**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

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**

**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 and linguistics is a subject that has been around for hundreds of years but has dramatically increased in accessibility to the public in recent years due to the advancement in technology, specifically mobile. [INSERT A CITATION]

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

Krashen (1982) discusses that there are two distinct and independent ways of developing second language competence, one of these being 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.* Krashen (1982) goes on to discuss his Monitor Hypothesis where he suggests that conscious language *learning* is available 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 suggests that the Monitor hypothesis implies that conscious learning plays a limited role in second language performance.

Dulay and Burt (1974) reported that their research on children acquiring English as a second language provides strong evidence that children who are exposed to native second language speech will acquire grammatical structures, morphemes, in a “universal order”. This order of difficulty is as follows:

[FIND MORE RESEARCH ON UNIVERSAL ORDER TO CREATE AN ORDER FOR SENTENCES]

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.