

The Depth of Vocabulary Search on Smartphones Among Japanese Language Learners in China

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Abstract

The use of smartphones for language learning has become commonplace, and with the decline of electronic dictionaries, these devices are now the primary tool for looking up words. Although many studies have highlighted the potential of smartphones to increase student engagement and motivation, some researchers remain concerned about whether this technology promotes more self-directed and effective learning (e.g., Stockwell & Wang, 2024). Observations suggest that while smartphones provide effortless access to information, students may not engage deeply, often only skimming the surface. Are these observations accurate? This paper examines students' word searches on smartphones, analyzing recorded data to explore how students use their devices for word searches, the depth of their searches, and the factors that influence that depth. These explorations are intended to help teachers better understand the students in front of them, and thus reflect on the useful integration of technology in the classroom.

Keywords: Vocabulary learning, Japanese learner, Levels of processing model, Screen recording function

Introduction

As many researchers anticipated, mobile technologies are increasingly being integrated into foreign language learning ecology (e.g., Stockwell, 2007 and 2010). This study focuses on a familiar learning activity: word searching via technological tools, particularly smartphones, which have largely replaced

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traditional dictionary tools. The nature of these searches and how learners conduct them are changing unpredictably. Understanding how learners use their phones to search for words is complex; it's difficult to know what motivates a search, what learners are specifically looking for, and whether they achieve their search goals. This study aims to explore these search behaviors to improve our understanding of learner-technology interactions and to reflect on the implications for language education in an ever-changing technological environment.

Smartphones and the Depth of Vocabulary Knowledge

Nowadays, students frequently use various apps for vocabulary learning tasks such as memorizing words, reading and extracting vocabulary, looking up definitions, and even creating personal mini dictionaries.

However, studies like those by Lai et al. (2022) emphasize the importance of focusing on word usage, and their interview findings suggest that reliance on vocabulary apps often leads to a “shallow understanding” (p. 12) and fail to actively engage students.

Table 1. Analysis criteria for the depth of words search*

Depth of search (4 stages)		Definition	Examples of learner descriptions
Quick search	Surface search	Searches aimed at confirming superficial features such as characters or morphemes.	Want to know how to read or write it
	Translation search	Quick information retrieval to confirm the basic meaning of words or phrases.	Want to know the meaning in my native language
Deep search	Meaning and usage search	Searches focused on how a word or phrase is used, including collocations, idiomatic expressions, common contexts, example sentences, and comparisons with the native language.	Interested in phrases, collocations, example sentences
	Context search	In-depth consideration of usage context and nuances, including the exploration of hidden meanings and related concepts in Japanese, with a production intent.	Want to know the meaning and usage in specific situations

*Li (2024) defined this criterion based on Craik and Lockhart's (1972).

As highlighted by Schmitt (2014), deep lexical knowledge is essential for effective language application and requires significant attention and engagement. This study focuses on lexical depth knowledge during the word search process. Building on the model of processing levels by Craik and Lockhart (1972), Li (2024) categorized lexical search behaviors into two broad types and four subtypes. As shown in Table 1, these are “Quick Search” (including surface search, level 1; translation search, level 2) and “Deep Search” (including meaning and usage search, level 3; context search, level 4). Based on this theoretical framework, this study addresses two main research questions:

1. How deep do learners search for unfamiliar words?
2. What factors influence the depth of vocabulary searches?

Methods

Participants

The study was conducted from February to March 2022 at two Chinese universities, involving 48 participants: 26 Japanese majors and 22 students taking Japanese as an elective. All participants were proficient in using smartphones for various learning activities, including vocabulary searches.

Data Collection and Analysis

This study used an innovative screen-recorded data collection method to provide a first-hand account of learners’ search behavior. Data was collected using the smartphone’s screen recording function and uploaded to a NINJAL platform. A pilot study in December 2021 confirmed the feasibility of this data collection method. Students recorded their search activity for one continuous week, capturing each search from start to finish. To ensure varied behavioral data, recordings included both weekdays and weekends. In addition to video, students provided detailed textual records for each search, which were combined for analysis. The study analyzed 1,566 complete recordings, focusing on 1,119 smartphone searches. Searches were categorized based on criteria in Table 1, and factors such as learner level, search purpose, motivation, duration, and repetition were assessed for their impact on search depth.

Ethical Considerations

The use of screen recording presented significant ethical concerns regarding the protection of personal information. Measures were taken to secure uploaded

data and to delete any content that inadvertently captured personal information. All public videos were reviewed by participants. Informed consent was obtained, allowing students to withdraw their videos at any time and ensuring that would not affect their grades.

Findings and Discussion

First, the analysis of search depth (Table 2) shows that most students (nearly 60%) primarily engage in “Translation Search,” with only about 14.23% engaging in “Meaning and Usage Search” and 3.72% in “Contextual Search.” This indicates a general tendency towards superficial word searches, with the average search lasting 24 seconds and most students (79%) conducting a single search per session. These findings highlight a preference for quick, superficial searches that rarely achieve significant depth, potentially limiting deeper vocabulary learning.

In response to RQ2, chi-squared test results show a significant correlation between search depth and factors such as student level, search frequency, presence of contextual information, motivation type, and learning purpose (all p -values < 0.001). Higher level students and searches with contextual information are more likely to be deeper. Intrinsic motivation also leads students to invest more time in each search, aiming for deeper understanding. Searches intended for practical “use” also tend to be deeper, suggesting that contextual information, intrinsic motivation, and practical use enhance search depth.

In conclusion, this study highlights that while smartphones provide easy access to information, they may also foster only superficial engagement with the target language. As mentioned by Stockwell and Wang (2024), technology alone does not promote autonomy, as engagement often stops after the task is completed. Therefore, Teachers need to balance the convenience of technology with the need for deeper language exploration and to encourage learners to critically reflect on their search practices.

Table 2. Frequency ratings of the depth of search (n = 1119)

Depth of search		Frequency	Percentage
Quick search	Surface search	309	20.94%
	Translation search	902	61.11%
Deep search	Meaning and usage search	210	14.23%
	Contextual search	55	3.72%

Limitations and Future Studies

The data collection period for this study concluded before the emergence of generative AI technologies like ChatGPT. Unfortunately, no data from generative AI tools. A follow-up study is currently being planned to investigate how these advanced technologies influence word search behaviors.

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