

COGNITIVE STRATEGY AND COGNITIVE PERFORMANCE IN LEARNING CHEMISTRY OF FORM FOUR STUDENTS

ABSTRACT

Classroom learning needs understanding and higher order thinking skills. The understanding and skills are hard to achieve if students are still weak in acquiring basic scientific concepts. Previous researchers have proposed using cognitive strategies during learning process as a solution to this problem. In order to achieve that, a research based on Information Processing Theory had been conducted and the purpose of the study is to investigate the cognitive strategies and performance of Form Four students in learning chemistry. This study explored the Short Term Memory (STM) and Long Term Memory (LTM) and the changes that occurred at both levels.

This qualitative approach research was conducted in a school in Petaling Jaya. Six participants were involved in this study where two participants represented each group designated as high, average and low achievers. They were selected based on purposive sampling and all of them shared the same chemistry teacher. Each participant underwent seven memory related tasks. In-depth interview and observation of participant's behaviour formed two main methods employed to seize the relevant data. The data obtained were then triangulated with document analysis which consisted of participants' journals and researcher's journals. This triangulation supported the finding and enhanced research validity. The data obtained from interview, observation and document analysis were coded according to categories until a resilient theme emerged.

The findings denote that (i) Cognitive strategies among students with different abilities varied, (ii) Cognitive strategies increase participants' cognitive performance at STM and LTM levels, (iii) There are two changes on the cognitive strategies at STM

and LTM levels namely, (a) Prerequisite knowledge result in positive impact on cognitive strategies, and (b) Elaboration and organization strategies are present at STM but not detectable at LTM level. Four common cognitive strategies such as coding, rehearsal, chunking and mental image were detected at both STM and LTM levels. Abstract cognitive strategies were used by high achievers. Low achievers used deficient coding strategy supported by weak underlying concepts. Average achievers employed coding strategy with meaningful underlying concepts. The results show an overall decline in students' usage of cognitive strategies at LTM level as compared to STM. However, participants from the average group display tendency towards strategies almost similar to participants from high and low achievers.

This study will assist teachers in selecting appropriate teaching strategies that will enable students to learn and practice effective cognitive strategy by themselves. This is important due to limited learning time available and overloaded chemistry curriculum. An understanding of cognitive strategy will assist teachers in guiding their students to gain maximum quality knowledge in the limited time available. From a theoretical perspective, this research could enhance the understanding of other researchers in the fields of psychology and educational science of the human cognitive system. Thus, the real situation evolving the human mind during the learning process can be better understood.