Theories of Learning in Educational Psychology

John Flavell
Metacognition Theory

Biography

John Flavell of Stanford University is regarded as a foundation researcher in <u>metacognition</u>. He was influenced by the work of <u>Jean Piaget</u>. One of Flavell's significant accomplishments was the publication of his book, The Developmental Psychology of Jean Piaget (Flavell, 1963). While many recent researchers now challenge certain aspects of Piaget's theories, many ideas that he proposed have found their way into the conventional wisdom of metacognition. Included among those is the notion of intentionality. Intentionality presupposes thinking that is deliberate and goal-directed, and involves planning a sequence of actions.

Theory

Flavell (1971) used the term metamemory in regard to an individual's ability to manage and monitor the input, storage, search and retrieval of the contents of his own memory. Flavell invited the academic community to come forth with additional metamemory research, and this theme of metacognitive research has continued more than thirty years later. He implied with his statements that metacognition is intentional, conscious, foresighted, purposeful, and directed at accomplishing a goal or outcome. These implications have all been carefully scrutinized in subsequent research, and in some cases have been the subjects of controversy among researchers in metacognition. For example, Reder & Schunn (1996) and Kentridge and Heywood (2000) argue that metacognitive processes need not operate in a person's conscious awareness.

In his 1976 article, Flavell recognized that metacognition consisted of both monitoring and regulation aspects. It was here that the term metacognition was first formally used in the title of his paper. He defined metacognition as follows: "In any kind of cognitive transaction with the human or non-human environment, a variety of information processing activities may go on. Metacognition refers, among other things, to the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in service of some concrete goal or objective." (p.232). Hacker (1998) offered a more comprehensive definition of metacognition, to include the knowledge of one's own cognitive and affective processes and states as well as the ability to consciously and deliberately monitor and regulate those processes and states.

Flavell (1976) also identified three "metas" that children gradually acquire in the context of information storage and retrieval. These were: (a) The child learns to identify situations in which intentional, conscious storage of certain information may be useful at some time in the future; (b) the child learns to keep current any information which may be related to active problem-solving, and have it ready to retrieve as needed; and (c) the child learns how to make deliberate systematic searches for information which may be helpful in solving a problem, even when the need for it has not been foreseen.

Flavell (1979) was another seminal paper. In this work Flavell acknowledged the explosion of interest and work in areas related to metacognition, such as oral skills of communication, persuasion and comprehension, reading, writing, language acquisition, memory, attention, problem-solving, social cognition, affective monitoring, and self-instruction. In the 1979 paper, Flavell proposed a formal model of metacognitive monitoring to include four classes of phenomena and their relationships. The four classes included (a) metacognitive knowledge, (b) metacognitive experiences, (c) tasks or goals, and (d) strategies or activities. Flavell's 1979 model will be further described in the section on the theories of metacognition.

The first attempt to generate a formal model of metacognition was presented by Flavell (1979). He acknowledged the significance of metacognition in a wide range of applications which included reading, oral skills, writing, language acquisition, memory, attention, social interactions, self-instruction, personality development and education. Flavell mentioned that components of metacognition can be activated intentionally, as by a memory search aimed at retrieving specific information, or unintentionally, such as by cues in a task situation. Metacognitive processes can operate consciously or unconsciously and they can be accurate or inaccurate. They can also fail to be activated when needed, and can fail to have adaptive or beneficial effect. Metacognition can lead to selection, evaluation, revision or deletion of

cognitive tasks, goals, and strategies. They can also help the individual make meaning and discover behavioral implications of metacognitive experiences.

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The first of Flavell's (1979) classes was metacognitive knowledge, which he defined as one's knowledge or beliefs about the factors that effect cognitive activities. The distinction between cognitive and metacognitive knowledge may lie in how the information is used, more than a fundamental difference in processes. Metacognitive activity usually precedes and follows cognitive activity. They are closely interrelated and mutually dependent. Metacognitive knowledge can lead the individual to engage in or abandon a particular cognitive enterprise based on its relationship to his interests, abilities and goals. Flavell described three categories of these knowledge factors: 1) Person variables 2) task variables, and 3) strategy variables. These are the three categories in which Flavell proposed that individuals have metacognitive knowledge. The person category of knowledge includes the individual's knowledge and beliefs about himself as a thinker or learner, and what he believes about other people's thinking processes. Flavell gave examples of knowledge such as a person believing that he can learn better by listening than by reading, or that a person perceives her friend to be more socially aware than she is. One's beliefs about himself as a learner may facilitate or impede performance in learning situations.

The task category of metacognitive knowledge encompassed all the information about a proposed task that is available to a person (Flavell, 1979). This knowledge guides the individual in the management of a task, and provides information about the degree of success that he is likely to produce. Task information can be plentiful or scarce, familiar or unfamiliar, reliable or unreliable, interesting or not, organized in a useable or unusable fashion. Task knowledge informs the person of the range of possible acceptable outcomes of the cognitive enterprise and the goals related to its completion. Knowledge about task difficulty and mental or tangible resources necessary for its completion also belong to this category.

The strategy category of metacognitive knowledge involved identifying goals and sub-goals and selection of cognitive processes to use in their achievement (Flavell, 1979). Flavell also emphasized that these types of variables overlap and the individual actually works with combinations and interactions of the metacognitive knowledge that is available at that particular time. He also stated that metacognitive knowledge is not fundamentally different than other knowledge, but its object is different. He also mentioned that metacognitive knowledge may be activated consciously or unconsciously by the individual. This question of consciousness later became a subject of controversy among researchers in metacognition.

Metacognitive experiences, Flavell's (1979) second class of phenomena included the subjective internal responses of an individual to his own metacognitive knowledge, goals, or strategies. These may be fleeting or lengthy, and can occur before, during, or after a cognitive enterprise. As monitoring phenomena, these experiences can provide internal feedback about current progress, future expectations of progress or completion, degree of comprehension, connecting new information to old, and many other events. New or difficult tasks, or tasks performed under stress tend to provoke more experiential interaction, while familiar tasks may tend to provoke less metacognitive experience.

According to Flavell (1979). Metacognitive experience can also be a "stream of consciousness" process in which other information, memories, or earlier experiences may be recalled as resources in the process of solving a current-moment cognitive problem. Metacognitive experience also encompasses the affective response to tasks. Success or failure, frustration or satisfaction, and many other responses effect the moment-to-moment unfolding of a task for an individual, and may in fact determine his interest or willingness to pursue similar tasks in the future. Flavell underscored the overlapping nature of metacognitive knowledge and metacognitive experience.

Metacognitive goals and tasks are the desired outcomes or objectives of a cognitive venture. This was Flavell's third major category. Goals and tasks include comprehension, committing facts to memory, or producing something, such as a written document or an answer to a math problem, or of simply improving one's knowledge about something. Achievement of a goal draws heavily on both metacognitive knowledge and metacognitive experience for its successful completion (Flavell, 1979).

Metacognitive strategies are designed to monitor cognitive progress. Metacognitive strategies are ordered processes used to control one's own cognitive activities and to ensure that a cognitive goal (for example, solving a math problem, writing an effective sentence, understanding reading material) have been met. A person with good metacognitive skills

and awareness uses these processes to oversee his own learning process, plan and monitor ongoing cognitive activities, and to compare cognitive outcomes with internal or external standards. Flavell (1979) indicated that a single strategy can be invoked for either cognitive or metacognitive purposes and to move toward goals in the cognitive or metacognitive domains. He gave the example of asking oneself questions at the end of a learning unit with the aim of improving knowledge of the content, or to monitor comprehension and assessment of the new knowledge.

Flavell (1987) elaborated on several aspects of the theory he proposed in 1979. In the category of metacognitive knowledge, he suggested subcategories of person variables; he defined intra-individual variables such as knowledge or beliefs about the interests, propensities, aptitudes, abilities, and the like, of oneself or of another person. Inter-individual variables provide comparisons between or among people in a relativistic manner. The universal subcategory deals with generalizations a person forms about learning and learners in general. Flavell underscored the importance of cultural influences on the formation of beliefs about learning.

Flavell (1987) offered additional description of task variables, reflecting that individuals learn about the implications that various tasks carry with them. Personal experience builds up sets of expectations about which tasks will be rigorous or difficult, and which will be less taxing. Different kinds of information require different kinds of processing and place different demands on the learner.

Strategy variables are interlocked with one's goals or objectives in the learning process (Flavell, 1987). It is important to distinguish between cognitive strategies, such as summing a column of numbers, and metacognitive strategies, such as evaluating whether the correct answer has been obtained.

Flavell (1987) also offered clarification on the term metacognitive experience. He defined metacognitive experience as affective or cognitive awareness that is relevant to one's thinking processes. He described a variety of examples such as feeling that one is not understanding something, feeling that something is difficult or easy to remember, solve, or comprehend, and feeling that one is approaching or failing to approach a cognitive goal. Metacognitive experiences arise when they are explicitly demanded by a situation, such as when one is asked why he chose a particular answer or a particular way of doing something. Unfamiliar and novel situations and expectations also generate metacognitive experiences. Situations having an important consequence can also stimulate strong metacognitive experience. If the outcome is very important, the individual is likely to monitor his judgements and decisions more carefully. Conflict and paradox also trigger metacognitive experiences. Becoming aware of inconsistencies, paradigm differences, and counterexamples are likely to generate strong affective responses. More urgent subjective experiences such as physical or emotional pain are also powerful triggers for metacognitive experience.

Flavell (1987) also proposed numerous questions and possible explanations relating to the development of metacognition. He proposed that the emergence in the child of awareness of the flow of time, and specifically awareness of future time could support the ability to form metacognitive goals. Another change that occurs during childhood development is the sense of the self as an active agent in one's own experiences. As early as 1987 Flavell was actively encouraging the development of metacognition in school children; in schools there are abundant opportunities to develop metacognitive knowledge about persons, tasks, and strategies.

Learning Theory Bibliography

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