ENHANCING THE PHONOLOGICAL WORKING MEMORY CAPACITY THROUGH CLASSROOM-BASED INSTRUCTION TO DEVELOPE EFL/ESL LEARNING AND TEACHING

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ABSTRACT: *This article aims to increase teachers' awareness of the phonological loop as part of the phonological working memory (PWM) and its function in storing and retrieving phonemic forms and then informing teachers of ways to implement this knowledge in actual teaching practices through proposing some classroom-based instruction. This article highlights the importance of the PWM in EFL/ESL learning. It identifies the roles and functions of PWM in acquiring, storing, and learning new vocabulary. These suggestions act as a guide for EFL/ESL teachers to increase their students' cognition and, in turn, their scholastic achievement. Various educational games and activities are introduced according to three keys findings from the literature: the importance of articulatory suppression and how can we incorporate it for better storage of phonemic input; the role of phonological awareness and how can we enhance it to expand the capacity of the PWM; and the influence of long-term memory and how can we activate it to enhance the PWM.*

KEYWORDS: Phonological Working Memory (PWM), Phonological Loop, Working Memory (WM), phonemic Awareness, EFL/ESL, Articulatory Suppression.

INTRODUCTION

Phonological working memory (PWM) plays an essential role in a person's ability to learn new words through the phoneme system. It contains the phonological loop that is responsible for storing and manipulating phonological materials and retaining them over a short time. It is an essential factor for "learning the novel phonological forms of new words" (Baddeley, Gathercole, & Papagno, 1998, p. 185). It creates a "stable and long-term mental representation of novel phonological material" (Martin & Ellis, 2012, p. 379) including the word's syllabus, chunks, and sounds. Empirical studies and experiments on children and adults (with or without neuropsychological disabilities) revealed that there is a strong association between the PWM and word learning (Baddeley, Gathercole, & Papagno, 1998). Since PWM is important for learning new words and since new words are building blocks for the acquisition of a foreign or second language, it is crucial for foreign language success and second language acquisition. Therefore, teachers need to access this knowledge and be aware of its role in amplifying students' achievements in EFL/ESL classes. This amplification can be effectively attained through simple classroom-based instruction.

Despite the extensive literature on the PWM's role in and effects on language learning, particularly foreign and second language acquisition, very few studies address this aspect from a practitioner's point of view to inform teachers of instructional approaches and strategies that implement the results and findings of research on PWM and cognitive psychology. Teachers do not have access

to many resources that interpret research into practice through teaching guides for classrooms. Teachers may unintentionally adopt disruptive or ineffective techniques when designing classroom-based instruction for EFL/ESL students. Another motivation for this study is that such knowledge is primarily popular in psychology and cognitive science fields. Many teachers, even those working in special education, are not fully aware of the role of PWM and how its capacity can be increased through classroom-based instruction.

The purpose of this article is to increase EFL/ ESL teachers' awareness of the importance of PWM and its critical role in language learning and then provide them with a guide for how to implement the findings in a practical way. This study provides an overview of the findings of previous studies conducted in cognitive psychology. It also proposes some instructional implementation by designing classroom-based instruction of educational games and activities from my experience as an EFL/ESL teacher. This article is for EFL/ ESL teachers to consider PWM's important role in language learning and then adapt some appropriate interventions in the classroom. It proposes instructional games and activities designed according to findings from long-term studies and research in working memory and cognitive psychology. These strategies are constructed upon three findings:

1.   The articulatory suppression has a significant influence on the phonological store and PWM.
2.   The phonological awareness enhances PWM and increases its capacity and efficiency.
3.   Long-term memory influences the function of PWM and increases its performance.

Many studies have investigated the association between PWM and language learning by measuring reading and vocabulary test scores (Gathercole & Baddeley, 1993). In EFL/ESL teaching and learning, vocabulary acquisition is found to be highly related to PWM (Gathercole & Baddeley, 1993; Service, 1992). Building vocabulary and developing it depends on the phonological loop in the working memory (Service, 1992). Deficits in the phonological memory can affect students' abilities to retain verbal information and process it, which will consequently affect vocabulary learning and language development in general (Gathercole & Baddeley, 1993).

Working Memory as the framework of PWM
 Working memory (WM) is the mechanism responsible for the processing, manipulation, and storing of received information to perform cognitive tasks (Baddeley, 2003 as cited in Biedron & Szczepanic, 2012). WM allows a limited number of cognitive resources to be used during a particular time and operation. The efficiency of WM is affected by the amount of input loaded (French, 2006). WM is more of an executive controlling system than simply just a storage system (Baddeley, 2003 as cited in Biedron & Szczepanic, 2012). This system facilitates learning and helps one acquire focused behavior (Dunning, Holme, & Gathercole, 2013).

Baddeley and Hitch (1974 as cited in Martin & Ellis, 2012) developed a model for WM that replaced the concept of short-term memory. This model has three important subsystems: the central executive, the phonological loop, and the visuo-spatial sketchpad (Baddeley 2003; Baddeley, Gathercole, & Papagno, 1998 as cited in Martin & Ellis, 2012). The central executive is responsible for the attention, control, and supervision of inputs and is assisted by verbal and

visuo-spatial stores (Baddeley, 2000 as cited in Dunning, Holmes, & Gathercole, 2013). It also affects verbal ability and reading comprehension (Martin & Ellis, 2012). The visuo-spatial sketchpad is responsible for processing visual and spatial information like colors, shapes, and locations. The phonological loop is responsible for the verbal material reception, manipulation, and processing (Biedron & Szczepanic, 2012). Biedron and Szczepanic indicated that the fourth component is the episodic buffer, which is responsible for storage.

A number of studies have found that WM affects fluid intelligence, general cognition, comprehension, language learning, and reasoning. WM is also used as an indicator for individual differences and intelligence (Kane, Conway, Hambrick, &Engle, 2008 as cited in Biedron & Szczepanic, 2012). It is suggested that people who do well in languages are mostly those who have higher WM capacities. WM is also a predictor for comprehension skills and development in first and second languages (L1 and L2) (Oh, 2011).

The function of WM in learning is best explained by Gathercole and Alloway (2007) as a "mental workplace in which we can hold information whilst mentally engaged in other relevant activities" (p. 12). The cognitive load influences the functioning of WM as it has a certain capacity. The amount of information, its nature, the speed of delivery, and previous knowledge are all important variables that influence the capacity and efficiency of processing.

An example of how WM and cognitive load function is when EFL/ESL learners encounter continuous listening tasks and must go through different levels of mental tasks. This work starts with decoding information (the analysis of phonemes of words and sentences), comprehending meaning, interpreting and relating information to previous knowledge, making sense, and inferring meaning. All these procedures require energy and focused attention from the listeners, which might be reduced with an excessive amount of information and the continuous loading. Imagine the case when students are also required to respond to what has been said: in addition to the previous processing, they also need to hold the outcome knowledge while thinking of an answer. Remembering heard information is distracting in this case as the process of listening is still in action as there is more incoming information. In other words, there are two process going on at the same time; interpreting meaning and remembering them. Students may work on processing meanings and not get to process of remembering and then recording what has been said. If the information is far more than they can process, then all the incoming information will not be remembered. The student will be overloaded with information that cannot be held and processed and therefore they will not be able to complete tasks or follow instructions effectively.

Symptoms of overloading could be hesitation to respond as students feel lost within all of the information and they are not sure what is expected from them, inability to follow instructions, forgetting details, main ideas, steps, or procedures, and the inability to participate in class discussion or conversations are all signs of an inefficient WM (Gathercole & Alloway, 2007). The students will receive the verbal information or spoken material simply as acoustic material, without any interpretation of its visual images or attitudes.

In the EFL/ESL class, cognitive overload issues are far more frequent than in L1 classes. In a first language, students are more likely to understand the language, be familiar with vocabulary, the

grammar, and the phoneme system than they are in an L2 or foreign language. The awareness of culture and environment is also a factor that facilitates and influences the ease of processing. Therefore, teachers need to consider that EFL/ESL teaching and learning demands more consideration of cognitive psychology than any other discipline.

What is the phonological loop and why is it important?
The phonological loop, represented by the PWM, is known for its retention function. It is responsible for retrieving verbal information within a short time. The phonological loop performs two functions: it stores verbal information and practices it to prevent it from diminishing through the phonological store (Baddeley, Gathercole, & Papagno, 1998). The phonological loop is an essential part of human cognitive abilities. It is highly associated with language processing in word acquisition, reading, or comprehension. The functions of the phonological loop can be used by educationalists and psychologists as measures for language processing skills and for intellectual abilities (Gathercole & Baddeley, 1993).

The importance of the phonological loop is highly significant at young ages and when learning new languages. The function of the phonological loop is at its highest level of importance when children begin to construct languages (Baddeley as cited in Dimitrova & Hyltenstam, 2000). It is the same in the case of adults learning a new language. Reliance on the phonological loop is reduced over time as people become used to hearing the verbal forms and sounds of the language. As the child matures and becomes more familiar with the language, they do not analyze verbal decoding and sound system as much as they do with semantic and visual representations.

Articulatory suppression and its influence on the phonological store and the PWM
Articulatory suppression is the internal vocalizing of words and inner speech when we repeat words to retrieve them, think of them, or memorize them. The phonological loop is not responsible for remembering familiar words but for learning new words (Baddeley & Gathercole, 1998). Articulatory suppression is responsible for "the processing of novel speech input" (p.170) to keep new words revived as long as possible to be stored in the short-term memory. This subcomponent is found to be an integral key for improving the verbal memory (Gathercole & Baddeley, 1993) in retaining and maintaining heard information in the phonological store; even if it is only for a short time, it is the first step in holding the information.

The speed of articulation increases with age development but can be reinforced through training and activities to facilitate and enhance verbal processing and transform the information to the long-term memory. Such training is inspired through natural and subconscious human behavior. For example, we repeat a telephone number while we are looking for a pen and a paper or we keep repeating an important word or name to memorize it.

I have designed different activities and techniques to motivate students to practice this action, recognize its importance, and get used to using it so they adopt this behavior spontaneously in future reactions. There are some simple instructions for teachers to consider before proposing these techniques. First, talk to students about the importance of this action, even though it may happen unconsciously sometimes, they need to acknowledge its importance and be encouraged to intentionally do it whenever they encounter new words. Second, always encourage students to ask

for the information to be repeated if they missed it or did not hear it well the first time. EFL /ESL teachers need to consider the following aspects while teaching:

- Reduce the cognitive load while teaching a concept, explaining a task, or delivering instructions; divide information into chunks, this depends on students' age, language level, and the level of information introduced.
- Reinforce important words or concepts with intonation or tone of voice, so students pay attention to what is being said.
- Allow time for students to process what is being said; look for facial expressions that can reveal confusion or nervousness.
- Ask students to repeat or summarize what has been said and what is expected from them.
- Provide support for verbal information by displaying or distributing visual instructions, handouts, and graphic organizers for targeted information.
- Do not use many new words within the same sentence or instruction; this will make the cognitive processing more complex and slower.
- Reduce extraneous variables like going off topic or allowing interruptions while delivering specific information.
- Use examples to reduce abstractions and make knowledge more concrete and tangible.

Phonological awareness and its influence on the PWM
Phonological awareness is the understanding of the phonological structure of the language. It is the awareness of the sound system of the heard input. When one knows the phonological structure, he/she knows sentences, words, syllabus, and segmentations of each spoken utterance and is able to distinguish and identify sounds and words. Phonological awareness is significantly associated with the PWM (Minear & Shaw, 2006). Phonological awareness is the process of analyzing the phoneme system, which is activated through the WM (Gillam & van Kleeck, 1996; Leather & Henry, 1994; Oakhill & Kyle, 2000). Results indicate that improving phonological awareness enhances the capacity and quality of WM and PWM. Minear and Shah (2006) stated that identifying the particular sounds and phonemes within words helps develop phonological awareness.

The long-term memory and its influence on the function of PWM
The phonological loop or PWM develops concurrently with WM as children grow; this indicates that the number of memorized words controls the capacity of the PWM. The memory span can be optimized through practice and through language usage (Gathercole & Baddeley, 1993). Many studies proposed the importance and critical role of long-term knowledge on "immediate working performance" (Gathercole & Adams, 1994, p. 687). Baddeley and Gathercole (1998) stated, "long-term representations of novel phonological materials is a key component of language development" (p. 158). Stored verbal materials play a significant role in processing and maintaining novel ones. Previously stored information facilitates immediate memory functioning. It is not only the short-term memory that leads to long-term memory, but the long-term memory also leads to short-term and working memory (Hulme et al., 1991 as cited by Gathercole & Adams, 1994).

In EFL /ESL learning, long-term memory plays a significant part in attention, focusing, and then understanding. Imagine hearing strings of sounds and utterances of an unfamiliar language and having no understanding of what is being said. Many people in this scenario will stop concentrating and interpreting after a couple of seconds as they realize they have no previous knowledge of this language and there is point in continuing to process the sounds. However, if the listener understands approximately fifty percent, he/she is more likely to focus and concentrate on what is being said; he/she will process what he/she knows and build understanding. This is basically what occurs between the PWM and the long-term memory. In class, therefore, EFL /ESL teachers need to constantly refresh the long-term memory and develop it through revisions and brainstorming; these two actions are able to connect already stored knowledge with new knowledge.

The following section is some recommended instructional activities and games designed according to above theoretical framework. There are three sections, which represents the three keys determined above.

Games for teaching new vocabulary through enhancing the phonological loop by using articulatory rehearsal
The following are some games that train students and encourage them to do internal articulation while learning new words. These games can enhance the phonological loop by allowing more time and opportunity for the processing of heard input, which will result in better storage and retrieval.
Name of the game: Echo Me
Materials: None.
Aim/s: Stress the importance of subvocal rehearsal to encode verbal materials; enhance articulatory suppression; create fun and excitement.
Number of students: The whole class.
Procedure:
• This game is played when the teacher wants to introduce new words.
• Write the new words on the board.
• Teacher starts saying each word in funny ways: with various intonation, volume, and tones.
• Students repeat words with fading effects like a normal echo.
• The teacher signals the number of repetition with her/his fingers. Fewer repetitions are better in order to avoid mistakes and changes of words; three echo repetitions is a suitable amount.
• The teacher can perform this activity with individuals only or with groups. It can also be made competitive with the best or funniest echo winning: this will be funny for students at young ages.
Name of the game: Cat Echo Sounds
Materials: Smart board or sound magnifier; iPad or iPhone.
Number of students: Depends on number of devices.
Aim/s: Stress the important of subvocal rehearsal to encode verbal materials; encourage practicing repetition; create fun and attractive learning environment.

Procedures:
• Many youngsters might be familiar with this application; it is an iPhone and iPad application for repeating phrases with funny and weird sounds.

- Invite a student to the front of the class to choose a character and say a word. Use a sound amplifier if needed or connect the device to a smart board, so the whole class can see and listen.
- Students will enjoy saying words and listening to the character repeating the same sound in funny ways.

Activities and games to increase phonological awareness for better PWM
These games and activities focus on enhancing phonological awareness and identifying the phonemic system of the FL/SL. Students through these activities will be able to analyze sounds into words and sentences and be able to decode different phonemes.
Identifying sounds in words; initial, middle, or last sound
Name of the game: The Fly Swatter.
Materials: Two fly swatters, letter cards, white board.
Number of students: Three students at a time.
Aim/s: Identify sounds in different positions; enhance phonological awareness; create fun and excitement.
Procedure:
- Different letters and sound are written clearly on the board, for example (/ph/- /ch/- /d/ /g/ etc.).
- The mission should be written on the board for all students, for example, "what is the first sound in the following words?"
- One of the students can be the reader; he/she reads different words from a list of words given to him/her.
- The two other students should be ready with their fly swatters to hit the correct sound.
- The winner is the student who hits the most correct sounds.
Name of the game: Match With Me.
Materials: Letters/sounds and words written on small pieces of paper.
Number of students: Two groups or the whole class.
Aim/s: Identify sounds in different positions; enhance phonological awareness; create fun and excitement.
Procedure:
- The teacher divides the class into two halves or uses two small groups. Students in both teams stand in two rows; each student faces his/her counterpart on the other team.
- One half of students are assigned small pieces of paper with words on them.
- The other half of students are assigned pieces of paper with a sound or a letter, for example, /ph/ /k/ /o/ /i/ etc.
- The students read the information on their piece of paper silently.
- The students with the words start reading their words aloud one-by-one without pausing, like a Mexican Wave at a stadium. When they are finished, they repeat the process one more time.
- The second half of the students responds quickly after hearing the words. Every 'sound student' runs to join his/her 'word student'.
- The last student to find his/her match is the loser, wrong matchers are also losers; they need to come up with other words that match their sound (depending on the focus whether it is first, middle, or last sound).

- The teacher asks each partner to read their words and sounds. The rest of the class judge if is a correct match.

Name of the game: Cook a Word

Materials: Markers, pictures of cooking pans with a transparency attached over it so that students can write and erase on the transparency easily, ingredient list: (a piece of paper with instructions such as what the sound is, the position of the sound, how many words they need to create, how many syllables are in the words...and so on), a C.D. or tape recorder for music.

Number of students: The whole class divided into groups.

Aim/s: Enhance phonological awareness; create fun and excitement; enhance social learning through collaboration.

Procedure:

- The teacher divides the class into groups. Each group is given a picture of a cooking pan, an ingredients list, and markers.
- The teacher explains that students need to cook a meal, a word, consisting of different letters and sounds. They need to follow the ingredients carefully to have a tasty meal. Students need to start once they hear the music and stop whenever it stops.
- When the groups finish, they need to come to the front of the class and hold up their cooking pan picture with the word written on it.
- Each group explains their meal according to the ingredients they had.
- The rest of students say 'yummy' if they think the word is right.

Categorizing phonemes by identifying words with the odd sound in a sequence (Rhyming words activities):

Name of the game: Stand up/Sit down

Materials: Rhyming words with odd words.

Number of students: The whole class

Aim/s: Enhance phonological awareness; create fun and excitement; encourage physical exercise; enhance a positive learning environment.

Procedure:

- The teacher says lists of rhyming and non-rhyming words.
- Students stand up when they hear a non-rhyming word and sit down when they hear rhyming words.
- The teacher can vary the speed to add more excitement.
- Students lose if they standup or sit down at the wrong word. They step aside and the last student remaining is the winner.

Recognizing common sounds in different words

Name of the game: Tell Me What It Is

Materials: List of long and short words with a common sound.

Number of students: Two players

Aim/s: Enhance phonological awareness; enhance a positive learning environment.

Procedure:

- The teacher asks two students to listen carefully to a list of five or more words and identify the common sound among the words.

- The student needs to identify the common sound in a very short time, the first who says the correct answer is the winner.

Name of the game: Complete?

Materials: None

Number of students: Teams/groups or the whole class.

Aim/s: Enhance phonological awareness; enhance a positive learning environment.

Procedure:

- If playing with the whole class, the teacher needs to divide students into groups. Each group has a different sound. They get to know their sounds while creating the words.
- The game starts with the first group when the teacher says their sound and quickly each member says a word that starts or ends with the same sound.
- If a student cannot come up with a word, they should say pass, so the turn moves to the next player.
- The game moves quickly from one student to the next, otherwise it will not work effectively.
- Students who were not able to say a word form a new group and repeat the task with a different sound.

Segmenting and blending sounds; two or more phonemes together (b+a_t= bat)

Name of the game: Mathematical Words

Materials: A list of words that have 2 or 3 sounds (c+at = cat / bas+ket = basket).

Number of students: Two players

Aim/s: Enhance phonological awareness; enhance a positive learning environment.

Procedure:

- The teacher asks two students to divide or blend sounds from a word list on the board (cat-met, mention-dentist…depending on the grade).
- The first student reads the first segment /c/, then the second completes reading the next segment /at/, then both students read the whole word together/cat/.
- The whole class can repeat after them.

Deleting or changing a phoneme from a word.

- The teacher can use the Fly Swatter game as explained above. The adjustment is that he/she needs to say the word incompletely and students complete it from letters or sounds on the board to make meaningful words.
- The teacher can also use the Cook a Word game by modifying the ingredients list or the instructions.
- The teacher asks students to listen to a word and change or delete a particular syllable orally.

Instructions to enhance long-term memory and thus PWM

Teaching through games is a very effective and appealing approach especially when teaching students at an elementary stage. Through games teachers can add some fun and excitement to everyday class activities and daily routines. Games not only provide a fun atmosphere, but they also create friendly and social relationships between the teacher and his/her students and among

the classmates. The following are activities and games that can be used for both brainstorming and revising pre-taught vocabulary. They can be used as warming up or wrapping up activities.

Name of the game: The Huge Mitten.

Materials: Two different color huge mittens that students can put both hands inside, word cards, magnet stickers.

Number of students: Three students at a time.

Aim/s: Revise pre-taught words; create fun and excitement; attach knowledge of words to success in games and competition; enhance a positive learning environment.

Procedure:

- The teacher distributes word cards on a carpet on the floor; words can be hung around walls or over other students' desks.
- Stick a magnet sticker at the top of each mitten to magnify the word cards.
- One student can read the words and the other two students pick them up.
- The reader reads the words, while the two others, who wear the mittens, listen to the word and run to choose the correct word card and pick it up with the huge mitten.
- The first student who picks the correct card is the winner.
- Wining could be after collecting some word cards or after the first card, it depends on the teacher and the class time. Each player can have two turns so every student has a chance to play.

Name of the game: The Fly Swatter.

Materials: Two fly swatters, word cards, a white board.

Number of students: Three students at a time.

Aim/s: Revise pre-taught words; create fun and excitement; attach knowledge of words to success in games and competition; enhance a positive learning environment.

Definition: It is a fun and great game to review and practice new or difficult terms.

Description: The fly swatter game is a very simple game. Teachers can use word cards, pictures, or sentences to represent the meaning of the word. It is an interactive game and can be adapted to different subjects and topics. This game is great for any level.

Procedures:

- Write words all over the board randomly. You can also use word cards or word pictures.
- Have two students stand side-by-side next to the board and each has a fly swatter.
- Read out the word, its definition, a synonym, or an acronym. You can read out words in the native language if you are teaching as a foreign language. You can make it funny by saying it very slowly, very quickly, or in a silly voice.
- The first student who swats the correct word will get a point. You can repeat this for five or more words.
- You can choose a student to read out the words instead of the teacher. This will enhance students' sense of responsibility and self-confidence as well as engage more students.

Activities:

Name of the activity: Graphic Organizer

Materials: Worksheets for different graphic organizer examples; students can learn to draw some simple mind maps like trees for example, or use online mind mapping software like Mindmaster or others.

Aim/s: Connect pre-taught information to new information; organize knowledge by creating big concepts or categories for groups of words.

Procedure:

- Talk to students about the importance of mind maps and graphic organizers.
- Provide students with sources, either copies of different examples of graphic organizers or websites for free online mind maps.
- Allow time for students to practice identifying new words and writing them with connections according to meanings, topics, or chapters.
- You can ask students to do this as homework and then present their maps later in class to reflect and explain why these words are organized under a specific category and why the student made the connections. This practice will help students memorize the words.
- You can also use graphic organizers to identify the different meanings for new words.

Name of the game: Without Talking!

Materials: Pre-taught words written on small pieces of papers.

Number of players: The whole class.

Aim/s: Enhance the meaning of words through deep thinking; relate the meaning of words to acting and scene creating.

Procedure:

- The teacher divides the class into two teams.
- One player represents his/her team every time.
- The player comes to the front of the class and reads the word silently.
- The player starts acting the word for his/ her team without articulating it; however, he/she can say how many letters it has, if it is a verb, noun, or adjective through hand gestures.
- The team gets a point when they identify the word correctly within the assigned time.

Name of the game: The Speed Game

Materials: Pre-taught words written on the board, a stopwatch.

Number of players: All students play one-by-one.

Aim/s: Revising pre-taught words; creating fun and excitement.

Procedure:

- The teacher writes a list of pre-taught words and sets the stopwatch to start whenever he/she counts to three.
- The participant comes to the board and starts reading the words as quickly as possible.
- If the student makes a mistake, he/she has one or two chances to start again.
- The teacher writes the time for each participant next to their names on the board.

CONCLUSION

Seeking better education, effective instruction, and appealing learning techniques for EFL/ESL classes start with incorporating findings not only from instructional theories and approaches, but also from cognitive psychology. This study is geared toward integrating recent research in cognitive psychology in a very simple and straightforward way with my previous experience as an EFL/ESL teacher and as a scholar in the field of education. It introduces teachers to concepts from cognitive psychology such as Working Memory (WM) and Phonological Working Memory (PWM) and highlights their functions and significance to language learning. This study introduces

instructional-based approaches for educators and language teachers based on three critical findings from research conducted by prominent figures in the field such as Baddeley and Gathercole and other recognized scholars. These three key findings are articulatory suppression, phonological awareness, and long-term memory.

For the articulatory suppression, research showed that internal vocalization of words as we hear them, especially for the first time, triggers the phonological working memory as we tend to process them through repetition, which will improve the chances of successful verbal storing and thus better retrieval. I have designed very simple, though effective instructional techniques and activities that motivate EFL/ESL students to practice this action and adopt it for better vocabulary learning.

Phonological awareness is also of great influence to PWM; studies revealed that there is a correlation between students' level of phonological awareness, determined by specific tests and measurement, and the capacity of the PWM. Students who are able to identify different phonemes within words and sentences are those who have higher scores in PWM measurements. I have introduced some instructional approaches that enhance the phonological awareness through games and fun activities.

The third key that is significant for developing the PWM is long-term memory. Studies stated that previously learned materials positively affect learning new materials. Revision and rehearsal refresh long-term memory and this enhances and activates the PWM. Different games and activities are demonstrated to refresh and rehearse previous taught vocabularies as the main focus on this study.

I have also made some general recommendations for the effective delivery of EFL/ESL instructions. These suggestions are meant to reduce cognitive load and ensure students' ease and a comfortable flow of information for more storage and better retrieval.

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