# The Effectiveness of Teaching Neurocognitive, Multimedia, Metacognitive, Socio-Cultural Techniques on Learning and Remembering English Words in Second Language Learners

*Vahedian, M. et al.*

## Extended Abstract

### Introduction

Due to the fact that vocabulary constructs meaning, it is crucial for the development of language learners' communication skills; inadequate vocabulary knowledge results in difficulties with both decoding and encoding during both reception and production. Research has demonstrated that English language learners' reading comprehension is significantly influenced by their vocabulary knowledge (Brooks, Colton, & Fraser, 2021). Recent developments in language instruction that recognize the communicative value of words have elevated vocabulary to the status of a crucial learning goal (Al-Qahtani, 2015). Recent developments in second and foreign language acquisition indicate that proficient users of English in an academic environment require not only a strong grasp of grammar and pronunciation, but also a substantial repertoire of vocabulary. In other words, they must be able to process language comprehension and production in order to be successful in the English language. The construction and simultaneous extraction of complex utterances via the use of suitable lexical combinations are time-dependent and location-dependent (Tovar, 2017). While there are various approaches to vocabulary instruction, there are emerging methodologies grounded in psychological theories that have the potential to simplify language learning, particularly vocabularyinstruction. Each of the methodologies employed in this research is associated with a proposed psychological theory, the selection of which was predicated on its own set of assumptions. Integrating psychology, neuroscience, and machine learning, the neurocognitive field argues that learning should be investigated along three crucial dimensions: as a computational process, as a social process, and as a process sustained by brain circuits that link perception and action. Ensuring the integration of verbal and visual inputs can enhance learning outcomes in multimedia environments. The socio-cultural approach to language instruction places emphasis on collaborative dialogue as a means to comprehend the speakers' meaning and intention, while also taking into account the social and cultural contexts. Metacognition is a form of higher-order thought characterized by active regulation of learning-related cognitive processes. Hence, English as a Foreign Language (EFL) learners employed pictorial-visual teaching techniques, the multi-sensory method, circle rotation, storytelling, and note-taking, all grounded in socio-cultural, meta-cognitive, and neurocognitive theories, to facilitate the recall and recognition of English vocabulary. The audio-visual education approach is founded upon Mayer's theory of multimedia learning. The vocabulary note-taking and multi-sensory method, which involve drawing with closed eyes, are grounded in metacognition and storytelling theory, respectively. The rotation method, which involves sentence formation, also draws upon SCT. While all of these techniques provide some insight into the neuro-cognitive function, certain methods, such as the rotating method and storytelling, offer more comprehensive explanations.

### Aim

The purpose of this study is to investigate the impact of instructional strategies rooted in socio-cultural, neuro-cognitive, multimedia, and meta-cognitive theories on EFL learners' ability to recall and recognize English vocabulary.

### Methodology

A control group participated in a semi-experimental pre-test-post-test design. In 2021, the statistical population comprised every English language learner enrolled in educational institutions in the city of Qom. A random sample of male language learners from two institutions was used for the statistical study; sixteen individuals comprised the experimental group, while seventeen comprised the control group. A total of eight 45-minute sessions were devoted to instructing the experimental group using pictorial-visual techniques, the multi-sensory method, circle rotation, narrative, and note-taking. In contrast, the control group received instruction using the conventional method. To assess the vocabulary proficiency of students learning a new language, language teaching professors collaborated in the development of two question categories: productive recall (30 questions) and recognition (30 questions) or vocabulary recognition. A total of sixty questions comprised the assessment. The statistical analysis of covariance and split plot was conducted utilizing version 22 of the SPSS software.

### Findings

By employing multivariate covariance, the observed F-value indicated a statistically significant distinction between the experimental and control groups. Furthermore, meta-cognitive, neuro-cognitive, multimedia, socio-cultural, and socio-cultural techniques account for 73% of the variance associated with vocabulary acquisition.

These methods account for approximately 66% of the variance in word recognition and 65% of the variance in recall (production) in univariate covariance analysis. The split-plot analysis revealed that the methods of recall (production) and recognition of words facilitate intra-group learning, as indicated by the F-value in the intra-group mode. The experimental group demonstrated a distinct learning effect from the evidence group, as evidenced by the training course completed from pre-test to post-test; the effect size accounts for 66% of the variance in recall (production) and 64% of the variance in recognition.

**Conclusion**

The findings suggest that the implementation of specific strategies significantly impacts both the recall and recognition of vocabulary. This study introduces a novel methodology for language instruction and demonstrates that the integration of theoretical domains results in improved learning outcomes for language learners through the synergy of applied techniques encompassing distinct facets of the learning process.

**Keywords:** Learning, Metacognitive, Multimedia, Neurocognitive, Socio-Cultural.