



## Acronym – A Retrieval Strategy for Science Learning

### KEYWORDS

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**ABSTRACT** *Students have to learn and remember a lot of information to become scientifically literate. To improve memory many methods were devised over the years. One of the methods used for enhancing memory is the usage of mnemonic techniques. Many mnemonic techniques can be incorporated in learning to eliminate hardships in memorizing terms sequentially. In the present paper, an attempt is made to reveal the usage of one of the mnemonic techniques, acronym in learning science for elementary students. With the use of mnemonic techniques learning can be made easy and enjoyable.*

### Introduction

Worldwide, in most education systems, helping students to become scientifically literate is regarded as one of the important goals of school curriculum. An important aim of science education is to help students to develop positive attitude towards science as a subject and to value the contributions of science. They must be made aware of the fact that science will continue to make human achievement in medical and technological progress and improve the quality of human life (Westwood, 2006).

The India Science Report (2005) indicates that most Indians have faith in science and feel that science and technology can contribute to education, agriculture, economic growth and in general make their lives better. But Quality Education Study (QES) by Wipro Education Initiative (2012) reports that the quality of science education in India is in a depressing state and there is a 5-10% drop in learning levels in the last few years in the fields of mathematics and science. This is noteworthy as the task of improving the learning levels become more daunting as we have to first find ways to arrest this decline in the learning levels (Malik, 2012). A wide range of studies suggest that science educators can make a significant contribution in understanding science and promoting literacy (Webb, 2010). Hence the role of science teachers in motivating and attracting children to science is crucial as a significant part is played by how science is taught at schools.

While some students excel in science, many find learning the complex discipline difficult. To understand complex science topics, students must have a well-developed base of prior science learning as science builds on itself. If students fail to obtain basic science content in their early learning, they will likely struggle with more complex scientific concepts that follow. In teaching these students who lack a scientific base, the information they missed presents a challenge to teachers who do not have time to back-track and reteach information that should have acquired already. Hence students have to learn and remember a lot of information to excel in science. Moreover many students struggle to remember what they've read or to recall information in tests.

To improve memory many methods were devised and have existed for years, some dating back to Ancient Greeks (Underwood & Schultz, 1960; Yates, 1956). One of those oldest techniques was the usage of mnemonics. Roediger (1980) found that mnemonic enabled recall was found to be the best method of recall before considering which method to use, in an analysis of mnemonic devices.

### Mnemonics

In the present scenario, students are expected to learn and recall more information having complex content. Teachers have to find out an alternative way to help the students. Mnemonic techniques have proved to help individuals in this area. Mnemonics are memory aids that assist in remembering specific information by using a process, strategy, or technique that enables a person to improve memory (Higbee, 1977). These strategies work with all kinds of students and it can be applied to any type of content. Mnemonic strategies are systematic procedures which enhance memory and make information more meaningful. Mnemonic instruction is useful for students across a wide age range (Levin, 1993). It has proven effective to learn and remember unfamiliar school-related content for students with learning disabilities (Forness, Kavale, Blum & Lloyd, 1997; Pressley, Levin & Delaney, 1981). Their particular use is in developing better ways to encode information so that it will be much easier to retrieve and remember the information when needed. Although there are many different retrieval strategies that can be implemented to attempt to retrieve forgotten information, research has demonstrated that the way in which information is initially encoded, facilitates memory and the recall of this information better. The fundamental aspect in developing mnemonic strategies is to find a way to relate new information to information that is already in the long-term memory of students. If this connection can be made, the memory of this information has the potential of being remembered for a very long time (Bakken & Simpson, 2011). Mnemonic instruction with school age students is commonly implemented as an instructional strategy for teaching word recognition and vocabulary.

There are specific mnemonic strategies that require some transformation or reconstruction of target content to link it to more meaningful, familiar proxies, which are associated with positive outcomes. These include keyword method, pegword method and letter strategies (Scruggs, Mastropieri, Berkely & Marshak, 2010).

*Keyword method:* The keyword in the keyword method is a concrete, acoustically similar proxy for unfamiliar information that can then be associated with the to-be-remembered information. For example, consider the scientific name *oxalis*, which refers to a genus of clover-like plants. Keyword for *oxalis* could be *ox*, and a picture an ox eating clover-like plants could be used as a mnemonic device. When asked the meaning of *oxalis*, learners first think of the keyword, *ox* then think of the picture with the ox in it and retrieve the answer: clover-like plants (Mastropieri, Scruggs & Fulk, 1990).

**Pegword method:** Unrelated items can be easily remembered by relating them to easily memorizable items which act as pegs (Amiryousefi & Ketabi, 2011). The pegword method is a rhyming proxy for a number (e.g., *one is bun, two is shoe, three is tree*) and is used to remember numbered or ordered information. A teacher could show a picture of a spider weaving a web on a gate (pegword for *eight*) to help students remember that spiders have eight legs.

**Letter strategies:** First letter of the information are used to frame a mnemonic device. Teachers can use letter strategies to help students remember lists of information (Scruggs & Mastropieri, 1989).

### Letter Strategies

This strategy can be used for independently studying large bodies of information that need to be mastered. Research results showed that students who learned the *FIRST-Letter Mnemonic Strategy* received test grades that increased from an average of 51 percent to 85 percent (Hall, 2009). These are the most commonly known mnemonic strategies and include acronyms and acrostics. In acronym first letters of the target words are joint to form a new word, where each letter represents a word, such as "GAC" to represent common types of weeds, Grass, Amaranthus and Chenopodium (Anandhi & Raja, 2012). In acrostics first letters of words in a sentence are used to remember a list or sequence of information, for example, "My very educated mother just served us nine pizzas," to remember the planets in order (e.g., Mercury, Venus, Earth, etc.). Usage of one of the letter strategies, acronym in learning science is discussed in the remaining paper.

### Acronym in science

Acronyms are words whose individual letters can represent elements in lists of information. It can be generated by combining only the first letter or by adding some letters in between the target letters to frame a word.

### Use of first letter only

Mnemonic devices are prepared in the following way. A list of words to be remembered is prepared. First letter of each of the items in the list is identified and these first letters are written horizontally on a piece of paper. If they make a word, then that word can be used as a mnemonic device to remember the items in the list. If the word is remembered, there is a good chance of remembering the items (Nagel, Schumaker & Deshler, 1986). Some examples of acronyms formed using only first letters which are useful to learn science is discussed below.

In the eighth standard science book followed in Tamil Nadu, uses of algae are given under the headings - food, agar agar, iodine and space travel. First letter of these words (f,a,i and s) can be combined in different combinations to form acronym SAIF, FASI or ASIF. Anyone of this acronym can be used to remember uses of algae. After teaching content portion, acronym may be explained to the students. Afterwards when students come across 'uses of algae', they at once remember the acronym and from it information regarding the uses of algae can be retrieved.

Bryophytes are classified into Class Hepaticae, Class Anthocerotae and Class Musci. Using the first letters H, A and M, acronym 'HAM' can be used to remember the different classes. When hearing about classification of bryophytes, 'HAM' is remembered and from this class names Hepaticae, Anthocerotae and Musci can be derived.

Students have to learn about names of subatomic particles, protons, neutrons and electrons. Acronym 'PEN' can be used as an instrument to remember the names of the subatomic particles.

On the basis of the number and arrangement of flagella, bacteria are classified as atrichous (without any flagella), monotrichous (single flagellum at one end), lophotrichous

(Tuft of flagella at one end), amphitrichous (Tuft of flagella at both ends) and peritrichous (flagella all around). Acronym framed using first letters, 'AMLAP' can be used to extract clues about names of the classes and also number of flagellum starting from zero, then one and so on.

In India petroleum is found in Assam, Gujarat, Maharashtra, Andra Pradesh and Tamilnadu. Using first letters of the name of these states an acronym is framed. Letters 'A,G,M,A and T' are rearranged to coin the word, 'GATAM'. So sources of petroleum in India can be retrieved from the word, 'GATAM', as G represents Gujarat, A represents Assam, T represents Tamilnadu, A represents Andra Pradesh and M represents Maharashtra.

### Use of other letters along with first letter

Sometimes the first letter of each of the item in the list do not form a word. In this case, a letter or letters can be inserted in between the first letters to make it a word which can be remembered easily. It is best to insert just one or two letters, or it will be difficult to identify which letters represent items in the list (Nagel et al., 1986). Capital letters can be used to differentiate and indicate the first letter of the words to be remembered. Some examples for this type of acronym are discussed below.

In plant kingdom, Pteridophyta is classified into Psilopsida, Lycopsida, Sphenopsida and Pteropsida. First letters of these classes P,L,S and P cannot be combined to form a word. Hence, letter 'a' is introduced between the letters, 'P, L, S and P' to form the word 'PaLaSaP' to represent the classes of pteridophyta.

On the basis of carbon content, coal is classified into Peat, Lignite, Bituminous coal and Anthracite coal. For remembering these types an acronym 'PeLiBiAn' can be framed using the first two letters.

Law of conservation of mass was proposed by Lavoisier. It is very confusing for the students to identify name of the scientist with the law. To solve this confusion, acronym 'CoLa' can be used which is devised by joining 'Co' from conservation and 'La' from Lavoisier.

It must also be noted that for this strategy to be effective, students must first know the vocabulary each letter represents. Otherwise, the acronym will be of no help to them when recalling the information. Also, students need to be taught how to use acronym to assist them in studying. If not, they will not be able to recall the information. They must be instructed properly to link the acronym to the information to be recalled. If this is not done properly, students recall simply the acronym without understanding the content. The acronym cannot just be presented to the students or posted in the classroom. Students must be taught how to effectively use the acronym and practice using it so that they can use it independently.

### Conclusion

To achieve one of the important goals of education, to make the students scientifically literate, they can be assisted in learning by providing them with some memory techniques. Acronym is one such technique which students can use with ease and efficiency. Teachers must be given awareness programmes about the usage and effectiveness of acronyms in science education. Students can be given training to use and create acronyms which will encourage them to study with enjoyment. Thus students can be motivated to become scientifically literate. This will also help to realize the goal of science education, which will in turn make human achievement in medical and technological fields and improve quality of human life.

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