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# **COGNITIVE MODIFIABILITY, MEDIATED LEARNING EXPERIENCE AND AFFECTIVE-MOTIVATIONAL PROCESSES: A TRANSACTIONAL APPROACH TO LEARNING IN A KNOWLEDGE-BASED SOCIETY**

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**Abstract:** The 21<sup>st</sup> century promises to make very different demands on our students and schools in a knowledge-based society. A slow but dynamic shift has been occurring in our Singapore educational system towards a learning nation and thinking school ethos. In the midst of this change, students will need to acquire a new set of skills. They will need to be able to use a variety of tools to search and sort vast amounts of information, generate new data, analyze them, interpret their meaning, and transform them into something new. Change of this magnitude demands that learning is no longer encapsulated by time, place and age but has become a pervasive activity and attitude that continues throughout life. The main objectives of this paper are to examine the relationships among cognitive modifiability, mediated learning experience and affective-motivational factors, and to suggest a transactional approach towards learning and instruction to face the challenging demands fronting our students and schools. Some prominent non-intellective dimensions related to mediation and cognitive processes will be described and examples that demonstrate various interactive relationships among motivational-affective factors, cognitive processes and mediated learning experience will be depicted. Important implications for clinical and educational intervention and for research in our knowledge-based society will be outlined.

## **Introduction**

A growing body of research evidence in the last few decades has inferred that specific instructional activities of teachers in the classroom are highly correlated with their students' cognitive development. Psychologists and educators have long been interested in understanding the relationship between learning processes, school performance, cognitive changes and various nonintellective factors such as motivation and mediation. (Tzuriel, 1991) Elaborated theories have referred to the relationship between intellectual development or scholastic achievements and intrinsic motivation. (Haywood, 1992)

In today's knowledge-based economy, our students need to acquire a new set of cognitive skills. Their learning is no more encapsulated by time, place and age but has become a pervasive activity and attitude that continues throughout life. Unlike traditional instructors, teachers today act as mediators who function in a fundamentally different manner in the classroom as they consistently guide and probe their students' responses, suggest alternatives, ask for elaboration, restate their comments and use appropriate pauses to allow them to think on their own. (Costa, 1985). Vygotsky's work has provided a strong theoretical focus for this trend and in

fact he had called mediation the central fact of psychology (Preseisen & Kozulin, 1992).

Feuerstein's (1980) theory of Mediated Learning Experience (MLE) has also made a major contribution to education and psychology by formulating a model of interactive learning. Among its unique features are the central position of relationships and its critical role in helping a student understand his world. MLE occurs through the process of reciprocal interaction between the student and the teacher, whereby the teacher interposes herself between the student and the world and by modifying the stimuli or experience the student will have. The mediation allows the student to acquire cognitive functions that will permit him to learn from formal and informal learning opportunities and mediated experiences become the vehicle for understanding his world (Welder & Greenspan, 1992).

The 'learning nation and thinking schools' call in Singapore has been sounding loudly in our classrooms. Higher-level problem solving, together with creative and critical thinking skills in our students, are being emphasised. However, there is no assurance that such higher forms of cognition will be exclusively promoted in the classroom. Preiseisen and Kozulin (1992) for example, suggest that to understand the learner's higher-order cognitive states, we must examine the classroom environment with its socially shared cognition. If knowledge is to be absorbed in class, then teachers must explore ways in which the learners can construct knowledge jointly with them.

Several studies attempting to trace the determinants of intellectual competence in the classroom have discussed two factors, cognitive and motivational-affective as mainly responsible for differences in intellectual ability. Cognitive functioning and motivational-affective factors are inseparable influences and Scarr (1981) has suggested that assessment of cognitive functioning also involves a measurement of cooperation, attention, persistence and social responsiveness. Intellectual competence includes learning and motivation. It is argued that performance on an intelligence test reflects three distinct factors: cognitive processes, academic achievement unrelated to formal cognitive properties and motivational-personality factors.

One important element of the MLE theory is its focus on how the learner organizes experience according to his developmental level. Each child or student has individually different ways of using his or her sensory processing and motor capacities. The functional developmental level and 'individualness' level of the learner will have a great bearing on how one should engage him in the interactive aspects of the learning process.

Wieder and Greenspan (1992) have identified six distinct developmental levels and organisations of experience and a number of constitutional-maturational patterns. Each developmental level involves different tasks or goals and builds on the earlier levels and has its own characteristics. Each developmental level of experience is, therefore, a reference point for the factors that influence development. For each level there is a range of experiences, e.g., dependency, pleasure, assertiveness, aggression, self limit setting, empathy, love, sadness and fear. The structure and organization of each experience is influenced by the teacher-learner interaction.

The six developmental levels are: mutual attention, mutual engagement, interactive intentionality, representational/affective communication, representational elaboration and representational differentiation. These can be collapsed into four essential interactive processes which identify how the learners negotiate the various phases of their interactions. The processes are: shared attention and engagement, two-way communication, shared meaning and emotional thinking.

### **Cognitive Modifiability and Mediated Learning Experience**

The Structural Cognitive Modifiability (SCM) theory suggested by Feuerstein and his colleagues is based on the assumption that human organisms have the unique capacity of becoming modified in a variety of cognitive and motivational functions and to adapt to changing demands in life situations. Cognitive modifiability is considered possible irrespective of three conditions: etiology, age and severity of conditions which are very often considered as barriers to change. The three main characteristics that define structural modifiability are: permanence, pervasiveness and centrality. Permanence refers to the endurance of the cognitive changes across time and space. Pervasiveness is related to a 'diffusion' process in which changes in one part affect the whole. Centrality reflects the self-perpetuating, autonomous, and self-regulating nature of cognitive modifiability. The basic assumptions of the SCM theory are that (a) the human organism is an open system amenable to cognitive changes that affect its functioning and (b) cognitive modifiability is best explained by the MLE processes. (Feuerstein et al, 1985)

MLE refers to an interactional process in which the adult, usually the parent or teacher, interposes himself between the child and the world and mediates a set of stimuli by affecting its frequency, order, intensity and context. (Tzuriel, 1991). The mediator arouses in the learner vigilance, curiosity and sensitivity to the mediated stimulus, and creates for, and with the learner temporal, spatial and causal relationships among stimuli. Feuerstein suggested ten criteria for MLE. However, only the first three (a) intentionality and reciprocity, (b) meaning and (c) transcendence are considered necessary for an interaction to be classified as a mediated interaction.

Tzuriel (1991) described the first criterion as the mediator's intentional efforts to produce in the learner a state of vigilance in order to help him/her register some information. Intentionality can be observed at a very early age in dyadic interactions and is marked by many signs of reciprocity. The reciprocity aspect is characterised as a process in which teacher and learner are mutually and alternatively responding to one another. According to Tzuriel, the reciprocity aspect is conceptualised as essential for the development of basic feelings of competence and self-determination. Interactions imbued with reciprocal intentionality assist the learner in realising that his actions determine other people's behaviour and foster his organismic belief that he is the agent of change.

The second criterion, mediation for meaning, has long been recognized as a powerful determinant in efficient learning processes (Ausubel, 1968). This criterion refers to interactions in which the presented stimuli possess effective, motivational and value-oriented significance. The mediator does not convey a neutral attitude toward the stimuli but rather attaches importance and even enthusiasm, done verbally or non-

verbally. It is assumed that a learner who has mediated for meaning will initiate attachment of meaning to newly-acquired information rather than passively waiting for meaning to come.

The third criterion, transcendence, refers to both the character and the goal of MLE interactions. The objective of MLE is to transcend the immediate needs and specific situation and reach out for goals that may have nothing to do with the original activity. Mediation of transcendence is evident for example when a mediator uses daily activities such as planning a trip or playing a game to develop problem solving strategies, planning ability or summative behaviour. Although transcendence depends to a large extent on intentionality, the combination of both becomes a powerful modality for development and widening of the learner's need system. (P 98. Tzuriel 1991)

### **Affective-Motivational Processes and Cognitive Functioning**

In most studies, the relationship between affective-motivational processes and cognitive functioning has been investigated using various constructs and methodologies. The affective-motivational factor functions as an energizer influencing cognitive performance and one of the most researched constructs is intrinsic motivation. This motivation is aroused inside the learner and according to Hunt (1965) it is aroused by incongruity between informational input and cognitive processes. The individual derives pleasure from activities and events that provide an optimal level of incongruity, complexity and arousal. Eg the motivation to explore is brought about by uncertainty due to inadequate information. Other factors important for arousal of exploration include factors such as novelty, complexity, surprise and ambiguity.

Another view of this relationship between affective-motivational processes and cognitive functioning looks at the individual who seeks to exercise a sense of control over the external environment (Deci, 1975). The learner here seeks stimulation, incongruities and challenges or tries to conquer challenges and to reduce incongruities. This kind of motivational pattern is aimed at achieving feelings of competence and self-determination.

Haywood (1971) discusses intrinsic motivation in terms of competence, affectation and challenge. This is based on the motivation-hygiene theory differentiating individuals according to their disposition to respond to task-intrinsic or task-extrinsic incentives. Apparently, intrinsically-motivated persons tend to seek satisfaction from responsibility, achievement and challenge while the extrinsically-motivated persons avoid dissatisfaction by focusing upon the ease, comfort, safety and security in non-task conditions. In a related research Bandura (1977) examines the notion of self-efficacy and notes its important role in coping behaviours and self-regulation processes such as setting up goals and evaluation plans.

In another study, it was shown that the learner's perception of reality is a more powerful predictor of achievement motivation and behaviour than the reality itself. (Covington, 1984). The child's perception of competence is critical to the organisation and regulation of behaviour such as problem solving, learning and adjustment.

Renzulli (1986) suggests one other key affective-motivational process important in the learning environment. The term task commitment refers to a combination of traits such as perseverance, endurance, hard work, dedicated practice, self-confidence and a belief in one's ability to carry out important work. Early evidence of task commitment has been identified in very young children (Bloom and Sosniak, 1981). They confirm the important role of affective-motivational factors such as enthusiasm, determination and industry.

### **The Transactional Approach of Tzuriel**

Tzuriel (1991) basically conceived that cognitive modifiability, mediated learning experience (MLE) and affective-motivational factors are all interrelated and intermeshed processes. Each has a transactional relation with each other. For example, cognitive modifiability depends largely on the existence of MLE and this relation depends significantly on adequate levels of motivational and emotional factors. These factors in turn are conceived as preliminary and essential energetic forces that determine the effects of MLE on development of cognitive modifiability (P 104 Tzuriel, 1991).

For example, mistrust and suspicion of others, or an apathetic approach toward cognitive challenges are negative emotional-motivational factors that interfere with the teacher's mediating attempts and consequently in the development of cognitive modifiability. On the other hand, curiosity, self-confidence, competence and self-determination, an optimistic view of life and general feelings of well-being are conceived as positive factors in the enhancement of MLE processes. (P 105, Tzuriel, 1991). The effects of MLE on the development of cognitive modifiability are possible only when essential affective-motivational factors are at work.

In figure 1, a schematic transactional model of the relations among MLE, affective-motivational factors and cognitive modifiability is described. There are two processes to note: interaction and transaction processes. In interaction processes, one factor (A) has an effect on a second factor (B) and vice versa, B has an effect on A. The focus here is on the changes that occur in one factor as a result of the interaction of the two factors. In transaction also, both factors mutually affect each other. However, the situation is more complex since B, being changed or transformed by A, affects A in return in a different way than the original B. Thus, while the interaction process is characterised by relative simplicity and transience of effects, the transactional process is circular so that there is a continual change and adjustment of factors. In a similar way we can conceive the transactional effects of MLE, affective-motivational factors and cognitive modifiability. (P 105, Tzuriel, 1991).

### **Nonintellective Dimensions**

There are a number of nonintellective factors embedded in the transactional model related to the MLE and cognitive modifiability processes. Based on dynamic assessment procedures in his clinical-educational work, Tzuriel (1991) has observed some strong motivational, affective and personality dimensions such as anxiety, strong need for approval, apathy, avoidance and fear of failure. These are only 'glimpses' of the actual motivational and personality dynamics that are interwoven with the cognitive processes. These factors are important in explaining the learner's

test performance and school work and also for evaluating changes in students' motivational patterns and the teacher's intervention strategies.

- 1 Accessibility to Mediation
- 2 Need for Mastery
- 3 Frustration Tolerance
- 4 Locus of Control
- 5 Fear of Failure and Defensiveness
- 6 Confidence in Correct Responses
- 7 Vitality and Alertness.

### **Implications of the Transactional Model**

The model has indicated that motivational development and cognitive development proceed in a transactional relation. It is evident that enhancing task-intrinsic motivation improves the effectiveness of learning and that improvements in cognitive structures lead to increases in intrinsic motivation. What is important is not so much what our students know or do but rather how they learn, and how we can modify their cognitive structures as a function of mediational processes. Therefore, an important implication of the transactional model refers to the timely intervention of cognitive programs.

Theoretically the nature of the intervention program will be to provide the learner with MLE structured according to his specific needs and particular condition. At a more practical level, the intervention program will have to reflect an application of the basic principles or criteria of MLE appropriate to specific age groups. The intervention is not only remedial in nature, in some cases it can be used as a preventive measure. The intervention program is directed at the individual learner rather than at factors external to his condition.

These programs aimed either at enrichment or remediation of cognitive functioning, should emphasise adequate teacher training and preparation. Teachers need to be coached in using effective teaching techniques and strategies and in adjusting their approach to the learner's level of modifiability and motivational arousal. Teachers are to be made aware of their mediational styles on different learners' intrinsic motivation and in return, the learners' motivation and cognitive functioning will also affect their mediational styles. The mediational processes of the teacher must be consistently monitored and supervised.

Embedded in the transactional model is a need for innovative approaches to assessment and learning. The model is a dynamic one which requires ongoing analysis of processes. The interactions are moving and changing constantly and the investigator's concern is to measure the process itself as it is happening rather than on its end results. Dynamic assessment may provide more useful information about teachers, students and tasks in this interactive learning and the examiner should try to change the motivational and affective components during assessment. The goal of this transactional approach to learning is to change the cognitive structure of the learner and to transform him into an autonomous, independent thinker.

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