

# World Education Research Association - International Research Network (WERA-IRN)

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Annual Progress Report for the period 1 June 2016 - 30 May 2017

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## I. IRN Proposal:

### **Cognition, Emotion and Learning: Facilitating students' learning cognitively and affectively to prepare them for the rapid changing 21<sup>st</sup> century**

With the rapid explosion and proliferation of knowledge in the twenty-first century, it has impacted on the way we learn with knowledge becoming more transitory and the difficulty to predict what will be useful for the future or what to select to learn. Jones & Jones (1992) proposed that students must be taught how to think and learn so as to equip them with the basic attitudes, beliefs, skills, and resources necessary to approach new problems and acquire new information. Indeed, the ability to cope with change, learning as much as possible, is consequently the generic capacity needed for the twenty-first century (Kozulin & Rand, 2000).

Feuerstein, Rand, Hoffman & Miller (1980) stated that cognitive factors can be considered key elements to the individual's successful adaptation, particularly in a technological and rapidly changing society. Park, Knörzer, Plass, & Brünken (2015) also observed that learners who were in a positive emotional state before learning had better learning outcomes. Positive emotions are deemed indispensable, if not paramount in a learning environment and parents, teachers and learners collectively acknowledged the importance of learner's emotional welfare to promote effective learning (Markopoulou, 2015). The ability of students to cope successfully, both cognitively and affectively with change in a knowledge-based, technology driven environment is thus critical and immutable.

The modifiability of cognition and emotional elements are the cornerstone of Feuerstein's theory of structural cognitive modifiability (SCM), which states that "all human characteristics, including personality, cognition and behavior are modifiable states, regardless of etiology, age, or severity of the condition" (Feuerstein, Klein & Tennenbaum, 1991, p. 13). In this theory, Feuerstein's proposition is argued on the basis that a person's capacity to learn is not solely determined by his or her genetic endowment and further suggested that modifiability is possible irrespective of a person's age and stage of development (Feuerstein, 1990).

Embedded in the theory of SCM is the theory of mediated learning experience (Feuerstein et al., 1991) which proposed that the quality of interaction between the individual and the environment via a human mediator plays a pivotal role in the cognitive development of the individual. The mediator may be a parent, facilitator, teacher or some significant other who plays the intentional role of explaining, emphasizing, interpreting, or extending the environment so that the learner builds up a meaningful internal model of the context or the world experienced.

In the study done on pre-schoolers by Salas (2010), it was found that the emotional, affective, and energetic component of the mediated interaction, promoted the interaction between all children in the experimental group in every activity and situation. Similarly, a study by Tan (2000) with polytechnic students revealed that the presence of mediated learning experience during a cognitive modifiability intervention with SCM as its theoretical underpinning can produce significant effects on cognitive ability and attitudes. Chua (2014) further established that learners' employment of cognitive functions allowed for the

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scaffolding of learning to further developed cognitive strategies that aid thinking process and nurture problem-solving, self-directed and reflective skills.

Therefore, in any classroom setting, it is important to address the quality of interaction between the teacher and students with the implication that teachers need to take the role of facilitators rather than content disseminators in order to maximize students' learning affectively and cognitively and enhance their capacity to adapt and cope with change in preparation of confronting a wide range of problems in the real world.

As leading cities in the world are now interconnected by multibillion-dollar state-of-the-art internet communication technologies (ICT), the impact of Technology on learning over the last 40 years had seen its main strength, not simply as a tool for delivering content but in supporting students' efforts to achieve. As such, the integration of Technology in education is a key enabler in any study that focuses on how we can effectively facilitate students' learning as we prepare them for the twenty-first century (Tamim, Bernard, Borokhovski, Abrami & Schmid, 2011).

Bielenia-Grajewska (2014) further noted that education in the twenty-first century is characterized by a number of features that contrasted greatly with education 50 years ago, where the field of learning is nowadays characterized by diversity in terms of learners, learning environments, and learning methods, which resulted in a growing demand for interdisciplinary and advanced research on education in order to foster the process of acquiring knowledge in different contexts and with different audiences, as well as to enhance the potential of educational institutions in a world that has no effective geographic boundaries. As a result, there has been dramatic advancement and growing interest in neuroscientific research in various fields of life and its role in influencing the sphere of education.

In summary, there is clearly a need for more conversation and research across cultures and across continents on cognition, emotion and mediation of learning, on the impact of technology on learning advancement, on learners' employment of cognitive functions for the scaffolding of learning to further developed cognitive strategies and last but not least, on our understanding of neuroscience and how it stimulates learning process and increases students' learning potential. Thus, in this fast changing landscape of the twenty-first century, it is critical for researchers and educators to take on an interdisciplinary approach as we embark collaboratively to explore mediated interventions that would guide us in our development of human capital and strengthen the cognitive and affective development of students' learning.

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### II. IRN Participants List:

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## **III. Overview of IRN**

The IRN is currently at its second year of implementation where the focus has been on creating an international platform for educators, practitioners, and researchers to share and learn about technology, cognitive functioning, neuroscience, and quality mediated learning experience (MLE) that would enhance students' cognitive and affective development. During this process, conversations were facilitated through networking, and collaborations have been initiated to seek a deeper understanding on key components of mediated interventions that will promote students' learning cognitively and affectively. Year two (2) of the IRN also saw the addition of Professor Emeritus David Tzuriel, Bar-Ilan University (Israel) as a new member of the IRN.

## **IV. WERA Symposium with IACEP**

### **Mediated Learning and Dynamic Assessment: Applications in Different Learning Contexts**

A WERA symposium on mediated interventions and its impact on students' learning affectively and cognitively were organized on 12 July 2016 at the International Association for Cognitive Education and Psychology North American Regional Conference, Vancouver, BC Canada.

#### **Symposium Summary:**

Mediated learning experience (MLE) and Dynamic Assessment (DA) are based on Feuerstein's Theory of Structural Cognitive Modifiability (SCM). The basic principle of Feuerstein's method is that all human beings have the ability to significantly improve their learning and level of functioning. His method is applicable across students and teachers, learners of severe learning disorders as well as gifted learners.

This symposium presented researches that provided insight into the applicability and outcome of MLE and DA for both teachers and students in increasing academic achievement and cognitive functions as well as in mentoring.

The first paper presented by Prof David Tzuriel examined the significance of MLE strategies and discourse qualities between mothers and teachers, and the effects on children's Cognitive Modifiability.

The second presenter, Prof Carol Robinson-Zanartu elaborated on the use of RTMI to make DA more meaningful to both teachers and students. In understanding how DA, paired with social-cultural contexts can aid in facilitating effect on positive academic outcome and cognitive skill integration.

The third paper, presented by Dr Gwendolyn Lavert discussed how struggling readers can be assisted through the teaching of phonological awareness through MLE. Teachers were charged to help students focus on learning how to identify and correct cognitive functions that need strengthening so as to allow student's auditory processing to be built.

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A/P Isabella Wong presented the fourth paper which explored MLE as a framework and structure that offered a holistic and integrative lens into a transformative mentoring approach for the professional learning and growth of educators.

Lastly, the fifth paper presented by Dr Chua Bee Leng focused on developing cognitive functions in a mediated Problem-Based Learning (PBL). The study sought to identify perceived dominant cognitive functions across problem-solving stages. This served and provided a cognitive-centric approach to problem solving and advanced classroom practices.

### V. Edited book

#### **Advances in Mediated Learning Experience: Technology, Neuroscience and Socio-pedagogic perspectives**

As reported in WERA-IRN Year one (1) Progress Report, an exciting initiative is in progress to publish a comprehensive compilation of works that synthesize the most up to date practice and knowledge of MLE and its interventions that would guide practitioners and researchers in the cognitive, social-emotional and motivational development of students' learning. This will be materialized with the publication of an edited book for **Cengage Learning Asia Pte Ltd**, titled "**Advances in Mediated Learning Experience: Technology, Neuroscience and Socio-pedagogic perspectives**". The editors are Prof Tan Oon-Seng, Dr Chua Bee Leng and A/P Isabella Wong Yuen Fun (National Institute of Education, Nanyang Technological University).

As a recap, this book is **based on the theories** of the late **cognitive psychologist Dr Reuven Feuerstein**, who began his work on the theory of Mediated Learning Experience (MLE) and theory of Structural Cognitive Modifiability (SCM) in the 1950s and is written to present both practitioners and researchers point of view. The aim of this book is to provide a compilation of works that synthesize the most **up-to-date knowledge, research and practice of MLE** and its **interventions** that would guide the application of MLE with **diverse learners of different stages of human development** and **special needs such as ASD, ADHD and LD**.

The book shall be categorized into 4 strands, namely:

- (i) **focus on cognitive, social-emotional and motivational development** of learners for the 21st century;
- (ii) **interdisciplinary in approach synthesizing different theories** and merging learning with **technology, cognitive functioning, neuroscience and brain development, dynamic assessment**, etc;
- (iii) **new instrumentation** to enhance and measure **MLE** for different learning **context**; and
- (iv) application across **different stages of learners' development and contexts**.

The chapter call attracted a number of international and esteemed researchers who contributed book chapters to the edited book. These contributors included several IRN



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members such as **Dr Seng Seok Hoon** and **Associate Professor Wong Yuen Fun** from Singapore, **Professor Carol Robinson-Zanartu** and **Professor Katherine Greenberg** from United States of America. Our new IRN member, **Professor David Tzuriel** from Israel has also contributed a chapter. Due to the increase in high quality research works, the edited book will be expanded from 15 to 19 chapters and target to be published by 2018. The contributed chapters are currently going through the process of anonymous peer reviewing and editing.

### VI. Website

A stronger web presence of Feuerstein's body of theoretical work now resides inside the National Institute of Education (NIE) website. This website aims to serve as a link for educators, practitioners and researchers in the world to connect and facilitate further conversations for research collaboration. Besides showcasing publications related to Mediated Learning Experience and Dynamic Assessment, the website will also highlight contributions of the IRN. The website can be viewed here: [http://www.nie.edu.sg/about-us/campus-facilities/mediated-learning-laboratory-\(mll\)](http://www.nie.edu.sg/about-us/campus-facilities/mediated-learning-laboratory-(mll))

### VII. Launch of Mediated Learning Laboratory (MLL)

On 1 September 2016, MLL was officially launched with a ribbon-cutting ceremony by Guest of Honour, **Associate Professor Liu Woon Chia**, Dean of Teacher Education and **Professor Christine C.M. Goh**, Dean of Graduate Studies and Professional Learning, National Institute of Education, Nanyang Technological University.

The MLL in NIE is set up to propel the use and application of Mediated Learning Experience (MLE) and Dynamic Assessment (DA) for research in educational settings and translate research findings into practical guides for teachers and practitioners both locally and globally. In addition, it aims to connect with researchers to lead research and push the knowledge frontier for Feuerstein's theories of Structural Cognitive Modifiability (SCM), Mediated Learning Experience (MLE) and Dynamic Assessment (DA).

The MLL is equipped with the latest state-of-the-art video recording system, and a floor to ceiling one-way mirror adjacent to an observation room. The MLL is cozily furnished and well-appointed for learning intervention, observation and research activities.

During the launch, a series of seminars, workshops and a round-table discussion with academics and practitioners of MLE also took place. Please see Annex A for snapshots of the launch.

### VIII. MLE Seminars and Public Talk

Professor Emeritus David Tzuriel at Bar-Ilan University (Israel) was invited as a visiting consultant from 1 to 6 September 2016 for the MLL launch. He conducted a series of seminars and workshops in NIE for educators, practitioners and researchers of MLE as well as a Sunday morning public talk at Suntec Singapore Convention and Exhibition Centre for

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the general public. A separate seminar for ERAS was also conducted. These seminars and workshops provided a platform for the exchange of ideas and research collaboration for local and regional educators, practitioners and researchers in MLE. During the launch and workshops at NIE, Professor Tzuriel conducted numerous intervention processes with children volunteers at the MLL which were live broadcast to audiences seated in a packed seminar room of 50 participants. He also often accommodated adult participants during the workshops who volunteered impromptu for mediated intervention or DA. Abstracts for the MLL launch, seminars, workshops and public talk are found in Annex B.

### **IX. MLE Handbook**

The MLE Handbook, published in conjunction with the MLL launch, translated research findings into practical applications across various contexts of Mediated Learning Experience. It is written as an introductory guide for classroom interventions locally as well as internationally and should prove useful to educators, counsellors and professionals dedicated to improving the cognitive functioning of young people. PDF copies of the MLE Handbook can be downloaded here: <https://repository.nie.edu.sg/handle/10497/18183>.

### **X. Details of Organizers**

Convener:

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*End of report*

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## Annex A



From left: Mr Chan Tee Miang; Associate Professor Caroline Koh; Associate Professor Rebecca Ang; and Associate Professor Steven Tan (sixth) present as well at the official launch of MLL as Professor Christine Goh (fourth) and Associate Professor Liu Woon Chia (fifth) officiate the facility's launch at National Institute of Education, Nanyang Technological University.



A group photo of guests who attended the MLL official launch on 1 September 2016.

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Professor Emeritus David Tzuriel, Bar-Ilan University (Israel) at the Mediated Learning Lab (MLL) looking on Dr Ruth Wong's quote on the wall.



Audiences seated in a seminar room at NIE watched a live broadcast of Professor David Tzuriel conducting mediated intervention with a child volunteer at the MLL.

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At the public talk, “*How to develop children’s learning potential?*”, the crowd observed Prof David Tzuriel conducting mediated intervention and dynamic assessment with a child volunteer.



A roundtable discussion on conclusion for academic interventions regarding the use of MLE strategies to develop cognitive functions and enhance cognitive modifiability

**MLL Opening Ceremony**

**A. Applications of Mediated Learning by Professor David Tzuriel**

Thursday September 1, 2016, 10am -11 am

Venue: NIE2-B1-13

Feuerstein et al. (1979) defined *cognitive modifiability* as individuals' propensity to learn from new experiences and learning opportunities and to change their own cognitive structures. This theory is based on the assumptions that individuals are open systems, capable of meaningful structural change, and that their level of cognitive growth is dependent upon the unique events that they experience during formative years, especially their exposure to mediated learning experience. The objective of this intervention programme is to demonstrate the use of MLE strategies to develop cognitive functions and enhance cognitive modifiability. **A round table discussion from 11am - 12pm will follow with conclusions for further academic interventions.**

**MLL Seminars and workshops**

**Abstract**

**B. The Effects of Peer Mediation on Children's Cognitive Modifiability**

Thursday September 1, 2016, 1- 4 pm

Venue: NIE2-B1-14

Peer mediation with young children is a relatively novel approach aimed at teaching students how to mediate to their peers. The main benefits of peer mediation are in developing children's mediation teaching style and cognitive modifiability. The peer mediation developed recently, is based on Vygotsky's sociocultural and Feuerstein's *mediated learning experience* theories. The seminar is focused on the principles of *Peer Mediation with Young Children (PMYC)* program and description of studies showing the effects of the PMYC on cognitive modifiability of mediators and learners. The findings of peer-mediation studies indicate clearly that children in experimental groups participating in the PMYC program showed better mediational teaching style and higher cognitive modifiability than control groups. Recent studies demonstrate that a program for peer mediation can compensate for low level of mediation in the family and serves as a powerful facilitation of self-regulation and planning of children with severe learning disability.

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## MLL Workshop

### Abstract

#### **C. The Cognitive Modifiability Battery (CMB) and the Seria-Think-Revised Instruments (Part 1)**

Friday September 2, 2016, 9 am-12 pm

Venue: NIE2-B1-14

The Cognitive Modifiability Battery (CMB, Tzuriel, 1995, 2000) is an innovative dynamic assessment instrument designed for assessment and intervention. The CMB is used with typically developing kindergarten to fourth grade children but can be used with older children with learning difficulties. It is composed of eight subtests; each addresses a different area of cognitive functioning. The main cognitive functions assessed and mediated are: Systematic exploratory behavior, analytic skills, spatial abilities, verbal tools, mental rotation, and a variety of abstract skills. The reliability and validity of the CMB was reported in many studies. Empirical findings indicate its effectiveness in enhancing children's cognitive skills and academic achievements.

The **Seria-Think-Revised** Instrument (Tzuriel, 1998, 2015) is a novel instrument aimed at assessing and teaching children's planning behavior and inhibition of impulsivity using a variety of arithmetic skills. It is based on the operation of seriation, in combination with mastery of math skills of addition and subtraction. The main cognitive functions assessed and mediated are: Systematic exploratory behavior, planning behavior, control of impulsivity, need for accuracy, and simultaneous consideration of few sources of information, comparative behavior, and trial and error behavior. The main cognitive operations assessed and mediated are estimation of lengths and numerical addition and subtraction. The reliability and validity of the instrument was established in several studies.

### Abstract

#### **Mediated Learning Laboratory (MLL) Public Talk**

##### **How to Develop Children's Learning Potential**

Sunday September 4, 2016, 10-11:30 am

Venue: Suntec Singapore International Convention & Exhibition Centre, Room 335

The concept of *Learning Potential* has been referred to by many psychologists as a myth, whereas for others it is a reality exemplified in everyday life situations. This concept is intimately related to issues of assessment, teaching, and intervention hence its importance. Prof Tzuriel's main argument, supported by research on brain plasticity is that every individual has higher learning potential than what is manifested in academic or test performance, but its actualization depends on the quality of parent-child, teacher-child, and peer's interactions. In this presentation, Prof Tzuriel focuses on *mediated learning* processes (MLE) that affect cognitive modifiability. MLE describes a special quality of interaction

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between a mediator and a learner. In this interactional process, parents, teachers, or peers interpose themselves between a set of stimuli and the learner, and modify the stimuli for the child. In this presentation, Prof Tzuriel will demonstrate the relation between the quality of parent-child MLE interactions and cognitive modifiability, as well as the effects of intervention targeting peer-mediation on cognitive modifiability. He will discuss evidence and examples that support the conclusion that learning potential is a reality and not a myth, provided sufficient mediation is given to the child in family and educational settings.

### **Workshop for ERAS**

#### **How to Develop Student's Learning Potential**

Monday, September 5, 2016, 9-12 am

Venue: Victoria Junior College

The concept of *Learning Potential* has been referred to by many psychologists as a myth, whereas for others it is a reality exemplified in everyday life situations. This concept is intimately related to issues of assessment, teaching, and intervention hence its importance. Prof Tzuriel's main argument, supported by research on brain plasticity is that every individual has higher learning potential than what is manifested in academic or test performance, but its actualization depends on the quality of parent-child, teacher-child, and peer's interactions. In this presentation, Prof Tzuriel will focus on *mediated learning* processes (MLE) that affect cognitive modifiability. MLE describes a special quality of interaction between a mediator and a learner. In this interactional process, parents, teachers, or peers interpose themselves between a set of stimuli and the learner, and modify the stimuli for the child. In this presentation, Prof Tzuriel will demonstrate the relation between the quality of parent-child MLE interactions and cognitive modifiability, as well as the effects of intervention targeting peer-mediation on cognitive modifiability. He will discuss evidence and examples that support the conclusion that learning potential is a reality and not a myth, provided sufficient mediation is given to the child in family and educational settings.

### **MLL Workshop**

#### **Abstract**

#### **D. Dynamic Assessment Instruments for Assessment of Cognitive Modifiability (Part 2)**

Monday September 5, 2016, 2-5 pm

Venue: NIE2-B1-14

Cognitive modifiability is measured by dynamic assessment (DA) which allows recording of change criteria. The conceptualization behind using change criteria is that interactions by which the child is mediated how to process information efficiently are more closely related to measures of modifiability, than they are to standardized static measures of intelligence. The



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mediational strategies used within the DA procedure have more “matching value” to learning processes in other life contexts than do conventional static methods and therefore give better indications about future changes of cognitive structures. Accumulating evidence from educational research provides indications that a score reflecting individual differences in “modifiability” added substantially to the predictive power of learning and future academic success. In this workshop, these instruments will be presented: *The Children's Analogical Thinking Modifiability Test (CATM)*, *The Children's Inferential Thinking Modifiability Test (CITM)*, *The Seriation Thinking Modifiability Test (CSTM)*, *The Children's Conceptual and Perceptual Analogical Modifiability (CCPAM)*, *Closed and Construction Analogies Versions*, and *The Windows Mental Rotation Dynamic Assessment (WMR-DA)*.

### MLL Workshop

#### Abstract

#### **E. Mediated Learning Strategies: Potent Intervention Techniques for Remediation of Deficient Cognitive Functions**

Tuesday September 6, 2016, 9am-12 pm

Venue: NIE2-B1-14

Cognitive functions were defined as compounds of native abilities, learning habits, attitudes toward learning, motivational orientations, and cognitive strategies (Feuerstein et al.1979). Adopting an information processing approach, Feuerstein suggested a list of deficient cognitive functions on the *input*, *elaboration*, and *output* phases of the mental act. For example, in the input phase one can identify difficulties in systematic exploratory behavior, simultaneous consideration of two or more sources of information, and spatial orientation. Deficient cognitive functions in the elaboration phase might be expressed by difficulties in planning behavior, comparative behavior, working memory, and episodic grasp of reality. Deficient cognitive functions in the output phase might be expressed by egocentric mode of communication, trial and error behavior, and projecting virtual relations. The deficient cognitive functions are considered as key elements for understanding children's performance. The modifiability of cognitive functions and operations (e.g., analogy, seriation) during DA is considered as an indicator for future changes, provided some treatment is given to modify them. In this workshop, Prof Tzurriel will demonstrate how mediated learning strategies are potent in remediating deficient cognitive functions.