ESTUDIOS

INFORMATION PROCESSING BY THE SCHOOL CHILD: IMPLICATIONS FOR TEACHERS AND COUNSELLORS

PATRONES DEL PROCESAMIENTO DE LA INFORMACIÓN EN LA EDAD ESCOLAR: IMPLICACIONES PARA PROFESORADO Y ORIENTADORES

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RESUMEN

En este artículo se exploran los patrones de procesamiento de la información en niños y niñas en edad escolar. Se rastrean los procesos psicológicos que tienen lugar en el cerebro cuando el individuo percibe datos para ser analizados. El artículo se centra en el procesamiento cognitivo de la información entre otros modelos. Se resalta la necesidad de que los orientadores y los profesores conozcan y se familiaricen con los procesos fundamentales de adquisición, retención y recuperación de la información como esenciales en el proceso de enseñanza-aprendizaje. Se concluyó que puesto que el periodo de atención de la mayoría de los niños y niñas en edad escolar suele ser breve necesitan ayuda para la adquisición y procesamiento de la información útil.

Palabras clave: procesamiento de la información, adquisición, retención y recuperación de la información, procesos de enseñanza-aprendizaje, papel de los orientadores.

ABSTRACT

This paper explores the pattern of information processing by the school child. The psychological processes that go in the brain when data to be analyzed is perceived by the individual are traced in this paper. The paper focused on cognitive information processing among other models. The paper addresses the need for the counselors and teachers to be acquainted with the crucial processes of acquisition, retention and recall of information which is central to the teaching and learning process. It was concluded that since the attention span of the average school child is brief, he/she needs assistance in acquiring and processing useful information.

Key words: information processing, acquisition, retention and recall of information, teaching and learning processes, role of counselors

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Introduction

Information processing encompasses attention, perception, thinking, memory and problem solving strategies (Elliott et al, 2000). Provision of information and assistance given to clients to process it are important components of the counseling, pedagogic and consultancy services (Baker, 1994). Teachers and Counselors therefore, need to provide students with opportunities to acquire useful information and process them adequately. Information being referred to here are educational, vocational and personal-social information. Information services have always been referred to as the hub of counseling services and since teaching and counseling are educational services that complement each other, informational service is crucial to both. Initially, information was simply disseminated or made available to students but recently the counselors' roles expanded to include the processing of information. Counsellor education training programmes include courses that lead to acquisition of decision making skills and procedures for teaching students how to process acquired information.

Students interact successfully within their environment according to their ability to organize, categorize and process information. Brunner, Goodnow and Austin (1956) summarizing the importance of categorizing information, indicated that categorizing allows humans to reduce their need of constant learning. In other words, each time we experience an object, we are not forced to form a new category, we merely categorize with no additional learning. When teaching an idea or a concept, good teachers consistently give examples and they compare the concept to other categories that do not include it. Concepts are vital to thinking, reasoning and perceiving relationship. The quality of a student's concept is the best measure of probable success in learning.

Information processing by the school child depends mainly on the child's capacity to store the information for use when required. The study of memory and information processing therefore, is very crucial and their implication to the teachers and counselors will be discussed here.

The counseling Psychologist is a personnel in the school who acts as a mediator between the teacher and the school child. The professional school counsellor performs a series of functions that complements teaching. He/she conducts individual and group counselling, keeps vital records on every school child. For instance, records are kept on the child's health, family, academic and any other significant event which might be found useful in assisting the child. The teacher is in charge of the subject matter and the counselor assists in resolving any learning difficulty the child experiences in the teaching and learning process. The goal of teaching is to facilitate the transfer of knowledge from the expert to the learner. Alutu (2005), noted that students learn and perform better when appropriate guidance is given by the instructor during the teaching and learning process.

The different models for teaching and learning like objectivist model, constructivist model, the cooperative model and cognitive information processing model are very important in discussing the information processing of a school child. This is because, understanding the various models would help the teacher to select the method most appropriate for adequate processing of information and for transfer of knowledge. Learning models are often classified as being either behavioural or cognitive. According to Jonassen (1993), the objectivist model of learning is based on Skinner's stimulus response theory which states that "learning

is a change in the behavioural disposition of the organism that can be shaped by selective reinforcement". This model made many pedagogical assumptions regarding learning and instruction. Here, it is assumed that there exists a reality that is agreed upon by an individual; this reality can be represented and transferred to a learner; the purpose of the mind is to act as a mirror of reality rather than as an interpreter of reality; all learners use essentially the same processes for representing and understanding the world. In terms of instruction, the objectivist assumes that instructors structure reality into abstract or generalized representations that can be transferred and then recalled by the students (Yarusso, 1992).

The constructivist assumes that knowledge is created or constructed by each learner. They do not believe that there is the existence of an external reality independent of each individual's mind. For the constructivism, the mind is not a tool for reproducing the external reality but rather, the mind produces its own unique conception of events (Jonassen, 1993). Constructivism in education is essentially the belief that the mind is active in the construction of knowledge. A constructivist's approach incorporates the students existing knowledge and prior experiences as necessary components in the process of learning.

The cooperative or collaborative model of learning assume that learning occurs through interaction of individuals with other individuals (Slavin, 1990). Unlike the constructivism where learning is assumed to occur as an individual interacts with the objects. The major role of collaborative learning is the construction of shared understanding through interaction with other individuals, an implicit goal is improving communication and listening skills and eliciting participation. The collaborative learning model believes that knowledge is created as it is shared, and the more it is shared, the more it is learned; that learners have previous knowledge they can contribute to the discussion; that participation is critical to learning and that learners will participate if given optimal conditions such as small groups to work with.

The cognitive information-processing model according to Schuell (1986) focuses on cognitive process used in learning. Learning involves processing instructional input to develop, test, and refine models in long-term memory until they are effective and reliable enough in problem-solving situations. The pace of learning is controlled by the frequency and intensity with which a student cognitively processes instructional input. Only the instructional inputs that are noticed and attended to by the learner are processed. Here, it is assumed that learners differ in terms of preferred learning style; that the individual's prior knowledge is represented by mental mode in memory and that the mental mode or schemata, is an important determinant of how effectively the learner will process new information; that given a learner's limited information processing capacity, attention is selective (Bovy, 1981).

Since no particular model is the best approach, it is very important that the teacher or instructor should be knowledgeable of different learning models and the various outcomes anticipated by the models. For the purpose of this paper the authors wish to explore in greater detail the cognitive information processing model.

Cognitive information processing by the School child

As earlier mentioned in the paper, concepts are vital to thinking, reasoning and perceiving relationships and the quality of a student's concept is the best measure of probable

success in learning. Acquiring concepts in itself is not enough if they are not remembered. Meaningful concepts facilitate the entire learning process and also aid the memory. An analysis of the memory widely accepted by cognitive Psychologists was the distinction made between episodic and semantic memory (Tulving, 1972). Episodic memory is recall of all experiences within specific context or period of time. Semantic memory is the memory necessary for the use of language- a kind of dictionary without reference to our personal experiences that represents our general knowledge. Atkinson and Shiffrin (1968) proposed a three store system: the sensory register, the short-term store and the long-term store. These three stores are structurally distinct because they hold information differently, for varying times and for different purposes. They also lose information differently. Information is lost from the sensory register in less than a second, either through spontaneous decay or through the entry of new data. The short-term store is the working memory, which entails conscious processes. In-put to the short-term store comes from both the sensory register and the long term store. Information can be held indefinitely here if attention remains constant, otherwise, decay sets in and data are lost in fifteen to thirty seconds. The longer information remains in the short-term store the greater the chance that it will be transmitted to the long-term store. The long-term store holds both conscious and unconscious data. Although information may be stored indefinitely, data may be lost through interference, lack of retrieval cues and sheer decay.

Baddley, (1990) noted that many cognitive psychologists have shifted emphasis from the multi-store information processing and advocated a levels of Processing analysis which focuses on the depth of processing. Information is not transformed by moving through a series of stores but data are processed by various operations called perceptual-conceptual analysis. The perceptual analysis reflects an individual's attention. If an individual deems incoming material important it will be given maximum attention and it will be analysed differently from the material adjudged unimportant. Whether the information is processed at a shallow or deeper level depends on the nature of the stimulus, the time available for processing and the person's own motivation, goals and knowledge base. In other words the operations performed during the in-put stage determine the fate of the incoming data.

Gagne's (1985) identified four phases of learning listed below.

- Phase I: Receiving the Stimulus Situation.
- Phase II: Stage of acquisition or input.
- Phase III: Storage or retention phase.
- Phase IV: Retrieval or recall.

During phases I, and II the stimulus situation and acquisition of knowledge, information received is processed. Information processing as earlier mentioned encompasses such topics as attention, perception, thinking, memory and problem-solving strategies. Acquisition of information and concepts in itself is not enough, students should remember what they have acquired. The longer information is retained in the short-term memory, the greater the chance that it will be transmitted to the long-term memory. If not encoded or rehearsed consciously, the data are forgotten. In phase III, the initial processing of the information received during phases I & II will determine the rate of remembering and which aspects are remembered. Storage or retention implies putting information into the memory, which occurred as a result of attention, encoding and the use of memory strategies. Retrie-

val on the other hand, implies recognizing, recalling and reconstructing what has been previously put in. The ability of the learner to retrieve or recall information when needed very much depends on the mode of acquisition and storage of the information during phases I, II and III.

Figures 1, 2 & 3 below show the pathway of information through the memory process.

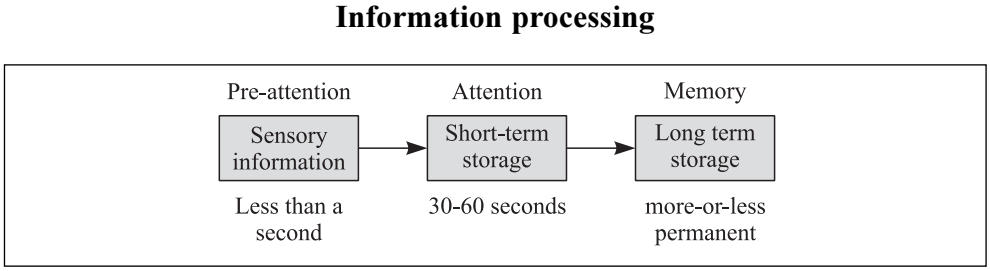

FIGURE 1.
This process is diagrammatically represented in the flow chart below.

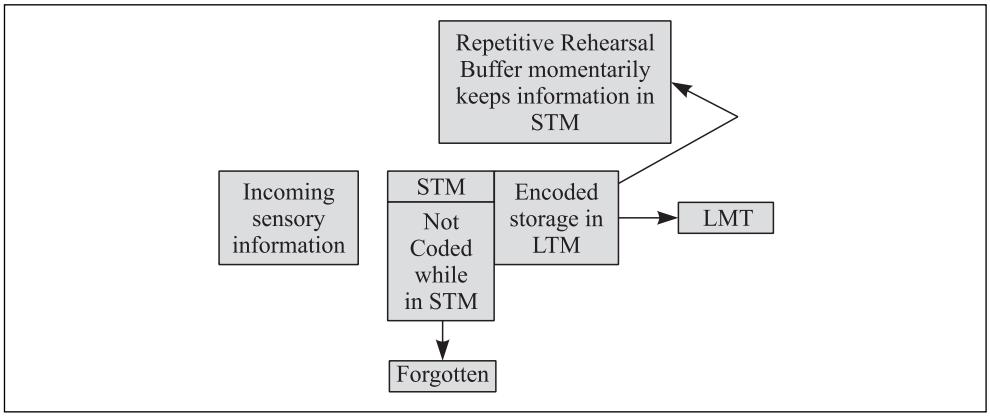

FIGURE 2.
Memory divided into three kinds of information storage.

Implications of Information processing for Teachers and Counsellors

The implication here for teacher is that teachers or instructors should be in control of the material, pace of learning and the model of learning adopted. An effective instructor should be very concerned with major stages in the learning process and adopt pragmatic strategies to impact it to the learners while teaching. The teacher apart from having a good knowledge of the subject matters should be conversant with management of the learning process to

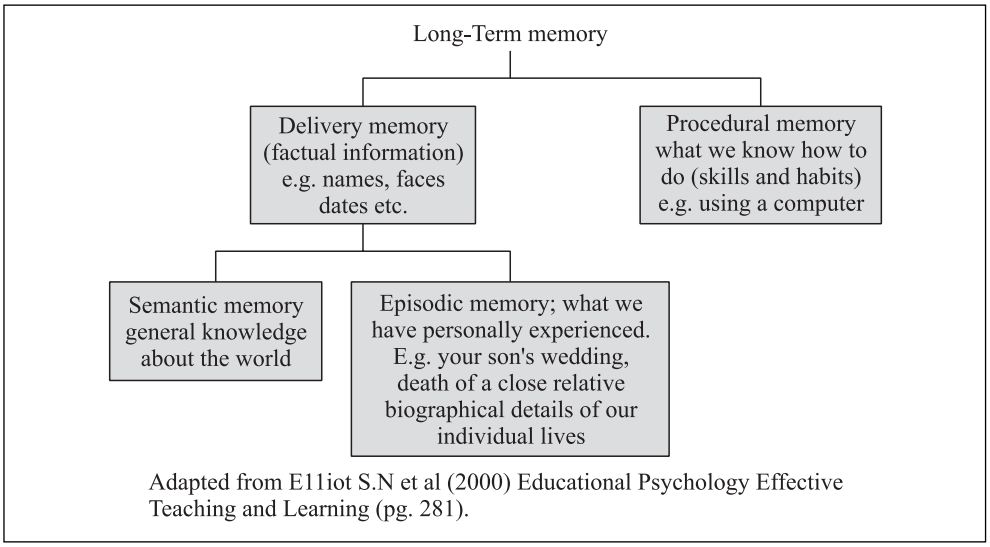

Figure 3.
The memory sequence: A model of information processing.

achieve the optimal. One of the crucial tasks of educational psychology is to know how the learner's behaviour is changed by instructional endeavour. There is therefore, need for instructors to stress on active participation in reading to remember. Unoh (1969) submitted that reading to remember means reading with a view to being able not merely to recognize and comprehend but also to retain for subsequent recall or reproduction The teacher and the counsellor should work in collaboration to achieve this in the school child. When objectivist model of learning is adopted, the presentation of information is very critical. Also the pace of instruction should be designed modularly with students' progressing on one topic area before proceeding to the next one.

The adoption of constructivist models calls for project-oriented session where the instructor provides tools for helping learners construct their own views of reality. The adoption of collaborative model of learning calls for the instructor's role to facilitate maximal information and knowledge sharing among learners rather than controlling the content and delivery of leaning. Also, the instructor should provide the feedback during class although feedback from the learner's peers is similarly critical. There is also a need for cooperative assessment strategies. The traditional competitive assessment strategies may disable learning. A learner may be motivated to withhold knowledge that would otherwise be shared with peers.

The adoption of cognitive information processing model of learning calls for the control of pace of instruction by students. According to Brunning (1983) there is need for pre-instruction such as topic outlines and learning goals.

In order to achieve this, the teacher needs to know the following:

1. The adaptation differences among his various students so as to deal with their specific problems.

2. Meaningful material aids recall.
3. Time on task helps students to recall instruction.
4. Rehearsal is an important memory strategy.
5. Mnemonic strategies can help students remember.

Many factors tend to affect the learner when he is exposed to information; such factors include teacher-personality, ability, concept, individual differences of the learner, hereditary factor and physical environmental situations among other factors. It has been observed by psychologists that the average learner does not perform according to expectation mainly due to inadequate processing of the sensory information through the memory process.

The Guidance Counselor assists students to overcome difficulties that are interfering with their school achievement by enlightening or guiding them on the best approaches to studying. The School Counselor, through progressive group guidance expose the students to various ways of studying and allow them to select the ones that best suit them. The main phases of learning should be introduced to the students and conscious effort should be made by the students to internalize them and put them into practice so as to acquire, retain and recall information easily when needed. Counselling Psychologists should encourage co-operative learning among students to cater for individual differences that exist. This will help to adjust and stabilize the attention span of the school child for effective learning. Periodic seminars and workshops should be organized for students on study behaviour and pattern of information processing.

Conclusion

This paper on information processing by the school child has drawn our attention to the importance of acquisition and processing of information. The cognitive information processing model and levels of processing analyses were the focus of the paper. For learning to be meaningful, information received should be processed in depth by the school child by giving it adequate attention so as to aid the memory in recalling the material when needed. Retriveal of information is dependent on how it was stored. Hence, in-put stage requires adequate attention, encoding and use of memory aid strategies. On the other hand, retrieval implies recognizing, recalling and reconstructing what has been previously stored. The teachers and Counsellors need to work collaboratively to assist the school child in information processing as this is very crucial to acquisition of knowledge.

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