

The Importance of Metacognition improving the Teaching -Learning Procees: an Epistemological and Analytical Study

أهمية ما وراء المعرفة في تحسين العملية التعليمية التعلمية: دراسة تحليلية إبستمولوجية.

Dr. Ali FARES* , Setif -2- University, Algeria.

ali-faresmaster2013@hotmail.fr

Date de réception:(18/07/2020) , Date de révision: (16/08/2020), Date d'acceptation :(01/09/2020)

Abstract :

ملخص :

The school's work in the twenty-first century is not to teach the student knowledge but rather to think through thinking through the pursuit of metacognition in the educational learning process because of its great importance in improving the educational product. Educational psychologists have long promoted the importance of metacognition for regulating and supporting student learning. More recently, the Partnership for 21st Century Skills has identified self-directed learning as one of the life and career skills necessary to prepare students for post-secondary education and the workforce.

Keywords : Metaconotion, Teaching Learning Procees.

إنَّ عمل المدرسة في القرن الواحد والعشرين ليس تعليم التلميذ المعرفة بل التفكير في التفكير، من خلال انتهاج ما وراء المعرفة في العملية التعليمية التعلمية لما لها من أهمية كبيرة في تحسين المنتج التربوي. إذ لطالما شجع علماء النفس التربويون أهمية ما وراء المعرفة لتنظيم ودعم تعلم التلاميذ، من أجل تعلم مهارات التعلم الموجه ذاتياً باعتباره أحد المهارات الحياتية والمهنية اللازمة والقوى العاملة.

الكلمات المفتاحية: ما وراء المعرفة، العملية التعليمية التعلمية.

*Auteur correspondant: Dr. Ali FARES, Email: ali-faresmaster2013@hotmail.fr

INTRODUCTION:

Educational psychologists have long promoted the importance of metacognition for regulating and supporting student learning. More recently, the Partnership for 21st Century Skills has identified self-directed learning as one of the life and career skills necessary to prepare students for post-secondary education and the workforce. However, educators may not be familiar with methods for teaching and assessing metacognition, particularly among elementary-aged children.

The concept of metacognition in spite of its novelty received a great turnout by many researchers in the field of cognitive psychology and educational psychology, which was considered an important component of human intelligence, and was also assigned to it the developmental characteristic as there are differences in metacognition between the child and the adult, as well as He presented a different perception of the human being, as he considered him to be an autonomous unit, as he is conscious and controlling for himself, assessing himself and others around him. Research in cognitive psychology has focused on the study of cognitive processes, which has aroused the interest of researchers in the educational field by employing metacognitive skills such as planning, monitoring, and evaluation for learners, which increase the effectiveness of learning and bring about learning for them. Thus improving and developing their academic achievement.

2. Establishing the concept of metacognition:

The concept of metacognition in the field of cognitive psychology emerged by John Flavell in the mid-seventies as a result of his research to establish the rules of this concept, which is considered one of the most recent topics of cognitive psychology, although it is not a new idea, as James and Dewey referred to the processes that Beyond cognitive in terms such as emotional self-hope during the processes of thinking and learning. (Fares, 2017, p 26)

If this concept is relatively recent, Fisher & Mandel (1984) traces its historical roots back to the ancient Greek era when Socrates launched his famous saying: "Know yourself." Which means that the individual is aware of his thoughts, feelings and feelings and that he is observing and observing the experiences that he has gone through, and Plato said: "When the mind thinks, it speaks for itself."

However, a clear vision of metacognition and its general frameworks can be traced back to the professor of psychology at Stanford University Flavell (1976) who is considered the first to use the term metacognition in educational research, where he observed that individuals perform a process of observing their own understanding, And other cognitive activities that lead to the selection of sources of knowledge, and evaluation of cognitive tasks, goals and strategies that can organize their learning, and often these people make mistakes during the learning process as a result of their failure to do so, so the student must take advantage of these processes in determining its goals and strategies that can be She can organize his learning.

The concept of metacognition is not born in 1970 but rather is a concept rooted in the past, but John Flavell brought it into the field of education because of its importance in improving the educational process.

Metacognition refers to higher order thinking which involves active control over the cognitive processes engaged in learning. Activities such as planning how to approach a given learning task, monitoring comprehension and evaluating progress towards the completion of a task are metacognitive in nature. Because metacognition plays a critical role in successful learning, it is important to study metacognitive activity and development to determine how students can be taught to better apply their cognitive resources through metacognitive control.

3. Definition of Metacognition:

John Flavell originally coined the term metacognition in the late 1970s to mean "cognition about cognitive phenomena," or more simply "thinking about thinking". (Flavell, 1979, p 906)

Flavell (1979) first used the term 'metacognition'. He described in these words: metacognition refers to one's knowledge concerning one's own cognitive process or anything related to them for example the learning related properties of information or data. Metacognition is an important part of intentional learning, since it involves actively thinking about what you know, what you don't know, and how you can get better at knowing and applying what you know. Metacognition is defined as "cognition about cognition", or "knowing about knowing." It can take many forms; it includes knowledge about when and how to use particular strategies for learning or for problem solving.

- Metacognition refers to learners' automatic awareness of their own metacognitive reading strategies
- Knowledge and their ability to understand, control, and manipulate their own cognitive processes.
- Metacognition refers to a level of thinking that involves active control over the process of thinking that is used in learning situations. Planning the way to approach a learning task, monitoring comprehension, and evaluating the progress towards the completion of a task: these are skills that are metacognitive in their nature.
- Different fields define metacognition very differently. Metacognition variously refers to the study of memory monitoring and self-regulation, consciousness/awareness and auto-consciousness/self-awareness.

Researchers working in the field of cognitive psychology have offered the following definitions:

"The knowledge and control children have over their own thinking and learning activities" (Cross & Paris, 1988, p 131)

"Awareness of one's own thinking, awareness of the content of one's conceptions, an active monitoring of one's cognitive processes, an attempt to regulate one's cognitive processes in relationship to further learning, and an application of a set of heuristics as an effective device for helping people organize their methods of attack on problems in general" (Hennessey, 1999, p 3)

"Thinking about thinking, defining what we know and what we do not know, and she also works as a CEO of thought management." (Blakey & Spence, 1990, p 17)

"If you notice that you are in a state of dialogue with your mind, that you are reviewing your decision and the problem solving processes, then you are practicing metacognition." (Costa, 1991)

"Awareness and management of one's own thought". (Kuhn & Dean, 2004, p 270)

"The monitoring and control of thought" (Martinez, 2006, p 696)

By reviewing the vast amount of previous definitions, the researcher sees that all of them have emphasized that what is metacognition is thinking in thinking and did not touch on what it contains of components, and accordingly, the knowledge behind indicates the individual's awareness of his cognitive processes, and his ability to organize and manage his thinking in order to solve the problem or perform the task, As it relates to knowledge of a deductive pattern of the individual's cognitive activity, as it is a pattern of complex and higher thinking that includes second-degree cognitive processes, they are cognitive

processes on other cognitive processes. To clarify aspects of the concept of metacognition, the researcher mentioned the researchers' views on its components.

4. Metacognition Components:

The metacognition components are classified in Table 1.

Table 1. Typology of Metacognition Components

Metacognitive Component	Type	Terminology	Citation
Cognitive knowledge	Knowledge about oneself as a learner and factors affecting cognition	Person and task knowledge	Flavell, 1979
		Self-appraisal	Paris & Winograd, 1990
		Epistemological understanding	Kuhn & Dean, 2004
		Declarative knowledge	Cross & Paris, 1988 Schraw et al., 2006 Schraw & Moshman, 1995
	Awareness and management of cognition, including knowledge about strategies	Procedural knowledge	Cross & Paris, 1988 Kuhn & Dean, 2004 Schraw et al., 2006
		Strategy knowledge	Flavell, 1979
		Knowledge about why and when to use a given strategy	Conditional knowledge
Cognitive regulation	Identification and selection of appropriate strategies and allocation of resources	Planning	Cross & Paris, 1988 Paris & Winograd, 1990 Schraw et al., 2006 Schraw & Moshman, 1995 Whitebread et al., 2009
	Attending to and being aware of comprehension and task performance	Monitoring or regulating	Cross & Paris, 1988 Paris & Winograd, 1990 Schraw et al., 2006 Schraw & Moshman, 1995 Whitebread et al., 2009
		Cognitive experiences	Flavell, 1979
		Assessing the processes and products of one's learning, and revisiting and revising learning goals	Evaluating

Source: Lai, 2011, p 07

5. Explanatory paradigms of Metacognition:

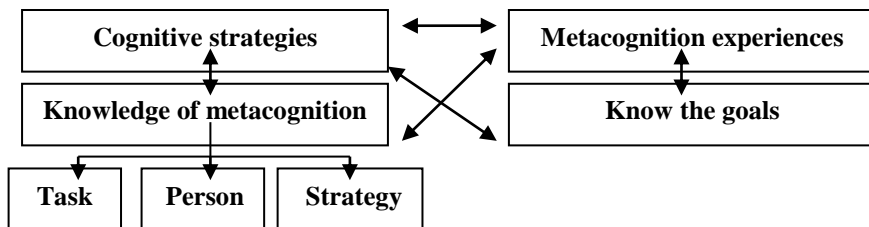
The explanations and models of metacognition have varied according to the different angles through which each researcher looks. Perhaps among the most important of these models we mention, for example, but not limited to the following:

5.1. Flavell (1976) Model:

John Flavell (1976) presented his first attempts to define the components of metacognition by presenting a paradigm that includes control of knowledge, in which he proposes two

basic metacognitive components.

Fig.1. Flavell (1976) Model

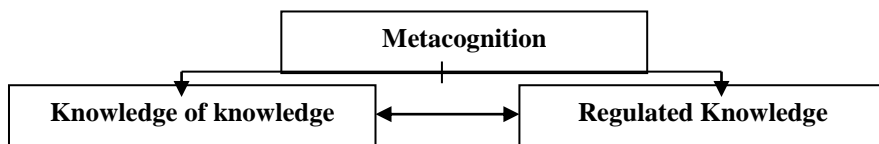


Source: Flavell, 1976, p 10

5.2. Brown (1987) Model:

Brown (1987) presented a model that explains metacognition, which includes two basic components:

Fig.2. Brown (1987) Model

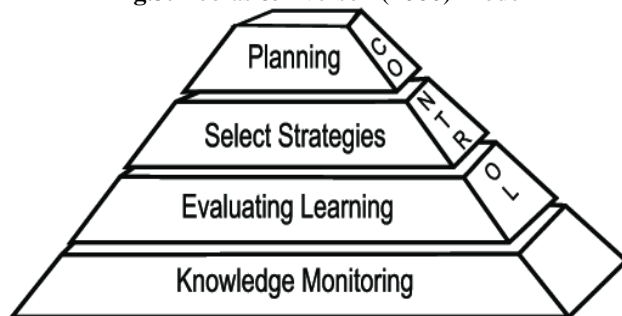


Source: Brown, 1987, p 22

5.3. Tobias & Everson (2000) Model:

Tobias & Everson (2000), after years of study, provided a model that explains metacognition and its various skills, shown in the following figure.

Fig.3. Tobias & Everson (2000) Model



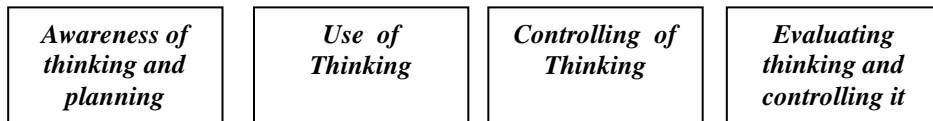
Source: Tobias & Everson, 2002, p 02

5.4. Bowler (2007) Model:

Bowler (2007) presented a model that explains metacognition, and believed that its components are interrelated and interacting with each other as they are used by the individual in full:

Fig.4. Bowler (2007) Model





Source: Browler, 2008

6. Theories explaining the concept of metacognition:

Fares (2017, pp 37-38) presented the metacognition theories in the following:

6.1. Piaget (1969) Theory:

The initial studies of Piaget showed the early activity of the metacognitive process in children, when he studied the intellectual processes of children, and this cognitive activity was prepared as the evolutionary coexistence of the idea with the environment, starting with the process of coexistence or adaptation, as the child moves the existing intellectual processes to environmental influences. As the child effectively asks to reach a state of balance and cognitive stability with the new influencing environment.

Piaget felt that the primary purpose of the child's cognitive activity is always directed to a state of equivalence outside the activity, and to represent, absorb and transform it into stable and rational models of perception. According to Piaget's opinions, a young child can direct knowledge, but is unaware of the intellectual processes that arise. Some recent Piaget research with older children (7-11) years has described the formative ability to perform real operations, step by step, using full specific functions, and Piaget has called this realization the name (conscious person awareness), and this function applies to the term beyond Knowledge. It is mentioned that intentional and planned thinking aimed at achieving cognitive tasks is implicit in the concept of Piaget in the stage of formal (abstract) processes in which higher levels of thinking operate.

6.2. Flavell (1976) Theory:

John Flavell (1976) introduced the term metacognition, and he worked on analyzing memory processes, interpreting the metacognitive process in solving problems, and the meta-memory process is part of the metacognition process, as well as controlling memory functions, and what has been linked to the mind's ability to store Information and retrieval. He believes that there are two main components of metacognition: knowledge of metacognition and metacognition experiences. Moreover, metacognition includes effective observation, and the subsequent organization and coordination of cognitive processes, in order to achieve cognitive goals, as it indicates that to distinguish between metacognitive thinking and not other types of thinking, one must look at the source of metacognition, Which does not apply directly from the person's external reality, but rather is related to what one knows about an internal representation of this truth, which can include what the individual knows about the internal representation, how it works, and how the individual feels it.

6.3. Brown (1981) Theory:

Ann Brown distinguished between learning knowledge and organizing knowledge, as knowledge learning can be stable except that stability may be late or weak, and she indicated that the step of self-organization depends on the environment more than it depends on age, and the person may show the behavior of self-organization in a situation While not showing it in the other position, the child may show self-organizing behavior when the adult does not do the same. Organization may also be influenced by arousal paradigms (anxiety, fear, and concern) and by the concept of self (self-assessment, self-efficacy). Brown stated that the entry of feeling (awareness) into the skills-related routine represents a high behavior of mature human intelligence that diagnoses metacognitive

skills, highly developed, and through self-awareness, the individual is able to develop his personal intelligence effectively.

6.4. Paris (1982) Theory:

Paris (1982) assumes that metacognition includes two processes: knowledge and self-control and includes three factors (commitment, directions, attention) and knowledge and process control, and this skill includes three types of knowledge: (declarative knowledge, procedural knowledge, and conditional knowledge).

Paris (1982) indicated that metacognitive control refers to the ways and skills the learner creates, to achieve specific learning goals, and the degree to which the learner reaches in organizing and modifying these processes, to confirm the effectiveness of the learning process.

6.5. Sternberg (1990) Theory:

Sternberg's triple theory of human intelligence is based on the theory of information processing and includes three theories, namely structural theory, empirical theory, and contextual theory, and these three sub-theories are used to illustrate the inner mental world of learners, and how they use intelligence to interact with their environment. Sternberg distinguished three components of information processing: metacognitive, performance, and knowledge acquisition.

Sternberg defined metaphysics as the mental processes used in procedural planning, monitoring and evaluation of an individual's performance of a task, and metacognition likened what Brown (1981) called metacognitive processes. Sternberg described post components as white-collar operations, balancing the implementation components that he described as blue-collar operations to denote the level of mental activity. Sternberg's metacognitive processes are executive processes, which the learner uses when planning, observing, and evaluating learning or performance. These include the knowledge of the individual when he is aware of it and his knowledge of his cognitive processes as well.

7. The relationship between knowledge and metacognition:

Knowledge differs from metacognition, although they are sometimes similar to the point where it is difficult to differentiate between them, as it is observed that there is an overlap between metacognition and the processes of knowledge itself. To get a clearer understanding of the concept of metacognition, it is useful to distinguish between knowledge and metacognition in that they are two mental processes. Knowledge is acquired, and metacognition expresses the student's awareness, awareness, and understanding of this acquired knowledge. Metacognition refers to awareness of knowledge, its control and organization, and the distinction between knowledge and metacognition as the distinction between knowledge, the understanding of knowledge and its work with it, i.e. awareness and appropriate use of it. (Fares, 2017, p 39)

Flavell (1976) admits that metacognition may not differ from knowledge. As the distinction between what is cognitive and what is metacognitive lies in how the information is used, knowledge is used to help the individual achieve a specific goal, while metacognition is used to ensure that that goal is reached and achieved.

Perhaps metacognition may not differ from knowledge, but the difference may be more evident in the way in which knowledge or information is used, and it is not related to the type of information used, hence the overlap between knowledge strategies and metacognition strategies, as the same strategy can be considered a cognitive and in the same strategy Time can be considered a meta-cognition strategy, depending on the goal for which these strategies are used. For example: asking self-questions during problem solving may be used to gain an understanding of the problem (knowledge) or as a way to monitor the process of understanding the problem (metacognition) To clarify the relationship between

knowledge and metacognition, it is possible to distinguish between cognitive behaviors that are based on action, and metacognitive behaviors that are based on planning for the act, choosing what to do in any arrangement, forecasting results and monitoring performance, knowledge strategies and metacognition strategies. They are closely intertwined and are related to each other, so any attempt to separate one without looking at the other does not seem appropriate.

9. The educational importance of metacognition:

Metacognition contributed to the activation of many educational areas, including the following:

9.1. Improving the learning process:

The learning process is improved by achieving the following points:

- Improve the student's ability to understand.
- Improve the learner's ability to choose the most effective and appropriate strategy for different learning situations.
- Increasing the learner's ability to predict the effects of using one strategy and not others.
- Helping the learner to collect, organize and evaluate information during the learning process.
- Achieve unfamiliar better learning by increasing the learner's ability to think better.
- Increase the learner's independence by observing his misunderstanding and modification without waiting for the teacher's evaluation.
- Development of positive trends towards studying the learned material. (Ahmadi, 2012, pp 45-46)

9.2. Overcoming academic problems and learning difficulties:

Studies and research in the field of metacognition have shown that training learners to use metacognitive skills helps them to overcome many academic problems such as academic delay and learning difficulties, where Wong sees the need to include treatment programs for those with learning disabilities metacognitive skills through training and education. Differentiated and different types of strategies and behavioral patterns related to exact self. (Al-Zayat, 2004, p 597)

The study of Ahmed Jaber Ahmed El-Sayed (2002) has demonstrated the effectiveness of developing metacognitive skills among teacher students at the Faculty of Education (Ben Brika, 2007, p 191), as confirmed by the Abdullah Qali study (2009, p 303) conducted in Algeria. On the effectiveness of training high school students for teachers on the strategy of awareness of cognitive processes.

9.3. School selection and orientation:

Metacognition are extremely important in the field of school and vocational guidance, as they help learners to self-guide and formulate their academic projects according to their individual characteristics and differences, through the following:

- Reaching the learner to awareness of what he knows and what he does not know in the task presented to him, for example in the school media, which helps the learner behind the knowledge to determine the information he needs.
- Developing the learner's ability to design plans for their goals, implement them and follow up on their achievement, by bringing down his future visions to the ground and trying to achieve them in a thoughtful manner.
- Increase the learner's awareness of his potential and the possibilities of his external environment, so that he reaches to formulate realistic choices. (Sahraoui, 2011, p 41)

Bahloul (2004) summarized the importance of students' metacognition in different learning situations, as it helps to provide a thought-provoking learning environment.

Metacognition skills can contribute to:

- Improve the learner's ability to understand and understand.
- Improve the learner's ability to choose the most effective and appropriate strategy.
- Increasing the learner's ability to predict the effects of using one strategy and not others.
- Helping the learner to play a positive role in collecting, organizing, following up and evaluating information during the learning process.
- Developing the trend towards studying the learned material.
- The learner's use of metacognitive strategies in different educational situations, which is one of the basic requirements for creative thinking.
- Awareness of strategies for dealing with knowledge helps in developing critical thinking, creative thinking and the ability to solve problems.
- Helping the learner to bridge the gap between theory and practice.

Several studies have also demonstrated the important role that metacognition plays in increasing academic achievement among students in various subjects, such as for example the results of the Ahmed Khattab (2007) Study and the results of the Shaima Hamouda Al-Haroun (2008) study.

CONCLUSION :

In this article, we looked at a historical summary of the term metacognition that Flavell brought in the 1970s, which he extracted from Piaget's experiences and Vygotsky's works, as well as familiarizing with some definitions on this topic, we also touched on the components of this concept and its different models as well as the most important classifications Which researchers brought in the area of metacognitive, as well as the most important theories that dealt with this concept in the field of teaching and learning, as this concept added a new dimension in the field of educational psychology, cognitive psychology and teaching and learning strategies, as it opened wide horizons for experimental studies and theoretical discussions. On many topics such as intelligence, thinking, remembering, learning, problem solving.

Metacognition help develop thinking in its various dimensions and levels among learners, as it plays an important role in planning, monitoring and evaluating ideas, and in this most research indicates that it includes a subjective organizational aspect for the learner, so students who possess skills beyond high knowledge are the most effective in Organizing their learning, and they have the ability to control their learning and thinking processes, and choose the appropriate learning style.

11. Study proposals:

In light of the results of the current study, it is possible to come up with some practical suggestions, by emphasizing the following points:

- Reconsidering the curriculum again, with an emphasis on developing it so that creativity and critical thinking are a goal of its educational goals.
- Reconsidering the quality of education in Algeria, in accordance with the comprehensive quality standards in education.
- Attention to teachers through conducting formative training in the field of teaching, and this is within the framework of psychological and pedagogical training.
- Relying on pedagogy with the competency approach in its proper and sound basis, which reflects a review of the roles of the elements of the educational learning process.

- Teachers' awareness in the curricula and study programs of metacognitive skills and learning methods in the educational field.
- Assist students to acquire metacognitive skills at various levels and work to use them while dealing with and outside the school curriculum.
- Focusing on students with medium and low achievement to advance their academic level, by training teachers to implement strategies to acquire metacognitive skills to teach them and encourage them to use them.
- The need to take care of the student's mental health safety by providing appropriate care in order for his mental capabilities to grow in a harmonious atmosphere, and in the positive direction, because the lack of attention to the student's mental capabilities leads to wasting and blocking these capabilities at an early date.
- Building programs and curricula that help the Algerian student develop their mental abilities, by practicing school activities that adopt metacognitive methods, as well as cooperative learning in the light of project pedagogy and problem solving.
- Provide sufficient time for effective training classes in order to activate the activities that help develop metacognitive skills, and the ability to solve problems in preferred learning styles.
- Support the formation of teachers by providing successive courses supervised by specialists in psychology and educational sciences to explain the importance of these capabilities in the educational-learning process with a view to exploiting them to serve the educational process in general, and the paths of learners in particular.
- Serious attention to metacognition skills as an essential input to the teaching process.
- Control the outcomes of the educational-learning process, especially those related to metacognitive skills through:
 - Paying attention to the student before, during and after the whole learning process, and ensuring that the process continues continuously as the first concerned with developing these capabilities.
 - The necessity of making use of the specific educational aids and assisting in developing the metacognitive skills and learning methods of secondary school pupils.
 - Reducing, as much as possible, the number of pupils within a single department, to the extent that it allows the use of such skills to improve their academic achievement, and the possibility of creating the phenomenon of learning among learners.
- Disclose the learning methods that students use in their studies to provide appropriate counseling services in educational situations.
- Providing teachers and training them to understand the methods students use during their learning, in addition to providing them - teachers - with effective and appropriate teaching strategies for each unit of study.

Bibliography List:**Foreign references:**

-Blakey, E, & Spence, S (1990), Developing metacognition. Eric Reproduction Services No. ED327218. Retrieved from <http://www.eric.ed.gov/PDFS/ED327218.pdf>

- Browler, Leanne (2008), The Metacognitive Knowledge of Adolescent Students During the Information Search Process, Proceedings of the Annual Conference of CAIS / Actes du congrès annuel de l'ACSI · January 2008.
- Brown, Ann, (1987), Metacognition, Executive Control , Self –Regulation and other Mysterious Mechanisms. Company.
- Costa, A, L (1991), Mediating the metacognition: A resource book for teaching thinking, Alexandria, Virginia: Association for supervision and curriculum development.
- Cross, D. R. & Paris, S. G. (1988), Developmental and instructional analyses of children's metacognition and reading comprehension. *Journal of Educational Psychology*, 80(2), 131-142.
- Flavell , J.H, (1976), Metacognitive Aspects of Problem Solving . In L.B. Resenich (ED) the Nature of Intelligence , (PP231-235) NJ, Hillsdale :Lawrence Erlbam Associates
- Flavell , J. H. (1979), Development of Cognitive Peaccercch and theor" . New York , Macmillan.
- Flavell, J. H. (1979), Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*, 34(10), 906-911.
- Hennessey, M. G. (1999), Probing the dimensions of metacognition: Implications for conceptual change teaching-learning. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Boston, MA.
- Kuhn, D. & Dean, D. (2004), A bridge between cognitive psychology and educational practice. *Theory into Practice*, 43(4), 268-273.
- Lai, Emily, K (2011), Metacognition: A Literature Review, Always Learning, Pearson, pp, 10-40.
- Martinez, M. E. (2006). What is metacognition? *Phi Delta Kappan*, 696-699.
- Tobias, S, & Everson, HT, (2002), Knowing what you know and what you don't : Further Reasearch on Metacognitive Knowledge Monotoring, College Board Reasearch Report, College Entrance Examination Board, New York, N (03), pp. 01-25.

Arabic references

- علي فارس (2017)، العلاقة بين مهارات ما وراء المعرفة وأساليب التعلم والقدرة على حل المشكلات والتحصيل الدراسي لدى تلاميذ مرحلة التعليم الثانوي: دراسة ميدانية، أطروحة دكتوراه غير منشورة، جامعة الجزائر 2 أبو القاسم سعد الله، بوزريعة، الجزائر .
- خولة أحمدي (2012)، علاقة استراتيجيات ما وراء المعرفة وتوجهات أهداف الإنجاز (أهداف الإلتقان، أهداف الأداء) بالفاعلية الذاتية الإحصائية لدى طلبة السنة الثانية علم اجتماع ل.م.د، دراسة ميدانية بولايات الوسط الجزائري، مذكرة ماجستير غير منشورة، جامعة سعد دحلب-البليدة-، الجزائر .