**Flashcard-based design and spaced repetition in Computer Aided Language Learning (CALL): a literature review**

**Abstract**

**Purpose** – This literature review’s purpose is to address the following questions: How does the design of a flashcard-based Computer Aided Language Learning (CALL) application affect a user’s ability to acquire and retain language? What effect does spaced repetition have on the acquisition and retention of language in CALL applications? What other learning techniques can be used with such CALL applications to increase the efficiency of language acquisition and retention?

**Methodology**

*Search and selection strategy*

Google Scholar and the University of Portsmouth’s library Discovery and catalogue search to find papers and books to get a rough feel and overview of the topic areas, journals and research.

Scimago Journal and Country Rank was then used to find narrow down findings to journals that are reliable and peer reviewed. Papers related to computer assisted learning will be limited to papers from the past 5 years (2013 and onwards) to ensure relevancy.

*Refining the search criteria*

* *English only*
* *Papers on Japanese language favoured over others*

Journals of interest and relevance are:

* Computers and Education
* Journal of Computer Assisted Learning
* Language Learning
* The Modern Language Journal
* Studies in Second Language Acquisition
* Computer Assisted Language Learning
* Language Learning and Technology
* Journal of Experimental Psychology: Learning Memory and Cognition
* Brain and Language
* Journal of Memory and Language
* Language & Communication

The papers found in language and linguistics journals will be limited to second language acquisition and selected upon relevance.

The papers found in psychology journals will be selected upon relevance.

**Findings**

**Research limitations**

**Practical implications**

Introduction

This literature review uses a combination of academic papers, books, internet webpages and existing systems to answer some important questions that will have a large impact on the design of the application. These questions include: How does the design of a flashcard-based Computer Aided Language Learning (CALL) application affect a user’s ability to acquire and retain language? What effect does spaced repetition have on the acquisition and retention of language in CALL applications? What other learning techniques can be used with such CALL applications to increase the efficiency of language acquisition and retention?

Knowledge obtained as a result of doing this literature review will be converted into requirements for the application.

**Advantages and dis-advantages of flashcard-based interfaces**

**Flashcard design**

* *Note specifications for certain devices and operating systems*
* *Discuss any other design elements*

**Spaced repetition and the Leitner system**

* *Forgetting curve, Leitner algorithm*

**Spaced repetition algorithms**

* *Discuss the many different implementations of the SM2 algorithm and its flaws*
* *Discuss other algorithms*

**Conclusions**

**References**

***Notes on research papers written up as paragraphs***

Language learning has been around for hundreds, if not thousands, of years but has dramatically increased in accessibility to the public in recent years due to the advancement in technology and this accessibility has since increased even further due to the boom in mobile application development in recent years.

Because of this, however, we currently have an abundance of language learning software, a lot of which are just simple apps with no real research on language acquisition, learning and linguistics to back up their teaching and learning methods. [INSERT A CITATION]

Language learning and acquisition

Language learning and language acquisition are two very similar terms that get used interchangeably. Krashen (1982) suggests that these are in fact two distinct and independent ways of developing second language competence. Language *acquisition*, which Krashen claims to be “a process similar, if not identical, to the way children develop ability in their first language.” He goes on to say that learners are not usually aware that they are acquiring language but only that that they are using it for communication and that we are generally not consciously aware of the rules of the language that we have acquired, but instead “we have a “feel” for correctness.” He then discusses the other method of gaining language competence and that is by language *learning.* This, he says, refers to conscious knowledge of a second language, i.e. knowing the rules and being able to talk about them and that this is independent from language *acquisition.*

One of the most important questions in the field of linguistics is: How do we acquire language? Krashen’s (1982) Input Hypothesis attempts to address this question. His input hypothesis states that “We acquire by understanding language that contains structure a it

beyond our current level of competence *(i + 1)*. This is done with the help of

context or extra-linguistic information.” Krashen (1982) also says that conscious language *learning* helps us only as a “Monitor”, which can change the output, speaking/writing, of the language *acquisition* system before or after speech or writing. He then states that it is the acquired system which initiates normal, fluent speech which implies that conscious learning plays a limited role in second language performance.

*This suggests to me that having context with flashcards is very important in helping learners understand and acquire language.*

*This suggests to me that the application should focus less on things like grammar study and more on learning to understand language in order to acquire it.*

Rahimi (2014) took thirty-four lower-intermediate language learners and divided them into two groups (17 in each group) based on their choice to work with a mobile dictionary or a printed one for their language course. The experimental group used a dictionary installed on their mobile phones while the control group worked with the printed version of the same dictionary. The result of the study showed that the experimental group outperformed the control group in the final test. This study suggests that having easy access to a dictionary straight from your phone plays a vital role in a language learners success. *This suggests to me that having a built-in dictionary look up feature would be very useful for learners.*