

The Effects of Reinforced Learning in Language Acquisition and Cognitive Process: A Study

G. Alamelu, M. Iankumaran

Abstract--- Cognitive process is the mental activity of acquiring and processing of information through thoughts, experiences and senses. Learning, on the other hand, is the process of accumulate knowledge through experience, study or through teaching methodologies. Though cognition and learning appear to be two different entities, they are inexorably linked with each other. Learning requires cognition, while cognition involves learning. In the process of learning a language or an art, memory plays a vital role in the cognitive system. Learning at the rudimentary level, especially in the lower grade, happens through rote method where the information is slowly transmitted from the sensory memory to the long-term memory. Through this cognitive process, the development of word power or vocabulary is gained and understanding of sentence structure is achieved. The learner, thus, gains knowledge of syntax and semantic usage of a language. In the process, the learner inevitably undergoes three phases of acquiring knowledge from the basic level of acquiring vocabulary, to the intermediary level of gaining fluency, and to the final level of gaining proficiency in language. Spaced Repetition System, shortly known as SRS is a method of reinforcing data in the memory of learner at systematic intervals, has larger scope in the learning process, which is highly effective at rudimentary and intermediary levels. Nevertheless this method appears to be anew, it has already been practiced in the Vedic period where the Indian disciples learnt the scriptures from their masters by systematic repetition. This paper attempts to understand the interconnection of the cognitive process in the learning of English as a second language by the technique of SRS.

Keywords--- Reinforced Learning, Spaced Repetition System, Cognitive Process, Language Learning.

I. INTRODUCTION

Learning, acquiring knowledge through experience or study, forms an integral part of any living being, principally human beings. The primary aim of education or learning is acquiring the basic knowledge and recollecting the facts and applying the same in the real life situation which is considered as higher order thinking. Learning is both an intellectual and emotional process which results in a reasonably permanent alteration in the way of thinking, feeling and doing of the learners, whereas, cognition refers to the process or mechanism of learning which involves understanding through experience and senses. In other words cognitive process leads to learning.

II. FACTORS AFFECTING LEARNING

Learning is affected by different aspects, mostly depending upon the learner, like readiness, practice and

affectation on the learner's part. If the learner is ready and eager to learn with full concentration on the subject or aspect of learning and if he practises what he learns repeatedly and is emotionally attached or affected by what he learns, learning happens effectively. The first and foremost step towards learning is attention which forms the basis of all learning. As a child, everybody pays attention, which enhances the ability to focus on something without getting distracted, to each and everything around and starts observing and it learns through trial and error method using its five senses and this method of learning continues throughout an individual's life.

III. LEVELS OF MEMORY

The observance gets into the memory in three levels – sensory register, short term memory and long term memory. When something is attended to consciously, it immediately gets into the frontal lobe or the sensory memory, where it stays only for some seconds. The typical example is one remembering the One Time Password (OTP) auto-generated by the system when an online transaction is done. Again when the learner is exposed to the same thing to observe, it gets into the temporary memory where it stays for a little longer period of time. For instance, taking notes during a lecture and revisiting the notes and trying to infer what he has understood during the lecture. If the same process is repeated again and again with absolute focus and attention, it enters the permanent memory which holds the data infinitely and the capacity or the storage space of the memory is enormous. Thus the learning gets stored in the brain in three levels as an incessant process, one leading to the other with a stable effort by the learner. The data thus stored in the memory can be retrieved at any point of time by the learner. Hence the whole process of learning or cognitive process involves repetition or reinforcement.

IV. LEVELS OF LANGUAGE SKILL

Language can be verbal or non-verbal and the basic purpose of any language is communication with others. Language skills may be defined as an individual's ability to acquire vocabulary and sentence structures, enabling the learner to understand and produce the target language by spoken or written mode. Second language learning has become inevitable as English is accepted as the official language globally though learning a new language is not an easy task.

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This language skill, at the primary level, acquired by imitating from the family and the society also improves the cognitive skill of the learner. For instance, when a book review is written, the writer of the review uses his/her cognitive skill, by way of relating to what is already known or stored in the memory. Hence the production of language, here writing the review involves the review and recollection of what is already known by the language learner. Hence language learning and cognitive development are interconnected. Thus the acquisition of language skill and cognitive development can be attained by repeatedly reviewing what one has learnt already – through reinforced learning or spaced repetition system. Moreover, the process of learning happens in an effective manner under pressure or force to recollect and reproduce what one has learnt. 'Practice makes a man perfect' goes the saying. True to the saying, repeated practice makes the learner proficient in the language.

V. REINFORCED LEARNING

Reinforced learning dates back to the ancient Egyptian and Chinese education during 4400 B. C and 3000 B. C. respectively. (Aspin Wall, 1912, pp. no. 2, 6) Even in the Indian context, repetition was the principal methodology of teaching in the ancient vedic period when Gurukula education system was followed. Gurus (teachers) used to make the disciples (learners) to repeat the words, phrases and sentences in a repeated way in a systematic time interval as it was believed that repetition provides the practice that is needed for mastering a language or a skill by strengthening the neurons in the brain. Hence, this strategy enhances the learning speed of the learners improving their confidence and thereby creates a strong foundation for learning. Though this strategy is used in general learning, second language learning makes use of this principal to a great extent as for a language learner who wants to experience the sensation of using reliable and unrestrained language, repetition and rote learning are two most proficient and organized methods says Cook. (p. 133)

VI. SPACED REPETITION SYSTEM

The concept of spaced repetition system for a better learning experience is expounded by Prof. C. A. Mace in his book 'Psychology of Study' and Spitzer followed this theory and did a research on the sixth Graders in Iowa in learning science facts. (Spitzer, 1939) In spaced repetition system, the learner need not know the meanings of the words, phrases and sentences as the sounds, pronunciation and sentence structures get imprinted into the learner's memory involuntarily. If the learner fails to repeat and review what is learnt periodically, the learning goes unregistered as it tends to leave the memory of the learner. On the other hand, if what is learnt is reviewed in spaced intervals the learner gets long term retention of the learning.

VII. TIME SPACE BETWEEN REINFORCEMENTS

The time interval between the learning and the reviewing plays a vital role in the acquisition of any skill including the language skill. Cramming of concepts and ideas at a

particular time is termed as cognitive overload as the amount of information supplied surpasses the processing capability of the individual. Therefore, the learners find it extremely hard to comprehend the concepts and integrating them with what they already know. In addition to that, reviewing the acquired skill or knowledge within the time frame does not yield expected outcome in the long run. This may be effective to some extent for a brief period of time as students prepare for their examination the previous night, as the data gets registered into the short term memory and can be recouped successfully during the examination. But to retain something in the long term memory, the learning and reinforcing should be spaced out over a considerable period of time.

VIII. STUDY ON TERTIARY LEVEL LEARNERS

This idea is proved through a study conducted among the tertiary level students who were divided into two groups and were made to learn the Athenian Oath. One group was exposed to the oath six times continuously whereas the other group listened to the oath three times continuously and again listened to the oath three times after three days. When both the groups were tested, the crammed group was able to recall the oath more effectively than the other group. However, when both the groups are asked to recall the oath after four weeks, the second group which had the opportunity to review the oath with an interval of three days was able to recall and reproduce more efficiently than the first group. (Sean p. 13)

A similar study was conducted in a class of fifty Engineering undergraduates where the teacher read out twenty five one word substitutes and some verbal analogies and urged the students to answer together in class. Later the same exercise was repeated once in every four days for a fortnight. When the students were tested after a month, there was a drastic improvement in their vocabulary and the analytical skill of the students who were present for all the four classes, whereas the students who absented themselves for one or two classes could not perform at par with the other group. This proves that reinforcing the data at regular intervals enhances the learning and the retention process.

IX. RELEVANCE OF SPACED REPETITION SYSTEM

Spaced repetition system of learning started with the use of flash cards where thousands of flash cards were required for the conduct of classes. This is not feasible in all cases due to practical difficulties. But now thanks to the advancements in technology, especially in the field of computers, this system is gaining momentum. Now computers and mobile phones are used instead of using flash cards and a learner tends to learn nearly fifty to 100 words and phrases on a day. Hence rereading what is learnt the previous day does not actually help in the retention of the knowledge gained, instead, it consumes a lot of time and energy which can be spent in a more productive way of language learning.



Therefore, Spaced Repetition System advocates reinforcement of learning, when the memory of the learner starts waning. Exposing to important data or information, in a spaced interval of time is vital for strengthening the memory which in turn increases the chance of retention of what is being learnt. Hence it is obvious that SRS or Spaced Repetition System is a valid tool for enhancing the language skills of a non-native learner of English.

X. LEVELS OF LANGUAGE LEARNING

It is observed that language learning occurs in three levels: basic level which includes learning vocabulary, intermediary level where the learner gains fluency in the target language and the advanced level which focuses on the learner attaining proficiency in the language or mastering the target language. Learning new words, poems and prose pieces in the target language which enhances the language skill cannot be learnt and reproduced unless the contents are frequently repeated and sufficiently revisited. A student preparing for the examination, the day before finds it difficult to recollect what is learnt the previous day, whereas, the student who has learnt the concepts long back with periodical revision of the learnt information finds comparatively easier to take up the exam and reproduce what is learnt in a more effective manner. This methodology is more effective in the first two levels – the basic and the intermediary levels and to some extent helps the learner to acquire mastery over the language which is the advanced level though in this level focus is more on building vocabulary.

XI. REPETITION AND REINFORCEMENT

Thus it is evident that the repetition and reinforced learning primarily focuses on registering and retrieving the data in the context of second language acquisition. If the method is made use of in an effective manner, not just to repeat and memorize but to internalise, in other words to get the concepts and ideas ingrained into the long term memory, the stored data can be retrieved at the relevant time and can be employed in the real-life situation later. This method will be one of the best methodologies in the second language acquisition as memorization: which improves the ability of the learner to retain the information gathered, sows seeds that will guide to apprehending opines Boyle (p.125) Therefore, what begins as just rote learning without understanding, can further be improvised into repetitive learning with a motive of understanding also.

XII. EFFECTIVENESS OF REINFORCEMENT IN VOCABULARY DEVELOPMENT

Reinforced learning is found to be even more effective in enhancing the vocabulary of the learner which is considered to be the critical aspect of language learning as Wilkins precisely points out that sans grammar very little can be expressed, but sans vocabulary nothing can be communicated (p. 11) Krashen (1989) opines that vocabulary in the target language is acquired unconsciously through repeated exposure of the words and phrases in different contexts. Krashen reflects that the process of attaining proficiency in language happens subconsciously, in other

words, the learner does not realise that he is improving in language skill as he is consciously focussing on the message conveyed and not on the structure. Therefore, it is analogous to incidental knowledge is stored subconsciously in the brain and Chomsky terms it as ‘tacit knowledge.’ (p. 440).

XIII. BORROWED LANGUAGE

It is a known that English language is not original or unique developed from one source. Even the term ‘English’ is a borrowed term, received from the Angles, one of the three Germanic tribes who invaded England during the fifteenth century. English has borrowed many words and phrases from Greek, Latin, Germanic languages and so on. David Crystal opines in ‘English as a Global Language’ that English has borrowed words from nearly 350 languages. About seventy five percent of the words in English are borrowed from Greek and Latin. Even today, the English language keeps adding more words to its store house of vocabulary from almost all the languages of the country where it is spoken as a second language or a foreign language. Even ‘idli and sambar’ a favourite food in South India has found its place in the dictionary and words like ‘prepone’ which is used only by Indians is now accepted as a substitute for advance and this makes the language more dynamic and adaptable with new words being coined regularly and that too added to the vocabulary storehouse.

XIV. CHALLENGES IN LEARNING ENGLISH

‘Veedu’ (meaning house) in Tamil is pronounced as ‘vee’ ‘do’ together. Likewise any words in Tamil like ‘amma’, ‘appa’, ‘pallikoodam’, ‘kalloori’, etc. are pronounced without facing any difficulty as the sounds of the words go with the sounds of the letters used in the words. Yet, this is not the case with English language as it has only twenty four alphabets but the total number of sounds in the language is forty four, out of which twelve are vowels, twenty four consonants and eight diphthongs. From this it is clear that learning English as a second language or a foreign language is a real test for a non-English speaking learner. In addition to these varied sounds and symbols, (in the form of phonetic transcriptions) the pronunciation of certain words is confusing as some letters in the words are silenced. For instance, in the words given below, the letters given in “bold” are silenced.

Psychology, debt, debris, knight, receipt, pneumonia, asthma, kneads, honest, subtle and so on. Moreover, words like albeit, caveat, chaos, chaotic, epitome, gauge, hierarchy, paradigm, seque, etc have no logic behind their pronunciation. Additionally, English language owns some foreign words and phrases which are used as such they are used in the original language. Some of the examples are: cul de sac, coup de tat, en route, per se, bona fide, ad nauseum, ad interim, sine die, etc. These expressions are not improvised in any way before adding to the vocabulary list of English. Word power is considered by Richard and Renandya to be an essential element of language learning and mastering it and also serves as a foundation for how the



learner communicates in the target language both by way of writing and speaking. (255) This makes the English language learning all the more challenging. The learner may not be familiar with the sounds and pronunciation of the words. Hence, reading alone cannot serve the purpose of effective language learning. The learner has to listen to those words and phrases and imitate and repeat them periodically, so that the pronunciation of the words gets stored in the memory of the learner.

XV. SPACED REPETITION SYSTEM

Brown considers vocabulary as a monotonous list of words which has to be memorised by the learners. (377) Instead of learning the alphabets, syllables and phonetic transcriptions of each vowel, consonant and diphthong, the learner can learn the word by repeating and then start learning the spellings of those words. This methodology of learning boosts the confidence of the learners as the learner gets familiar with a good number of words even before starting to learn the language in a systematic way. In addition to the above mentioned facts, English language is not restricted to structure based learning, rather, it is sound based learning. Hence, listening and repeating which form the vital components of Spaced Repetition System, is the most effective way for the second language learner as SPS – Spaced Repetition System is basically done through listening, imitating, repeating and reinforcing.

XVI. UNCONSCIOUS LEARNING

Further, the monotony in learning grammar can be avoided by drilling the structures in grammar into the learner's subconscious memory without teaching in a systematic way. In the primary level of language learning reciting rhymes, learning mathematical tables are the chief strategies of learning involuntarily. Rhymes like 'Pussy cat pussy cat where have you been' taught in the kindergarten level is a suitable example for this, since the learner learns present perfect tense and how to use 'been' in a sentence in an unconscious manner. The learner can later on change the words used in the sentence based on the real life situation and produce the target language. Same way, mathematical tables where the learners learn multiplication also happens in an effective manner through tables classes which are conducted on a regular basis like twice in a week where one person reads out the tables while the others repeat the same.

XVII. SECONDARY LEVEL LEARNING

In the secondary level, reinforced learning or spaced repetition system is employed by way of poem reading which helps the learner in enhancing the skill of interpretation and solving puzzles, verbal analogies and verbal reasoning. By solving puzzles and verbal analogies on a regular basis repeatedly, the brain of the learner gets trained in a particular way of thinking and thereby the cognition of the individual also improves to a great extent. Through poem reading and by solving verbal analogies the language skill and vocabulary of the learner also gets enhanced. In the tertiary level, though the effect of reinforced learning is lesser when compared to the other two levels, it plays a significant role in improving the vocabulary

of the learner which is a key factor in mastering a language or any skill.

XVIII. FACTORS AFFECTING SPACED REPETITION SYSTEM

There are many factors affecting Spaced Repetition System. The first and foremost factor is the monotony of the system. Learners tend to get bored as the same thing is repeated again and again. Distraction is another major issue in the implementation of the system as the learners can repeat the task given mechanically even without paying attention and hence there is a fair chance of the learner getting distracted. Moreover, the retention capability of each learner is different and so the results may vary, like, in a group the learning speed and the amount of knowledge acquired always differs. The next major factor that influences the learning is the affective domain, in other words, the learners should be able to identify himself/herself with what he/she is learning. There should be an emotional bondage between the learner and what is learnt. And eventually, there should be a physical or psychological need for the learner to learn something. If the learner has to know how to perform something, then he has a physical need to learn it or if by doing something the learner attains some mental satisfaction (psychological need) he/she will be inclined to learn.

XIX. CONCLUSION

Spaced Repetition System, though dating back to 4000 B.C, has its own importance and effect even today and this system is being used in many fields of general studies and hence can be an effective way of learning language and to enhance the language skills of the learners. Through repetition and reinforcement, Spaced Repetition System also improves the cognition of the learners.

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