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Mediated Learning and Pedagogy: Applications of Feuerstein's Theory in Twenty-First Century Education

Tan Oon Seng

Introduction

Most educators are familiar with the work of Piaget and Vygotsky. Education owes a great debt to Piaget particularly for his extensive insights into the development of the mind and intelligence. Vygotsky provided educators with an understanding of how the social environment influences psychological developments.

What is less well known, but of potential interest to educators as we explore new ways to facilitate learning, is the work of Feuerstein and his theory of mediated learning experience (MLE). Reuven Feuerstein, an Israeli psychologist, began his work in the late 1940s and was at one time a student of Jean Piaget. Feuerstein's work, however, was popularized only in the 1990s. Although his work was primarily with disadvantaged adolescents and children, the theory has wider applications and can be shown to underpin contemporary classroom teaching and interventions across all sectors of education.

Feuerstein's work addressed those issues of utmost concern to parents, teachers and psychologists: What goes on in the mind of the learner? What goes on in the mind of the teacher? How can the interaction between them result in effective learning?

This article will provide (i) an outline of Feuerstein's work and his theory, (ii) explain mediated learning experience (MLE) theory, and (iii) show how it can be applied in a classroom context.

Review

Background of Feuerstein's Work and Theory

The theory of MLE was developed over the period 1950–1963 during which Feuerstein worked with large numbers of orphaned and traumatized youths coming back to Israel after the Holocaust (Feuerstein, Rand, Hoffman and Miller, 1980). These young people came from diverse cultures and disadvantaged conditions and had to be received, settled, and schooled for citizenship in a new country with a unique and thoroughly modern technological culture (Hobbs, 1980). The methods of psychometric testing used then provided little help for such a mammoth task. As Feuerstein noted, existing practice looked at children's *failure to learn* and not at what they could learn. Like the summative assessments of today, testing was for determining the end products of development and learning (i.e. achievement of learning outcomes) and for placement (i.e. predicting performance).

Since he was more concerned with the learning potential and untapped capacity, he turned the need to assess into a learning opportunity for the students, so that every assessment became a learning experience, interwoven with a diagnostic approach and an intervention or remediation. In this way, he made the assessment process "dynamic" and truly developmental.

Feuerstein thought beyond the traditions of his time. When others were modifying materials for those with learning disabilities, Feuerstein chose to invest his energies in modifying these learners directly. When behaviourism was looking at stimuli and output behaviours, Feuerstein chose to focus not only on the organism but the inner structure of cognition. Whilst intervention programmes were often concerned with content, Feuerstein was more concerned with the prerequisites of thinking and ways to help people learn how to learn. Psychoanalysis was concerned with emotions and antecedent factors, but Feuerstein preferred to search other mediating factors that impact future cognitive development.

At the heart of Feuerstein's Theory of Structural Cognitive Modifiability (SCM) is the belief in the plasticity and modifiability of cognition. Feuerstein (1990) argued that a person's capacity to learn is not solely determined by one's genetic endowment. Cognition can be improved or "modified" irrespective of a person's age and stage of development. In SCM theory a child (or even adolescent) who has cognitive deficiencies has every chance of positive change and development through mediation.

The concept of modifiability is of prime importance in SCM. It refers not merely to remediation of specific behaviours but to changes of a "structural nature" (that is, internal changes in cognition rather than external behaviour). It is about changes that are durable, substantial and meaningful to the individual. The changes impact on the individual holistically, on dispositional traits, thinking ability and the general level of competence.

Theory of Mediated Learning Experience

How do we bring about such a structural modification of cognition? The question relates to the basis for effective intervention or interaction. Embedded in the theory of structural cognitive modifiability is the theory of *mediated learning experience* (MLE). Simply put, this states that the quality of interaction between the individual and the environment via an intentional human being (*the teacher*) plays a pivotal role in the cognitive development of the individual.

According to Feuerstein and Feuerstein (1991) the lack of MLE is often responsible for an individual's deficiencies in learning tools, positive disposition and propensity to learn. Without mediation, a learner has limited opportunity to benefit from either formal or informal learning.

Feuerstein and Feuerstein (1991) identified a list of parameters that characterize MLE. Three of these parameters are seen as indispensable to any mediated interaction: (i) intentionality and reciprocity, (ii) mediation of meaning, and (iii) transcendence.

These parameters can be viewed as a repertoire for classroom teachers, as shown in Fig. 1.

(i) Intentionality and Reciprocity (IR)

In the MLE interactionist model, the teacher not only has a clear intention of what to teach, but also shares his/her *intentions* to the learner. *Reciprocity* refers to the teacher's alertness and awareness of how the learner responds to the intention. The presence of this "IR" parameter implies that an explicit and purposeful outcome results from the interaction. The "IR" parameter helps to highlight the fact that the quality of interaction is not accidental or coincidental in nature. Furthermore, it is the "IR" parameter and not just the specific content to be taught that is going to determine the effectiveness of a teaching-learning situation.

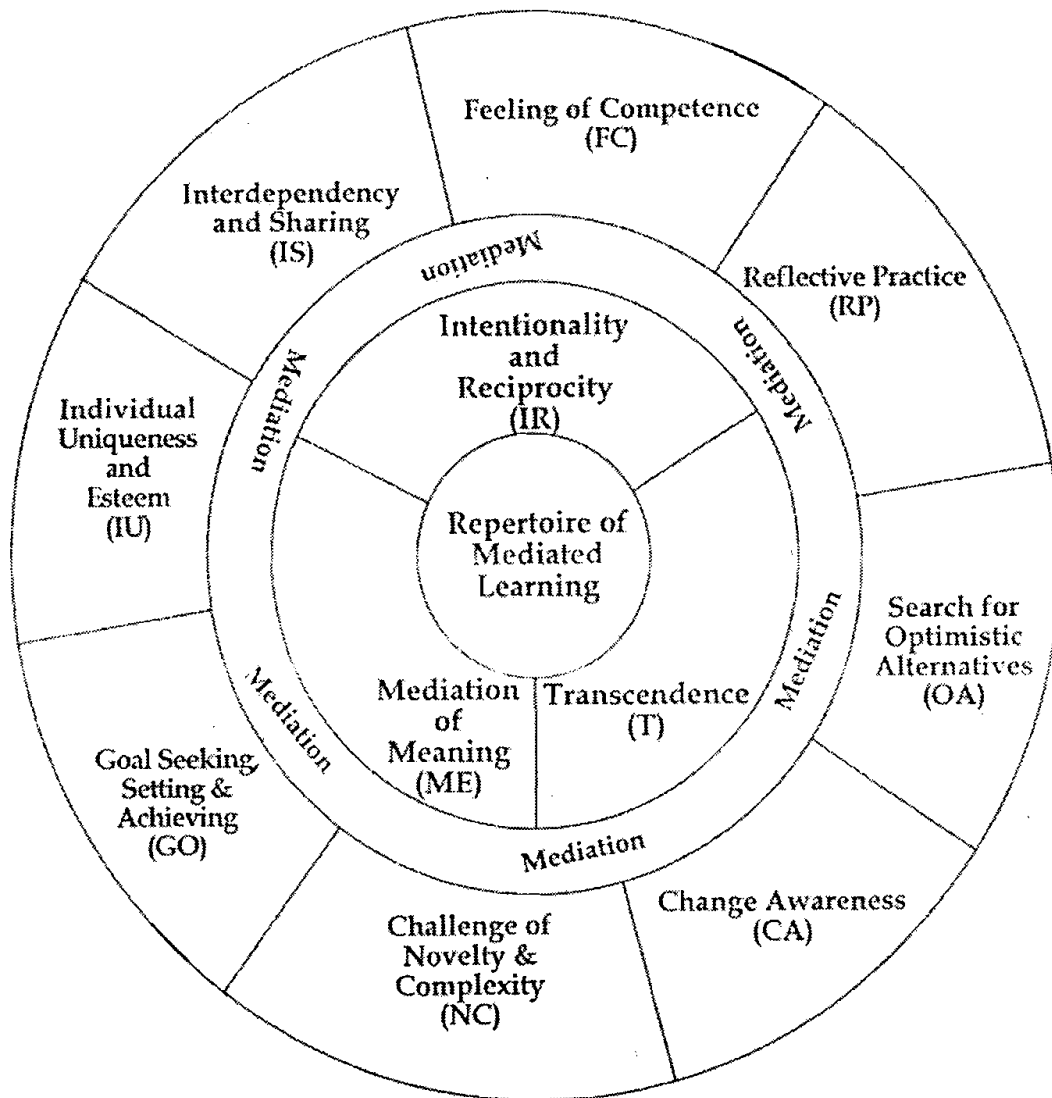


Fig. 1. Repertoire of Mediated Learning.

Source: Tan, O. S., Parsons, R. D., Hinson, S. L. & Sardo-Brown, D. (2002). *Educational Psychology: A Practitioner-Researcher Approach* (An Asian edition), p. 61. Singapore: Thomson Learning.

(ii) Mediation of Meaning (ME)

In MLE, the awareness of meaning constitutes a major component of the motivation system. Meaning involves the individual's cultural background, value system, aspirations and needs. According to Feuerstein and Feuerstein (1991), the effective mediator (teacher) *makes known* to the learner the significance of the interaction, for example, by asking: "Why are we learning this?" and "What is it for"?

(iii) Mediation of Transcendence (T)

According to Rand (1991) transcendence (T) is about going beyond the "here and now" of the learning situation. It refers to the transfer of learning *across contexts*

and situations. The effective mediator enables the learner to take a life-wide approach to learning so that the learner actually learns how to learn.

Other MLE Parameters

The first three parameters (IR, ME and T) represented in the inner ring of Figure 1 are necessary and sufficient conditions for a mediated learning experience. The other parameters are often present whenever applicable in effective learning situations. The parameter on mediation of *feeling of competence* (FC) relates to the need to provide "successful experiences" for students and to remove the unwarranted fear of failure. FC is important as the fear of making mistakes often results in the student's lack of investment in time and effort to try again. The mediation of *reflective practice* (RP), which relates to self-regulatory and metacognitive behaviours, is important for classroom learning situations. RP is important for students given the demands of school life and the challenges confronting their personal and social development.

The mediation of *interdependence and sharing* (IS) parameter refers to a "sense of belonging" and sharing behaviour. For example, in the case of a small nation like Singapore, the sense of belonging is an important notion especially in relation to national education and survival (Ministry of Education, 1998). There is a need to encourage students to appreciate their being an integral part of the community and institution. Furthermore, teamwork, interdependence and knowledge sharing are attributes emphasized in today's world. The recent educational emphasis on preparing students to be more creative and entrepreneurial (Ministry of Education, 1998) makes the "GO" and "NC" parameters increasingly important in the curriculum.

Application and Discussion

We shall consider an observation of pedagogy in a primary school class (Tan, Seng and Pou, in press) to illustrate how MLE principles are manifested in an effective class. By highlighting the parameters we hope to see how MLE can help teachers develop quality interaction for positive cognitive development.

The case scenario is as shown in Box 1. (For the ensuing discussion, the lesson has been broken into five "stages".)

Box 1. Classroom Scenario of MLE.

Stage 1

It is just another school day for a group of Primary Two children. There is, however, a sense of excitement and expectation amongst them as they get into the classroom. Their curiosity is aroused by the colourful charts, bright red and blue weighing machines, fruits and various objects brought in by the teacher.

Stage 2

Miss Chen, their mathematics teacher, announces to the class: "We are going to learn about the addition and subtraction of weight".

She glances at the young faces and notices a boy staring out of the window, apparently distracted by noises outside. With a firm but gentle voice Miss Chen draws the boy's attention: "Seng Lu, we are going to learn something important today."

Stage 3

She asks the class, "When you go to the market, is it important to know if the fruit seller charges you correctly when he weighs your fruits or vegetables?"

"Yes", comes the reply in chorus.

Stage 4

Miss Chen seems to have planned the learning environment well. After some recall of information and inquiry on the meaning of weight, the students are divided into groups. Each group takes turns to handle the objects and weighing machines at different stations. They have learnt that weight can be measured in grams. But what does that mean? What is 100 grams or 500 grams? As they handle the different objects and interact with Miss Chen and their peers, they discover for example that 250 grams is the weight of a real apple.

At another station they have small toy objects of smaller weights that enable them to handle addition and subtraction of small weights. They also work on various examples on a computer-simulated program later that morning.

Box 1. (Continued)*Stage 5*

By the end of the day almost all the students had no problem completing a worksheet on the addition and subtraction of weights of various amounts. In fact, when asked to make up a story given a statement like $250\text{g} + 200\text{g}$... they could say that Mr. Apple and Mr. Pear came together and Mr. Weighing Machine had to carry both of them who together weighed 450 grams. Another group came up with a riddle: Mr. Weight Lifter (the weighing machine) carried 2.3 kg of fruits. A pear weighs 250 g, an orange weighs 300 g and a guava weighs 400 g. How many pears, oranges and guavas were there? The teacher also gave a hint: "There is more than one answer!"

As the class ended a student remarked: "I am going with my mum to the supermarket this evening...I know what to do with the weighing machines now!"

MLE can articulate for us the key characteristics that make the interaction between Miss Chen and her students a quality interaction. Referring to the Repertoire of Mediated Learning (Fig. 1) and looking at the case scenario, it is not difficult to identify how MLE parameters apply.

Table 1 summarizes in some ways how Miss Chen's class epitomizes MLE.

At *Stage 1* we see what was going on in the minds of the students in Miss Chen's class. The students looked forward to interacting with the teacher and their peers.

By *Stage 2* the intentions of the teacher were clearly expressed through her communication with the students and her harnessing of the environment. Her intentions were reciprocated with enthusiastic responses and resulted in encouraging learning outcomes that certainly went beyond the completion of worksheets. She not only articulated her intentions but also planned the entire learning environment to provide a range of materials and psychological tools to support learning. She ensured that the students responded to her intentions at each stage of her lesson.

Table 1.
MLE in case scenario.

Scenario	MLE parameters	Some key "observations" about the Learners and the Teacher
Stage 1	GO (Goal seeking and Achieving) IR (Intention and Reciprocity)	The Learners: There was expectation, curiosity and excitement. The Teacher: There were clear learning objectives, meticulous planning, and creative design of the learning environment.
Stage 2	IR (Intention and Reciprocity) IU (Individual Esteem)	The Learners: They received a good idea of what they would be learning. The Teacher: There was clarity of intention and she ensured that every individual was with her.
Stage 3	ME (Meaning) IR (Intention and Reciprocity)	The Learners: They could see meaning and relevance in the learning. The Teacher: There was clarity of explanation, impartation of meaning and engagement of students' attention and interest.
Stage 4	Reflective practice (RP) Challenge of novelty (NC) Interdependency and Sharing (IS)	The Learners: They were stimulated to recall, think and connect knowledge. They saw something new. They had to learn with and from others. The Teacher: She provided challenge and facilitated thinking. She provided opportunities for engaging learning in different modes thus catering to different learning styles. She gave opportunities for pair and group learning.
Stage 5	FC (Feeling of competence) Search for Alternatives (OA) Change awareness (CA) Transcendence (T)	The Learners: They were developing the sense of "now I know", "I can do it" and "I have learnt something important". The Teacher: She got the learners to feel and be competent. She presented innovative problems to demonstrate that there are alternatives and different possibilities to a solution. She empowered learners to transfer their learning to relevant situations.

At *Stage 3* we see that the concept of weight was not just an abstract numerical quantity for the students. They had an idea that 250 g is about the weight of a real apple. The learning was meaningful not only because the children understood the concept but also because the teacher provided meaningful contexts. All experienced teachers know that meaning is one of the most powerful motivators.

In *Stages 4 and 5* the "transcendence" factor becomes apparent. Learning about weight extends beyond completing worksheets and taking tests. The principles learned extend to other lessons and to daily life. Transfer of learning is particularly important when we are addressing the individual's capacity to adapt and cope with change and new environments. For instance, students are not only acquiring specific theoretical knowledge but more importantly developing heuristics for solving a wide range of problems and applications as well as confronting problems in the real world.

It is not difficult to imagine that in such a class like Miss Chen's, the students would probably be saying to themselves things like:

"I want to be the next person to do that..."

"I am going to get the reading right..."

"I can do the addition..."

"I did it..."

In other words, the various MLE parameters are expressed in this interaction. Apart from the goal-orientations created, the students in their interactions developed a sense of confidence and a feeling that they can do it. The story lines the children created are evidence that they were challenged towards novelty and even complexity. These are the corollaries of mediated learning.

Conclusion

The theory of Feuerstein points to the importance of human mediation as the key to the psychological development of children in social interactions as well as pedagogy. Mediation is underpinned by a belief in the modifiability of the child and a holistic approach. Through the use of the MLE model teachers may be helped to re-examine their roles. MLE helps empower roles, such as being (i) facilitators of the learning of heuristics, (ii) mediators of knowledge sources (helping learners learn to access information sources, (iii) mediators of lifelong learning (helping learners develop dispositions and mindsets for learning to learn), and (iv) designers of the learning environment.

It has been said that *how* we learn is what we learn. Teachers are key mediators for empowering students to become motivated, flexible and adaptive learners for the twenty-first century.

Acknowledgements

I would like to thank Thomson Learning for the kind permission to reproduce Fig. 1 (Repertoire of Mediated Learning) in this article.

Implications of MLE for Teaching

- Every child can be helped to become a better learner and thinker. Mediation is the key to cognitive development, and the teacher's belief in the possibility of positive change and development is important.
- Education reforms are implying that teachers need to take the roles of facilitators rather than content disseminators. This can only happen if the learning environment encourages meaningfulness, feeling of competence, goal-seeking behaviours and the need for challenge and novelty.
- Purposefulness, meaningfulness and transfer of learning are indispensable elements of good pedagogy. The "Repertoire of MLE" enables teachers to focus on such factors to enhance quality interactions and key behaviours.
- MLE emphasizes the importance of teaching heuristics (i.e. strategies and reasoning in subject), scaffolding (e.g. templates for analytical thinking and systematic thinking) and connecting students to the milieu of knowledge.
- MLE encourages the use of collaborative and peer learning activities in the classroom.
- The "Repertoire of MLE" can be used as a tool for teachers to reflect on their own practices, peer review of teaching and mentoring of fellow teachers.

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