

Effect of Meaningfulness of Learning Materials on Speed of Learning

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This experiment examined the effect of meaningfulness of learning materials on speed of learning. Sixty undergraduate university students (30 males and 30 females) participated in this experiment voluntarily. The participants were divided into two groups (15 males and 15 females for each group) and each group was tested using 10 items. The experimental group learned ten English word whereas control group learned ten anagrams. The participants were asked to learn and memorize the items presented and later on to recall the items in serial order on a blank piece of paper. The number of correctly recalled items was recorded. The result of independent sample *t*-test revealed that the participants took significantly less number of trials on the average to learn words as compared to anagrams. Discussion includes implications and limitations of the current findings and suggestions for future research.

Keywords: meaningfulness of learning materials, speed of learning, experimental research

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Learning is a process of acquisition of knowledge. Basically learning is defined as a process by which experience or practice results in a relatively permanent change in behavior or potential behavior (Morris & Maisto, 1999). According to Powell, Symbaluk, and MacDonald (2002), learning is defined as a relatively permanent change that results from some types of experiences. Similarly, Ormrod (1999) defined learning as the means through which skills, knowledge, values, attitudes, and emotional reactions are acquired. He added that learning deals with relative permanent change in behavior and mental association due to experience.

There are many types of learning style, which are used in gaining information and knowledge. One of them is meaningful learning. Meaningful learning is a process in which people find meaning in the new information by relating that information to the knowledge already stored in their long term memories (Ormrod, 1999; Seifert, 1995). On the other hand, meaningful learning is sometimes referred to as external organization as it allows new information to be organized with previously learned information (Houston, 1991).

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Meaningful learning is frequently used in studying the effective way of learning. The task is design to study the acquisition of meaningful items. This research has been proposed and conducted by a German Psychologist, Herman Ebbinghaus (1913). He found that the associations he made with the words helped him to learn those words (Ormrod, 1999).

According to Ausubel (1978) and Mayer (1996) (cited in Ormrod, 1999), we learn information meaningfully by storing it in long-term memory in association with similar and related pieces of information. The process goes by relating new information to knowledge already stored in long-term memory and find meaning in that information. Thus meaningful learning facilitates both storage and retrieval that make the information being remembered easily.

Verbal learning researchers alternatively discovered that the characteristics of material influence and facilitate the process of learning. They found that items are more quickly learned when they are meaningful because they can be easily associated with other ideas (Salvin, 1994). Cofer (1971) and Paivio (1971) as cited in Ormrod (1999) also suggested that the exact idea earlier. These ideas supported the works and principles discovered and proposed by Ebbinghaus.

When learning new information, individuals impose meaning. According to Ormrod (1999), the effect of meaningfulness of the items on learning can be explained from an S-R perspective. When a stimulus word has many other words associated with it, one of the associations may in turn to be associated with the response to be learned. These associations facilitate individuals in learning and memorizing the words.

The aim of this experiment was to examine the effect of meaningfulness of learning materials on speed of learning. Based on literature review we hypothesized that the participants would take less number of trials on the average to learn words as compared to anagrams.

Method

Participants

Sixty undergraduate students in education levels 1 - 4 (30 males and 30 females) took part in this experiment voluntarily. They aged 20- 24 years. The participants were not paid any monetary reward for their participation.

Materials

Learning materials included two lists (list A and list B). List A included 10 English words whereas list B consisted of ten anagrams which were formed from the words of list A. A hand phone stop watch was used to record time.

Procedure

The participants were divided into two groups (experimental and control groups). Each group consisted of 30 participants (15 males and 15 females). Experimental group was tested using the list of words and control group was tested using the list of anagrams. We tested the participant one by one. The participant was asked to study the words or anagrams for one minute. After one minute, the list was taken back and the participant was asked to write down as many words /anagrams as they could in serial order on a blank piece of paper. This procedure continued until the participant recalled all the words correctly in serial order. The participants were instructed as follows:

Learning of words: "I'm going to give you a list of English words. Read them carefully and try to remember them. You will have one minute to read them. When I say go, start reading. When I say stop, stop reading and give the list back to me. After that you will be required to recall as many words as you can on a blank piece of paper. Take care that every word is recalled correctly in its position. Wrong spelling and wrong placement of words will consider errors. Do you have any question?"

Learning of anagrams: "I'm going to give you a list of anagrams. Read them carefully and try to remember them. You will have one minute to read them. When I say go, start reading. When I say stop, stop reading and give the list back to me. After that you will be required to recall as many words as you can on a blank piece of paper. Take care that every word is recalled correctly in its position. Wrong spelling and wrong placement of words will consider errors. Do you have any question?"

Result

An independent sample *t*-test was conducted to evaluate the hypothesis that learning of words is faster than learning of anagrams. The result was significant, $t(58) = 23.66$, $p = .001$, with words learned in 7.60 trials ($SD = 1.83$) and anagrams in 18.70 trials ($SD = 1.80$) on the average.

Table 1
Mean Trial Scores and Standard Deviations by Meaningfulness of Learning Materials

Learning Materials	M	SD	t	p
Words	7.6	1.83	23.66	0.00
Anagrams	18.7	1.80		

Discussion

This experiment investigated the effect of meaningfulness of learning materials on speed of learning. The result supports the research hypothesis that the meaningful materials are learned faster than anagrams. Previous studies on the effect of meaningful items on learning had found that meaningful words are easier to be learned than anagrams (e.g., Salvin, 1994; Cofer, 1971; Paivio, 1971).

As proposed by the previous researchers (e.g., Ebbinghaus, 1913; Cofer & Paivio, 1971; Slavin, 1974), the meaningful words are quickly learned because they are easily associated with other ideas. The process suggested that the new information gained is associated to the knowledge that is already stored in the long-term memory and find meaning in that information. This process is also referred to as external organization.

Conversely, there are several reasons on the difficulty in learning and memorizing the anagrams. As opposed to meaningful words, anagrams are harder to be associated with the information or knowledge that is stored in the long-term memory (Omrod, 1999). This could be the best explanation on the difficulty of learning and memorizing the anagrams.

However, regardless of how meaningful the words were, it was observed that, the participants who received meaningful words took several trials to learn all the words. According to Peterson and Peterson (1959), as cited in Reed (2001), information in STM lost rapidly, unless it is preserved through rehearsal. Their studies found that the probability of a correct recall declined rapidly over the 18-second retention interval. This implies that we must rehearse verbal information to keep it available in STM. Materials that are not actively rehearsed could be lost in 20 – 30 seconds. In this experiment, no interval was given to the participants so that there was no rehearsal occurred. Thus this clarifies the occurrence of this observable fact.

According to Solso (2001), in STM information is stored acoustically, visually and semantically. Materials are easier to be learned when they could be mentally visualized. In learning meaningful materials, it is easier to visualize the words. For example, when the word *indignant* was presented, the participants can visualize the image of angry person. However, when the anagrams were presented, they could not visualize them. For example, participants could not visualize the word *tnagnindi* because it gave no meaning.

Alternatively, the anagrams used in this experiment were difficult to be pronounced. This condition also contributed to the difficulties of the participants to learn and recall the anagrams. Ormrod (1999) suggested that items are easier to be learned when they are pronounceable.

Based on this experiment too, it was observed that most of the participants, especially those who received words, managed to recall the first and the last few materials. This is referred to as serial position effect. It refers to the ability to recall items at the beginning (primacy effect) and the end (recency effect) of learning materials. According to this concept, the first few items are repeatedly rehearsed as soon as they are presented while the last few items are better recalled as they are just being exposed and still available in STM. The middle items are lost due to the lack of time to process the items adequately in the long-term memory (Ormrod, 1999; Reed, 2001).

There are several implications of this experiment. In Malaysia, the educational system is now changing. All Mathematics and Sciences subject at school levels are conducted in English. Thus it is important for all parties to ensure that the students should understand English well so that the subject will be fully understood. In the university also, the consideration of English language should be looked into. This is to ensure the students can learn effectively. This finding also can be extended to the application of learning the behavior. Individuals tend to learn the behavior that brings significance to them compared to the less significant behavior.

For future research, there are several things should be considered. The items used for anagrams should not be too difficult and the level of difficulty should be equal to the meaningful items. The number of participants should be increased to ensure the representativeness of the sample. It would be better if the samples are taken from the school children.

In conclusion, this experiment revealed that learning of meaningful materials takes less time than learning of anagrams. The implications of this experiment will help us to ensure the best and effective way of learning.

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