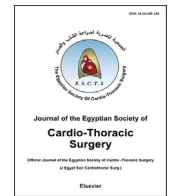


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Review of mnemonic devices and their applications in cardiothoracic surgery

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ABSTRACT

Memorizing information may impose difficulties in learning process with subsequent adverse effect on academic progress. Mnemonic devices are one of the most important methods used in education. They are special strategies that can be used to improve memory and the recall process for the information already stored in long-term memory for easier memorization especially for lists, numerical sequences, foreign language acquisition, and for individuals with memory deficits.

In the current review, we discuss mnemonic methods frequently used for teaching the cardiothoracic surgery science and some examples for its applications.

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1. Introduction

The word “mnemonic” is derived from the Ancient Greek word *μνημονικός* (*mnēmonikos*), meaning “of memory, or relating to memory” [1].

Mnemonic device is a learning method that develops specific ways to encode any given information for easier and efficient storage and retrieval [2].

It's considered in the context as the art of memory. Its use is based on the observation that the human mind more easily remembers spatial, personal, surprising, physical, sexual, humorous, or otherwise “relatable” information, rather than more abstract or impersonal forms of information.

In 1967, Miller GR had reported that mnemonics increased recall. He found that students who regularly used mnemonic devices increased test scores up to 77% [3].

The unlimited potential of the human brain is capable of understanding incredibly complex and intricate concepts yet at times unable to recognize the obvious and simple. Since 1960, when KISS principle “Keep it Simple and Stupid” was noted by the U.S. Navy [4] and states that most systems work best if they are kept simple rather than made complicated; trends become towards simplicity to be the key goal in design towards success. and stimulate the true potential to unlock mind and awaken the true power of brain.

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2. Definitions and differences

2.1. Acronyms

It is a specific type of abbreviation that is pronounced as a word. Each letter represents the first letter of group of words you need to remember.

In another words, the first letter from each word you need to remember is taken to spell out a simple word or phrase.

Examples:

For principles of Cooperative Learning: PIES (Positive Interdependence, Individual Accountability, Equal Participation, Simultaneous Interaction).

2.2. Acrostic

It's an invented sentence where the first letter of each word is a cue to an idea you need to remember.

Examples:

In math, the order of arithmetic operations: Please Excuse My Dear Aunt Sally (Parentheses, Exponent, Multiply, Divide, Add, Subtract).

2.3. Abbreviation

It is merely the shortened form of a word and pronounced like the full word it represents.

Examples:

“St.” is pronounced “Street” (or “Saint”) and “Mr.” is pronounced “Mister”.

2.4. Initialism

It is a type of abbreviation which consists of the initial (i.e. first) letters of words and pronounced one letter at a time.

Examples:

“CD” is the abbreviation for compact disc and pronounced as C alone and D alone [5].

3. Differences

3.1. Acronym vs. acrostic

Similarity between an acronym and an acrostic is both can stand itself as a Word. The difference between acronym and acrostic is that, an acronym will not form a poem, sentence or puzzle whereas, an acrostic will form a poem, sentence, or puzzle. Some examples of common acronyms include LASER (Light Amplification by Stimulated Emission of Radiation).

3.2. Abbreviation vs. initial (initialism)

An abbreviation cannot stand as a word, unlike an acronym as in KISS. So, Phd, should be pronounced as P, alone, h, alone and d, alone. However, on the other hand, Initial will always indicate the first letter of the word but an abbreviation need not follow this rule, Phd, has been taken from beginning, middle or from the end of the word or letter.

3.3. Acronym vs. mnemonic

Acronym is always auditory, whereas a mnemonic can be visual, auditory, kinesthetic or touch that is used to aid the memory. And a mnemonic, unlike acronym, doesn't follow any strict rule, for example; It is Gr8 2 b here (It is great to be here) etc. [3].

4. Mnemonic classification

Different Mnemonic devices have been described. Thompson [8] had arranged mnemonic strategies into five classes: linguistics, spatial, visual, physical response and verbal methods. Oxford identified [23] four major strategies: creating mental linkage, applying images and sounds, reviewing well, and employing action, and Baddeley [24] had described that mnemonic devices can be classified into visual imagery strategies and verbal strategies (Fig. 1), [9–11].

5. Application of mnemonic devices in cardiac surgery

Cardiac surgery is a complex field of medicine with significant morbidity and mortality. However, it must be performed routinely with ordered and organized steps designed in a system for successful throughput of patients. For postgraduate

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