Core Elements of Active Learners, Language Transfer, and Cognition Theories for Second Language Learners

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ABSTRACT: Language transfer is a cognitive process involving the strategic use of the first language in learning a second one. Essentially, the key factor in the transfer of language skills as a second language learner is affected greatly by the degree to which people learn with understanding rather than merely memorizing sets of facts for an examination. Fundamentally, the key characteristics of learning and language transfer has important implications for our educational needs in modern-day curriculums for this 21st century. In order to establish and to promote bilingual abilities in countries that are moving beyond its borders, and entering a more international and global reach for future generations to come, there should be more attention placed on creating learning goals that have staying power for students to build on their English language proficiencies.

In recent studies, the transfer of information is best viewed as an active, dynamic process rather than a passive end product of a particular set of learning experiences. Thus, the design of instruction requires that the initial learning stage is to actualize the transfer of new knowledge for students learning another language within a core language-based program. This paper will briefly explore the related components of how active learning can accelerate the language transfer process through the science of recent cognition theories from the classroom to the individual learning modalities.

Key Words: active learning, cognitive neural processes, English as a Second Language (ESL), language transfer, spaced repetition learning.

INTRODUCTION TO COGNITIVE THEORIES AND BRAIN RESEARCH

How do we learn as human beings? The answer cannot be simplified by how our mental processes stem from series of linear, well-regulated steps nor can it be explained by simply observing behavior responses as learning styles may differ from person to person. Amid years of research that had evolved for over 2,500 years since the fourth century by Greek philosophers, these ongoing research studies have shown us that learning is often filtered through our vital human sensory systems. From these neurological processes found in the brain, newly acquired information is then transferred from our short-and-long-term memory banks for purposes of future recall based on our human needs. Therefore, new information has been identified and labeled as either short-or- long-term memory storage units within our active human brain cells.

RESEARCHING HOW OUR HUMAN BRAIN WORKS IN ACQUIRING LANGUAGE SKILLS

Our neural brain pathways are formed to receive all experienced information within a given frame of time. Brain and cognitive research merits more recognition as scientific evidence for systematized recall for second language learners are being examined through various experimental testing procedures. In short, the positive acquisition of a second language requires the educator's general understanding of these finer points of learning built on previously shaped research done by behaviorists such as B.F. Skinner (1957) and others of this generation of theorists in the 1950s. This evolutionary research framework of the 1950s into the ever-expanding flow of new information by cognitive theorists such as Eysenek and Keanne (1995) have truly opened the road for more

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discussions in evaluating better approaches for educators in creating curriculums for our learners today. Although such psychological and scientific approaches in learning are just as important for further and deeper analysis, this paper will address only the pertinent issues relating to how language can be transferred for students learning a second language through the active learning classroom.

BRAIN AND NEURAL SCIENCE RESEARCH PAVES THE WAY IN UNDERSTANDING OUR LANGUAGE DEVELOPMENT CAPABILITIES AS HUMAN BEINGS

As an emerging field of study from the mid-1950s with psychologists and linguists like Norm Chomsky (1957) along with the steady progression of developing artificial intelligence as a research field, the language development processes were originally found to be located on the left side of the brain. Two major brain surgeons have been attributed to the discovery of the two specialized regions in the brain responsive to language development and long-term memory recall for language usages. Generally speaking, the part of the brain called the "Broca's area" is the region in the frontal side of the left hemisphere. This region has been identified as being involved in the production and comprehension of the spoken and written language.

TWO MAJOR 19th CENTURY DISCOVERIES IN BRAIN RESEARCH

In 1861, the French surgeon, Pierre Paul Broca described a patient who lost the use of speech, but was only able to pronounce the syllable 'tan', but could understand spoken language, and communicated by hand gestures. After this patient died, Dr. Broca performed an autopsy and located a lesion on the patient's left side of brain that had caused the patient's inability to produce sounds and common speech patterns. The other region of the brain known as the "Wernicke's area" is associated with the other aspects of language development and memory recall. A German physician Carl Wernicke in 1864 described one of his older patients who was able to speak, but could not understand the written language. In this case, Dr. Wernicke operated on the patient and found a lesion in the posterior region of the temporal lobe in the left side of the brain. He had determined that this disruption caused the patient's inability to understand language. In these medically studied patients for both Dr. Broca and Dr. Wernicke, the discovery of lesions on the left side of the brain affected the language centers within two localized areas of the brain.

In view of these 19th century discoveries of the human brain, the specialized area of brain research has led to making further inquiries and discoveries on how we learn language today. Indeed, these scientific breakthroughs are significant for educators at this time and place in history. By having a better understanding of these profound brain-related discoveries in the last 50 years, the amount of shared information has been phenomenal to date. This sharing of research information has opened newer avenues in maximizing our learning capabilities and potentials as human beings at a wider level of consciousness, and a faster speed of worldwide exchange. Due to multiple Internet-based websites along with social media channels, the rate of academic dialogue has more than tripled, and will most likely continue to prompt increased academic discussions on how we can learn better and faster than ever before.

BUILDING STRONGER SCIENCE-RELATED CONNECTIONS WITH OTHER LEARNING THEORIES TO IMPROVE OUR LANGUAGE-BASED CURRICULUMS

The cross-discipline approach incorporating both scientifically proven and psychological/behavior theorists had provided an excellent source for educators in developing lessons based on mental representations and information processing modes within the brain. The key to learning is in isolating the areas of the brain where connecting neurons form the pathways that cement our long-term memory banks. Most emphatically, there is much to be gained in evaluating how previous psychological and behaviorists theories have laid the basic foundation for cognitive theories to be more relevant in the classrooms of today. These well-accepted language development tenets have created the pathways for educators teaching a second language, and we are no longer in the dark. In doing so, we are able to forge ahead as these paths of learning have been illuminated with teaching ideas shared by educators all over the world. In keeping up with our educational goals, the magical spark that emits the light of learning provides us with how information may be utilized to actively solve the problems and issues of modern society. Effective educational solutions to our ever-expanding base of knowledge stems from our frontiers that had created new innovations and technologies in the last few decades so that we can now communicate with each other in essential and more meaningful ways in real time. In the spirit of higher learning,

the future becomes more in plain sight for us, and the tools for teaching a second language is available for any of us to utilize at any time and place.

HOW TO LEAP FROM THE FIRST LANGUAGE TO THE SECOND ONE?

The behaviorists approach to language learning in the prevailing belief held by B. F. Skinner in his book, *Verbal Behavior* (1957) was that language learning must have a constant stream of verbal input *shaped by reinforcement* in order for humans to communicate with each other effectively. Norm Chomsky (1959) made an incisive review of B.F. Skinner's book. Chomsky had said that, "*if learning a language was solely obtained by mere reinforcement in a stimulus/response modality, then native speakers of a given language would find it impossible to understand sentences that they had never heard before by an instructor.*"

The leap between learned language and the bridge between the first and second language is the challenge for ESL instructors. In view of how language can be transferred for long-term memory use, Chomsky claimed that language is *not* learned solely through a process of memorization and repetition, but that the mind contains an active language processor that generates rules through an unconscious acquisition of grammar. In other words, Chomsky relates to how our brain cells form associations with words and images that correspond to our base of knowledge within our mind. Other researchers in this field of language acquisition studies have moved away from the linguistic components of a language to a more inclusive realm of language in common and daily use. This includes language relating to social, political, business and psychological domains for the content-based approach in language study. The main reason is to have students connect to the cultural and contextual meaning in the spoken and written words within reading assignments. In sum, social theorists contend that language can be attainable through topics relating to the student's daily life situations by illustrating well-conceived educational, social and cultural contexts as reading material for discussion and debate to improve critical thinking skills.

DEFINING THE LEARNING ZONE TO INCLUDE SPACED REPETITIVE LEARNING

By examining the social contexts for which learning takes place, the expansiveness of the language learning scenarios in an active classroom environment gives the instructor a wider net of possibilities for language-based curriculums. In the widening scope of teaching practices that involve a heightened communicative and cultural interaction between the facilitator who can transfer new knowledge to those language learners elicits new levels of mastering a language. In view of how newfound information for a language learner is received, the instructor can support the student who may be filtering new words through the lenses of that person's first language repertoire. What is essential to note for educators is to allow the second language learner to accept the new information in spaced and timed intervals of 10-15 segments of learning modalities in a given hour. In doing so, this allows the neurons to spark and fire within the brain cells. Neuroscientists claim that time is needed in making new connections in association with new information for most students in a classroom setting. Thus, providing the time essential for the formation of new neural pathways is an integral part of the learning process for ESL students.

According to Vygotsky (1978), teaching must be matched in such a manner with the student's development level. An educator must take into consideration a student's zone of proximal development first and foremost. How does Vygotsky define this "learning zone?" In his own words, Vygotsky states in pertinent part: "*the learning zone is the distance between the actual developmental level as determined by independent problem solving, and the level of potential development...under adult guidance or in collaboration with more capable peers.*" In short, the measure of the learning zone suggests that the group-oriented behavior contributes to the development of individual achievements in learning a second language. For further evaluation though, it is advisable to do the pre-and-post tests to examine the true nature of learning needs by isolating proven and efficient teaching methodologies for ESL instructors who are interested in improving their teaching techniques and ESL learning materials.

WHAT IS THE DEFINITION OF LANGUAGE TRANSFER?

The term language transfer is used to describe what occurs when students are in the process of learning a new language. In this regard, the student is able to transfer the applications from his or her first language formed

from birth to the second language during school. This is to say that students learning a new language use some of the aspects that are applicable to the previous language while learning the new one. This is an essential cognitive learning process for the new language. In such a case, the transfer could occur on various levels, including the transference of letters, sounds, meanings and other factors that can enhance the learning experience through social and interactive sessions from a skilled language instructor in an active and interactive manner.

The process of language transfer is more common when the new language that the individual is trying to learn bears some sort of similarity to that person's original language. Such a similarity could be due to the fact that the new language is merely another dialect that closely resembles a language or another variation of the old language. It could also occur in a situation where the new language is an alteration of another language as in the case with Pidgin English spoken by native speakers in Hawaiian culture. For example, the Pidgin English language is a mixture of English and some local specialized words and terms that may have been imbued with other meanings than what was intended by the usages within the original English language. English speakers trying to learn the Pidgin language often try to expedite the process through the method of language transfer. In this case, learners try to use their knowledge of the original meaning for various words in the English language to help them understand the new language by making an educated guess in the meaning of words spoken in Pidgin English according to both theorists, Piaget (1936) and Vygotsky. (1962). Both represent theorists who have been in the forefront of social and interactional learning studies, and thus, provide us with the very foundation for how language is taught in schools and learned by students in their social learning environments. As ESL instructors, there is a need to be more aware of teaching techniques to bridge the first language to the second one. In understanding various practices in teaching English courses taught at the university level, the learning outcome for students can be realized with higher test score results such as the TOEIC and/or TOEFL standardized examinations.

METHOD AND DISCUSSION FOR INTEGRATION OF SPACED REPETITION LEARNING CONCEPT FOR JAPANESE ESL STUDENTS

In my own courses taught at various Japanese universities, students surveyed for this research paper had voiced their own opinions on learning English for either TOEFL and/or TOEIC-based examinations. In fact, the majority of students surveyed wanted to know this question: how to improve their TOEFL and/or TOEIC scores? In answer to student inquires, the concept of "spaced learning and repetition" was briefly introduced to them during the academic year 2017-2018 at several universities here in Japan. While the teaching techniques as discussed through the active learning and language transfer modalities is something to be considered for ESL teaching purposes, the most important element of learning comes down directly to the students learning a second language. Specifically for one case study of a given Japanese university within the business English department, the students were divided into four sections: L1, L2, L3, and L4. In these sections, the calculation of the ratio of students who received S and A grades in L1 to L4 classes from 2015 to the first semester of 2017 was about 50%. The details are as follows: L1 – 80%, L2 – 50-60%, L3 – 40 to 50% and L4 – 20%. Further, one of the survey questions about the time factor in ESL learning for students responded as follows:

QUESTION 5: How much time do you need to create your powerpoint slides as a group?

Response: one week (1) Response: two weeks (5) Response: three weeks (74)	80 Japanese university students surveyed from various courses such as (1) Media Literacy, (2) Internet English, (3) Life Topics, (4) Environmental Issues in Contemporary Society.

In the general research conducted for Fall semester at one Japanese university, the findings for the overall scores for the L3 class was 75% and the L4 class was 33% wherein the TOEIC scores were calculated as 30% of the total final grade. The higher TOEIC scores compared to the medium levels from 2015 to the Spring of 2017 into the final grading was remarkable high for the of Fall 2017. For the Fall semester, students who received final scores based on the active learning and language transfer techniques received grades in the 80-89 (A) and 90-100 (S) ranges were as follows: L3 – 75% and L4 – 33%. For one specific example, the TOEIC scores for one L3 class resulted in the following: 2 students who scored 25/30, and 15 students scored 20/30 in a class total of 37 students. Since Japanese versus U.S. grading system for post-secondary levels are quite different, please note the following for comparative reference:

Post-secondary

Grade	Scale	Grade Description	US Grade	Notes
S	90.00 - 100.00	秀 (Exemplary)	A+	Rarely given
A+	90.00 - 100.00	秀 • Shū (Exemplary)	A+	
A	80.00 - 89.99	優 • Yū (Very Good)	A	
B	70.00 - 79.99	良 • Ryō (Good)	B	
C	60.00 - 69.99	可 • Ka (Satisfactory)	C	
F	0.00 - 59.99	不可 • Fuka (Fail)	F	
P		パス (Pass)	P	

This, of course, was only a preliminary grade results for one university. In view of this sampling, there is a need to do more conclusive research in order to isolate variables connected to this ongoing research project. In response to the student's needs to obtain higher TOEIC scores, the concept of the spaced repetition concept of learning was introduced and practiced in class in order to accelerate and enhance the need for individualized or self-learning purposes. The preliminary results for this type of teaching modalities through visuals based on powerpoint images resulted in higher TOEIC scores for two classes, L3 and L4 which also included scores on both midterm and final examinations for the final grade outcome.

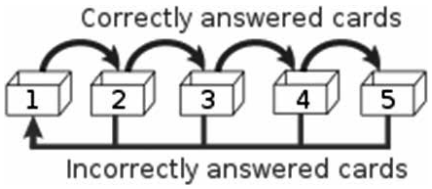

Image Source from Wikipedia (Spaced Repetition)

LEITNER'S SPACED REPETITION SYSTEM FOR LEARNING NEW INFORMATION

The Leitner system created by the German science journalist, Sebastian Leitner in the 1970s has been widely used as an efficient method of learning by using flashcards for individualized learning purposes. The book *So Lernt Man Lernen* (1974) published by Leitner became quite popular at that time, and is being currently reviewed as a learning tool for second language learners. Simply explained, the principal of "spaced repetition" is the process of learning where flashcards are reviewed at increasing spaced intervals of time for total recall of learned material, especially with regard to increasing vocabulary recognition response rates.

Depending on how well the learner can recall the math or reading comprehension problems, for example, then the learned card or powerpoint and image slide is sent to the next grouping for review. (See graphic representation of spaced repetition). If the learner cannot recall the new information, then this flashcard or powerpoint and image slide is sent back to the original pile of cards for another review. Each succeeding flashcard or powerpoint group had a longer period of time before the learner is required to revisit the card or slide grouping. According to Leitner's book, the learning boxes are numbered from 1 to 5 in proficiency levels and the review of each card section is based on timed intervals of 20 minutes for the first review, 24 hours for the second review, 3 days for the third review, one week for the fourth review, and lastly one month for the last and final review. For stronger learning outcomes though, it has been suggested to review box 2, 3 and 4 every five days for a more solid review process. In this individualized style of learning, the outcome for recall is much higher for those using the Leitner's spaced repetition technique in developing second language proficiencies, especially when learning new vocabulary words as well as other academic interests. As a caution though, this system must be done on a consistent, disciplined, and routinized learning schedule. For classroom learning though, the use of powerpoint slides was substituted for flash cards during the Fall Semester, 2017 for this particular research project.

CONCLUSORY THOUGHTS

Due to this ongoing research regarding left-to-right brain language students, the possibilities in creating lesson plans for English for Second language learners can make headways into a more an active and dynamic learning process. As discussed by many theorists to date, and in comprehending our human potential to bridge the gap between learning new things through the whole brain teaching strategies, learning outcomes can be improved. The ESL instructor in understanding the needs of both the left-brain from right-brain individuals and visa versa can be empowered to facilitate the learning modalities for students more efficiently. Exploring how human beings are able to convert their short-term memories to long-term recall based from various classroom experiences is what makes active learning so vital for our educational needs today.

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