

CHAPTER I – INTRODUCTION

1.1. Background of the Research

Vocabulary learning is an essential part of learning a second language. Words form the building blocks of a language; grammar (or syntax) describes important conventions for how these building blocks (linguistic units) can fit together to form larger structures in the language, but without any vocabulary knowledge the language learner cannot build (i.e. communicate) anything. This is the reason behind Wilkin's quote (1972, pp. 111–112), “without grammar very little can be conveyed, without vocabulary nothing can be conveyed”. This research explores the effectiveness of multimodal (multisensory) and monomodal (unisensory) methods of vocabulary learning.

Research in the field of neuroscience has shown that associating multiple sensory cues with objects and experience is a fundamental brain process that improves object recognition and memory performance (Okroy et al., 2023, p. 777). Applying this to the context of L2 vocabulary learning, we can infer that associating multiple sensory cues with second language vocabulary should improve recognition and memory of this vocabulary. For example, associating the Indonesian L2 word durian (a fruit) with memories of the sight, smell, feel, and taste of durian would result in a much stronger memory of the word durian than could be achieved by merely associating durian it with an L1 translation or L2 definition. This has significant implications for second language teaching and

learning as it means that multisensory or multimodal language learning – if done well – is superior to monomodal (e.g. text-only / audio-only) language learning.

Using Digital Flashcard software is one way in which L2 learners can learn new vocabulary in a multimodal way, since such software usually allows users to add text, images and audio to their Digital Flashcards (DFs). In a multimodal DF, the front side of the DF could display the L2 word accompanied with audio as a pronunciation guide, and the reverse side of the DF could display a picture of the L2 word's referent, accompanied by an L1 translation of the L2 word. Using pictures in L2 learning is particularly useful when the referent is unfamiliar to the learners and does not have a translation equivalent in L1 with which the learners are already familiar; this is often the case with the names of local fruits, local foods, local wildlife, and traditional musical instruments, to name a few. This research will use the Digital Flashcard software Anki (apps.ankiweb.net), which enables users to add text, images, and audio for free, to compare the effectiveness of multimodal and monomodal Digital Flashcards (DFs) for learning L2 vocabulary – specifically, concrete nouns.

Although there is a widespread belief that a second language (L2) is best taught through L2 alone – i.e. without the mediation of L1, the pedagogical and linguistic arguments that are put forward in support of a 'No-L1' approach to language teaching and learning are, at best, not proven (Kerr, 2019, p. 7). Moreover, a large number of research findings indicate that the appropriate use of L1 may be beneficial for L2 language learning, and as a result there is now a very

clear consensus among applied linguists that some use of L1 can support the learning of L2 (Kerr, 2019). One such appropriate use of L1 in L2 learning is the use of L2–L1 vocabulary flashcards, which are arguably one of the most useful tools for deliberate vocabulary learning (Nation, 2008). Using flashcards with an L2 word on one side and an L1 translation equivalent on other side can help students to easily and efficiently learn L2 words, especially if the words are not easily picturable (e.g. conjunctions and abstract nouns) or have L2 dictionary definitions that may be difficult for learners to understand (e.g. due to the L2 definition including yet more unfamiliar vocabulary). Therefore, L1 translation equivalents are included on the reverse side of both monomodal and multimodal digital flashcards in the present study.

Please note that, since many participants in the current study are bilingual, when describing the experiment the abbreviation L1 (first language) is used in a non-technical sense to refer to a known language to which participants were exposed from childhood and in which participants are already fully communicatively competent (i.e. Indonesian), regardless of whether the language was acquired ‘first’ or acquired simultaneously with another language. Indonesian is the known language used in this study (L1), and the artificial language Esperanto is the second language or target language that was learned by participants (L2).

Using vocabulary flashcards is best understood as one activity that forms part of a broader, well-balanced range of language learning activities (Nation,

2013, p. 471). While using vocabulary flashcards is not itself communicative, flashcards can help students to learn L2 words and phrases that are and can be used in communicative contexts. Therefore, vocabulary flashcards may be used in contemporary communicative approaches to language teaching, and their usage does not necessarily entail the adoption of a traditional ‘Grammar-translation’ approach (Kerr, 2019, pp. 2–3). The language learner who is aiming for communicative competence in a language would use flashcards as a tool for learning words that are encountered and used in authentic communicative contexts, with the intention of using what they learn for communicative purposes (see Larsen-Freeman & Anderson, 2011, pp. 158–165). In contrast, the language learner who is only concerned with attaining impressive performance statistics in a non-communicative language learning app (e.g. Duolingo, Anki, Quizlet, Memrise, etc.), is not on track to achieve communicative competence in their target language. Such a language learner is much like a musician who only ever practices scales.

The results of present research in the field of applied psycholinguistics will be of interest to those who use digital flashcards as a tool for learning L2 vocabulary as this study seeks to determine whether multimodal flashcards are significantly more effective than monomodal flashcards as a tool for learning the meanings (L1 translations) of L2 concrete nouns. The answer to this research question will help teachers and learners to answer the question; “Is it worth creating and using multimodal digital flashcards?” Since adding pictures and

audio to flashcards is time consuming, doing so is arguably only worthwhile if empirical evidence suggests that using multimodal flashcards leads to significantly better learning outcomes than the use of monomodal (e.g. text-only) flashcards.

1.2. Scope of the Research

The dependent variable of interest in this study is participants' recall accuracy of the meanings (L1 translations) of L2 concrete nouns learned using either monomodal or multimodal digital flashcards. The independent variable in this study is the monomodality or multimodality of the digital flashcards: In the present study, monomodal flashcards use text only (one mode), whereas multimodal flashcards use text accompanied by L2 audio and a picture (multiple modes). Other modes such as touch and gesture are not utilised.

This study limits its scope to testing participants' receptive retrieval, i.e. participants were presented with a word in L2 and asked to recall its meaning (translation) in L1 ($L2 \rightarrow L1$). Participants' productive retrieval ($L1 \rightarrow L2$) was not tested. Furthermore, the word pairs studied and tested in the present study were all concrete nouns. Words of other parts of speech (e.g. verbs, adjectives, and conjunctions) were not studied or tested, and nor were abstract nouns.

The experiment is designed to reflect real-life L2 vocabulary learning with Anki. Therefore, while other studies on the topic of multimodal or multisensory input (e.g. Carpenter & Olson, 2012) limit the amount of time the participant is exposed to each stimuli, this study will not control the length of time spent on

each flashcard because Anki does not do so. Although the length of time spent on each card for each exposure is automatically recorded by Anki (in seconds), this data is not of primary interest for the purposes of this study. If learners spend more time per exposure on multimodal cards and have higher recall accuracy for such cards, far from invalidating the results, this can be taken as a benefit of using multimodal cards, since the length of time spent on each card exposure can be interpreted as being a result of the multimodality of the card. Allowing learners to view the Digital Flashcards at their own pace is in line with Richard Mayer's Interactivity Principle (2002, pp. 67–68) as discussed in section 2.2.2. Additionally, to a limited extent, the number of exposures to each card will be determined by Anki's algorithm based on the feedback of the user; cards marked 'Again' will be shown after a short interval within the same study session (remaining in the 'learning queue' for that study session), whereas cards marked 'Good' will be scheduled to be shown the next day if the card is on the final learning or re-learning step.

Lastly, this study limits its scope to focus on Indonesian adult learners. The same study conducted with child participants may yield different results, and although it is assumed that the conclusion of this study may be generalised to the entire adult human population, it is possible that participants from a different background or with a different neurological make-up may benefit from multimodal learning to a greater or lesser extent. For example, multimodal (or multisensory) learning may be especially beneficial for students with learning

difficulties such as dyslexia (Baines, 2008, p. 26), and a range of ‘learning style’ theories suggest that the degree to which an individual benefits from learning using a certain mode or combination of modes may depend on their individual learning style or learning preference (Plass et al., 1998, p. 27).

1.3. Identification of the Problem

This research investigates the effectiveness of multimodal versus monomodal Digital Flashcards (DFs) for second language (L2) vocabulary learning within a Spaced Repetition System (SRS). Therefore, the questions related to this study are as follows:

1. Are multimodal flashcards (containing text, audio, and a picture) significantly more effective than monomodal flashcards (containing text only) as a tool for learning the meanings of L2 concrete nouns (i.e. resulting in significantly higher recall accuracy)?
2. Does learning L2 vocabulary multimodally result in better recall accuracy, even in response to monomodal (text-only) test cues?
3. If multimodal learning is shown to be more effective than monomodal learning in this study, why is this the case?

1.4. Objectives of the Research

The primary objective of this research is to determine whether studying from multimodal digital flashcards within a Spaced Repetition System (SRS) is more effective in creating stronger (more durable) memories compared with studying

from monomodal text-only flashcards, and if so, to what extent. The objectives of this research are divided into three parts:

1. To evaluate the effect of multimodal versus monomodal Digital Flashcard study on L2 vocabulary recall accuracy.
2. To discover whether multimodal learning benefits recall accuracy in response to monomodal text-only cues.
3. To discuss the reasons for such an effect (or lack thereof) in light of Paivio's Dual Coding Theory and Mayer's Cognitive Theory of Multimedia Learning, followed by insights from studies in multisensory research.

The present study is designed to test the research hypothesis (H1) by determining whether the probability of the null hypothesis (H0) being true is so small that it can be rejected. Empirical data was collected as described in Chapter III – Research Methods, and the statistical hypothesis below was tested by performing a one-tailed paired t-test on the raw data (as described in section 3.4).

Null hypothesis (H0) : Multimodal flashcards are no more effective than monomodal flashcards as a tool for learning the meanings of L2 concrete nouns.

Hypothesis (H1) : Multimodal flashcards are more effective than monomodal flashcards as a tool for learning the meanings of L2 concrete nouns.

1.5. Significance of the Research

Firstly, this research will contribute to the ongoing research into multisensory or multimodal learning and language learning in interdisciplinary fields such as applied psycholinguistics and educational psychology.

Secondly, this research may be of practical assistance to language learners and teachers. If multimodal digital flashcards are shown to result in better vocabulary recall accuracy compared to monomodal text-only flashcards, then this may encourage language learners to create or use multimodal flashcards for vocabulary learning. Additionally, the literature reviewed in chapter 2 will provide a theoretical basis for understanding why multimodal or multisensory learning might be more more effective in creating stronger (more durable) memories compared to monomodal or unisensory learning.

