) by Oscar Wilde. It was selected as reading material for the experiment. The readability, appreciation and the comprehension difficulty were pretested with another group of students the semester before, in order to check if the text could fit a B2 level. Four EFL teachers also classified the short story as a text suitable for the target level of students. Furthermore, an automatic Readability Checker[1] was conducted to proof the reading and grade level of the text.

Before the second session, students were randomly assigned to the following three groups:

- Treatment group 1 (paper): participants assigned to this group had to read the text and look at the definition of the target words marked in bold using the paper dictionary.

- Treatment group 2 (online): participants assigned to this group had to read the text and look at the definition of the target words marked using the online dictionary on their smartphone.

- Control group (control): participants assigned to this group had to read the text and infer from the context the meaning of the target words through the context without dictionary aid.

PONS bilingual (German-English/English-German) compact dictionary in book format and PONS bilingual dictionary online were used for groups 1 and 2 respectively.

The reading time was measured, but students did not have any time constraints.

After the reading part, the following tests were administered to the students:

Test object	Test typology
1)Vocabulary acquisition	**a) Form test (5 items)** Participants had to choose the correct English spelling of a target word in the reading passage from one of four possible options. Of the four spellings displayed for a target word, one is the correct spelling, one contains an incorrect letter, one contains two interchanged letters, and one contains an incorrect letter and two interchanged letters. It is a receptive task. (Ex. A. percipt B. percept C. precipt D. precept E. I don't know) **b) Meaning test:** 1) Translation - Receptive meaning (5 items) Participants were requested to write down in German, a brief definition or a translation of the target word from the reading passage. 2) Sentences - Productive task (5 items) The participants had to write 5 sentences with the target word of the receptive meaning task.
2) Content recall	**c) Cloze test (5 items)** Participants were asked to fill-in the target words in the blank spaces of the original text. Beside the memory task, this also includes a productive task. The participants had to recall and write the spellings or forms of the target words. Ex.: Over his shoulders was _____ a coarse brown cloak […]
3) Comprehension	**d) Content test (7 items)** The participants had to answer questions related to the content of the text. In this part, we tested how much information the participants could remember by having them focus on both the target words and passage content. The participants had to choose the best answer to each question from four options based on the information in the reading passage.

Table 1: Test typology

At the end of the second session the groups working with dictionaries had to answer some questions related to the experience of using the dictionary during the experiment

Dictionary use experience

Furthermore, the questionnaire included the following questions on the experience with the online and paper dictionaries. The items were adapted from previous studies on the topic (Koyama and Takeuchi 2004; Alharbi 2016).

In the questionnaire participants were asked to rate the presented items on a five-point Likert scale, which was recoded to 1 'completely disagree' to 5 'completely agree'.

1) Self-evaluation in the learning process:

- I was able to remember the words I looked up (SE1 = F12);
- In my opinion, my knowledge of English becomes more extensive by using this dictionary (SE2 = F15);

- The explanation of the words is easy to understand (UF1 = F1);
- The dictionary contains much information at first glance (UF2 = F2);
- I am satisfied with the dictionary (UF3 = F5);
- I would like to continue working with this dictionary (UF4 = F6);
- I could quickly find the meaning of the word I was looking for (UF5 = F8);
- I could find other meanings of the word I was looking for (UF6 = F9);
- The dictionary is accessible to all (UF7 = F10);
- I enjoyed working with this dictionary (UF8 = F11);
- The dictionary was user-friendly (UF9 = F13);
- I want to use this dictionary again when I participate in the experiment (UF10 = F14);
- I was confused when I used this dictionary (UF11 = F16);
- I can use this dictionary anywhere and at anytime (UF12 = F18).

3) Ergonomics

- Looking up the words did not strain my eyes (ER1 = F3);
- I can look up a word at a time (ER2 = F4);
- I did not have a stiff neck after using the dictionary (ER3 = F7);

One and two weeks after the main session, participants had to attend a delayed vocabulary test of the target words. It consisted of the same test performed by the subjects in the first session of the study.

2.3 Methods

To analyse whether there are statistical differences between the test performance of the three experimental groups in this study, we employ analysis of variance (ANOVA) and Tukey post-hoc test. If assumptions for ANOVA are not met, Kruskal-Wallis test is used as non-parametric alternative.

Students' experience with dictionary use during the experiment are analysed using exploratory factor analysis to test whether the expected underlying scales (self-evaluation, user-friendliness and ergonomics) can be found in the data. The number of factors is determined by the Kaiser-Guttmann criterion (eigenvalue > 1.00). Factors with insufficient factor loading (< 0.5) are excluded from the analysis. Reliability of the factors is evaluated using Cronbach's alpha.

2.4 Results

2.4.1 Session I: LexTale and evaluation of random assignment

Following the analysis strategy of the LexTale, for each participant we created a score, where one point is given for each correctly identified word or non-word and zero points otherwise. Applying the weighting formula suggested by the authors, we got the LexTale score for each participant, showing the percentage of correctly identified words weighted by number of words and non-words in the test. Table 2 shows the arithmetic mean and standard deviation of the scores. To assess whether the random assignment of students to the three experimental groups was successful we ex post sorted the students to their respective experimental groups.

The arithmetic mean which is similar in all groups and the results from an ANOVA for differences between the later assigned groups (non-significant) show that students' initial levels of vocabulary skills are quite similar, indicating that random group assignment was successful.

	M (SD)
Paper	62.6 (6.8)
Online	62.1 (7.5)
Control	59.2 (6.3)
Overall	61.7 (6.9)

Table 2: LexTale score (arithmetic mean and standard deviation)

At the end of session I, students were asked about their preferences regarding dictionaries and how they usually made use of this medium. About 70 percent of the students use their dictionaries 1 to 10 times per week, 20 percent 1 to 10 times per day and about 10 percent more often (10-20 and more times per day) (see Figure 2). In addition, students were also asked to indicate where they usually used a dictionary. They could distribute percentages up to 100 onto the four categories: in class, at home, on the train or in another location (which could be specified in a text answer).

2.4.2 Session II: Text reading time

In session II students read the short story *The Model Milionnaire*. Although there was no time limit, time till completion of reading was taken. On average students from the control group were fastest in finishing reading (M = 22.0 min, SD = 5.8 min) which was to be expected, since they were not interrupted by the usage of a dictionary. The online group needed 24.3 minutes (SD = 9.3 min) on average to finish, whereas the paper group read the longest with 29.9 minutes (SD = 10.7 min). These descriptive results could indicate that among dictionary users, participants using the paper dictionary had to exert effort in finding target words than those using online dictionary. Typing a word in an online dictionary is generally easier than leafing through a paper dictionary. Maybe the online dictionary treatment helped to reduce extraneous cognitive load, that allowed the participants to have more time to focus on text reading and comprehension (Liu & Lin, 2011; Sweller, 2010).

2.4.3 Session II: Vocabulary test

To analyse whether students' performance in vocabulary recognition, memorization and comprehension after the short story reading task differed according to the dictionary they used during the exercise, five tests (form, translation, sentences, cloze, content) were administered (also see Table 1). Table 3 shows the arithmetic means and standard deviations (in brackets) of the percentage of correct answers per test.

	Form	Translation	Sentence	Cloze	Content
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Paper	75.6 (28.5)	48.9 (29.3)	48.9 (29.3)	60.0 (29.9)	59.5 (30.6)
Online	66.7 (20.6)	52.2 (27.6)	48.9 (31.6)	51.1 (29.3)	59.4 (24.2)
Control	48.9 (28.5)	31.1 (22.6)	33.3 (20.0)	57.8 (32.2)	54.0 (17.1)
Overall	66.7 (25.0)	46.7 (28.0)	45.8 (28.8)	56.0 (29.7)	58.3 (25.4)

Table 3: Percentage of correctly answered items on several vocabulary tests after reading exercise

(arithmetic mean and standard deviation)

In the task participants had to remember the form of words, their correct spelling. Students from the paper group in this study performed best, solving 76 percent of the items correctly. Students from the online group were correct in 67 percent of instances and students from control group only solved 49 percent of the items correctly (see Table 3). The standard deviation of the online group is considerably lower than in the other groups. One interpretation for this could be that using an online dictionary results in less differences in performance between students, i.e. making the group more homogenous. ANOVA and Tukey post-hoc test show a significant difference (F(2, 42) = 5.17, p < 0.01) which is due to differences between the group who used a paper dictionary and the control group (p < .01).

Translation

The translation task was done best by the online group in this study, that was correct in 52 percent of instances. The paper group was almost as good with a score of 49 percent correctly translated items. Far behind is the control group, that only translated 31 percent of the words correctly trying to infer the meaning of the words from the context. The differences are statistically not significant.

Sentence

Using the newly learned words in a sentence was equally challenging for the paper and online groups. Both inserted the correct words in 49 percent of all instances. The control group scored considerably lower, inserting only 33 percent of the words correctly. The ANOVA on this exercise shows no significant differences.

Cloze

In the task several words were removed from the text and subjects were asked to fill in the missing content in order to test its memorization. In the test minor differences in the arithmetic means are found. The paper group performed best, followed by the control group. Students in the online group only solved a little more than 50 percent of the test correctly. The ANOVA shows no significant differences between the groups.

Content

In this task participants were tested on the content of the test they had read. The results reveal only minor differences in the means of correctly answered items. According to these students from the paper and online groups are a little better than those from the control group. Differences are statistically not significant.

In a bivariate analysis, we tested, whether the test results for experiment session II were related to frequency of dictionary use (see 7.4.1.1.) We found positive relationships (*: p < 0.05) between the frequency of use and students' performances in the tasks: Translation: 0.30*, Cloze: 0.24, Form: 0.39, Sentence: 0.31*, Content: 0.31*. These indicate that higher test scores are related to a more frequent use of dictionaries. At least for our subjects, more than the medium (online vs. paper dictionary), the frequency of dictionary use and its practice seems to play an important role in student's performances.

2.4.4 Sessions I, III and IV: Target words retention after one and two weeks from the main session

One and two weeks after the experiment main sessions, student's retention of the target words was measured using the test from session I. This was done to see if there are long-term effects of the use of paper and online dictionaries.

In session I, before the actual experiment, students in the sample translated 5 percent of the target words correctly . The group of students that used an online dictionary translated 7 percent of the items correctly, the other two groups were right in 3 (Paper) and 4 (Control) percent. One week after the main experiment students in the paper and online group performed considerably better (Online: 25%; Paper: 24%) than students in the control group (19%). The results after two weeks were similar: students in the online and paper group translated 23 percent of the items correctly, those from the control group 18 percent.

To analyse whether the differences are significant we performed a two-way repeated measures ANOVA. Apart from the main effects, we were interested to see whether the groups' performance changes over time and therefore introduced an interaction effect for group and time. For time we find a significant main effect ($F(1,81) = 60.1$, $p < .001$). According to pairwise comparisons this effect is due to a significant difference in performance from the first session to the third session ($p < .001$) and fourth session ($p < .001$), indicating that students' performance increased significantly after the experiment compared to before. The main effect for group showed no significant differences, neither did the interaction term. This shows that there are no differences in vocabulary retention according to the use of different types of dictionaries (paper or online) or no dictionary at all (control group).

2.4.5 User experience

To assess students' experience with the dictionaries an exploratory factor analysis was carried out. This way, we can determine whether the items that were included in the questionnaire to measure the concepts of self-evaluation, user-friendliness and ergonomics can be aggregated to the corresponding scales. The analysis resulted in the following factors: Factor 1 (Cronbach's $\alpha = 0.88$) subsumes items that were intended to measure user-friendliness of the online resp. paper dictionaries (UF2, UF3, UF4, UF5, UF8, UF9, UF10). Factor 2 ($\alpha = 0.75$) consists of the two items (SE1, SE2) that were used to measure the participants' self-evaluation capabilities in the learning process. The items allocated to Factor 3 ($\alpha = 0.61$) were partly thought to measure ergonomic aspects (ER3) of dictionary use and user-friendliness (UF7, UF12). In this combination we interpret them as "Accessibility".

Based on the results from the factor analysis additive scales were calculated. They can be interpreted on a scale 1 'I disagree very much' to 5 'I agree very much'. Table 5 shows the arithmetic means for the factors by groups and whether there are statistically significant differences between the groups.

	User-friendliness	Self-evaluation	Accessibility
	M (SD)	M (SD)	M (SD)
Paper	2.5 (0.7) a	3.0 (0.9)	3.2 (0.9)
Online	2.0 (0.9) a	3.1 (0.7)	3.2 (1.3)
Overall	2.3 (0.8)	3.0 (0.8)	3.2 (1.1)

a = significant difference (Kruskal-Wallis test; $p < 0.05$)

Table 4: User-friendliness, use for self-evaluation and accessibility of dictionaries by group

(arithmetic mean, standard deviation)

Overall participants show a tendency to rather not agree with the user-friendliness of both types of dictionaries. In comparison of both groups subjects rated the user-friendliness of paper dictionaries higher than that of online dictionaries. The difference is statistically significant on the 5%-level. The use of both dictionaries for self-evaluation is rated neutrally by both groups, with almost no difference between the groups. The same holds for the Factor 'Accessibility'.

3. Discussion and conclusion

This study aimed to investigate students' dictionary-using habits and behaviours with a particular focus on vocabulary acquisition while reading of long literary text in a foreign language (English).

The experiment results showed that there was a significant effect of using a paper dictionary in facilitating vocabulary learning. In particular, there was a significant short-term effect in the task related to the spelling of unknow words (form task) immediately after the reading session. Participants using paper dictionary perform significantly better in the test compared to the control group. No statistically significant difference was found between paper and online users. Our results confirm those of Koyama and Taguchi (2003) who found that there was no significant difference for the retention of word forms between typing the spellings of words in an electronic dictionary versus looking them up in a printed dictionary. We couldn't find any significant effects of the medium on meanings of unknown words (translation and sentence production tasks), on memory (cloze task) and on comprehension of the reading text (content task). In the long-term, we found no statistical evidence for an advantage of using a dictionary, online or paper, in vocabulary retention. Even though, the experiment seems to have worked well as students' performance in vocabulary retention was significantly higher compared to baseline one and two weeks after the experiment.

According to our results paper dictionaries are perceived to be significantly more user-friendly than online dictionaries. These results might be explained by the pragmatic aspect of learning, since a language student, unlike a passionate reader, is more focused on achieving goals and successes in his/her learning process and often the way and support (in the case of paper and digital dictionaries) to reach the objectives is not that crucial. As pointed out above, our subjects appreciate the qualities of the paper dictionary, in terms of user-friendliness, but the learning purpose almost minimizes the value of the medium by bringing out the pragmatic aspect of the learning process. The study is limited in the sample size (54 participants) and in the experimental setting (one university), which is due to the fact that our study was a pilot study on the analysis of effects of the type of dictionary on vocabulary acquisition in literary reading. Despite its limitations, the empirical evidence reported in this study present an overview and can give insights for educators in general and language teachers in particular who need to teach students at each level how to utilize digital sources in ways that optimize learning given a specific topic, purpose, and environment.

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