

# **Cognitive Enhancement and Rehabilitation for the Elder Population**

## **Application of the Feuerstein Instrumental Enrichment Program for the Elderly (FIE-E)**

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**Abstract:** The rapidly expanding proportion of elderly individuals in the population demands systematic efforts to maintain quality of life, prevent mental deterioration, and restore lost or declining mental functions. The Feuerstein Instrumental Enrichment (FIE) Program for the Elderly is proposed as an effective way of meeting these needs. The program is described and suggestions made for designing research and intervention protocols. Benefits for the elder client, the care takers, and care providing settings are outlined.

## **Rationale**

The rapidly expanding proportion of the population of older individuals, with attendant medical, residential care, and social adjustment issues demands new and adaptive responses to both individual, family, and societal needs. The general goals are to improve the quality of life for the elderly, prevent mental deterioration, and enable society to care for and integrate a major component of its population in ways that are both efficacious and within financial and other resource potentials. This focus is thus twofold: (1) meeting the needs of the elderly population, and (2) enabling care providing sites to improve the quality of training for caregivers, consistent with the needs of the setting and in compliance with professionally recognized and governmentally mandated guidelines. Such improvement offers the following beneficial outcomes:

- Enhancing efficiency of care giving
- Enhancing the quality of life of the elderly individual
- Preventing or overcoming effects of mental deterioration
- Retention of caregivers
- Extending the range of caregiving options for clients

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- Raising levels of professionalism in caregivers
- Improve the quality of interaction between the caregiver and client

It should be noted that while the focus of this paper is on interventions related to the elder populations, their applications are equally well suited for a broader range of population, specifically those affected by traumatic brain injury, strokes, and other debilitation conditions.

It is recognized that different care giving settings require differential task accomplishment and structural goals. This can be reflected in specifically adapted training programs that—while incorporating similar core elements—are tailored to differential levels of care, needs of client populations, types of interventions, etc.

Innovative practices are now available to achieve these outcomes. Evidence from research in neurophysiology, and brain plasticity, indicate that the structure of the brain itself, and not only behavioral functioning, is highly modifiable. Using a systematic approach to the modifiability of functioning will both benefit the elderly client and broaden the range of functioning in the caregiver and care providers.

The approach proposed is that of cognitive modifiability and the application of mediated learning experience (Feuerstein, Feuerstein, Falik, and Rand, 2002; 2006). There is a clearly defined technology supporting the potential for cognitive modifiability in the elderly that not only improves their day-to-day functional potential but also promises to have more lasting and salutary effects: Specifically,

- Prevention of mental deterioration
- Slowing processes of mental deterioration
- Recovering lost functions
- Overall improvement in the quality of life

### **The Program: Feuerstein Instrumental Enrichment for the Elderly (FIE-E)**

The FIE-E is an adaptation of the Instrumental Enrichment program developed by Professor Reuven Feuerstein (Feuerstein, 1980; Ben-Hur, 1994; Feuerstein et al. 2006). It's application in a systematic manner, in a well designed institutional context, offers promise to meet the needs of the elderly to improve their quality of life and affect changes in their cognitive functioning, by addressing three levels of intervention: *preventive, decelerative, and restorative.*

The program offers highly feasible and lower cost options for caretakers and providers, and makes a contribution toward meeting the needs the larger social community of the large number of elderly at risk who will be needing care and palliative services in the coming decades. We see this as a worldwide demographic phenomenon, to which our

approach may offer meaningful interventions affecting positively the cognitive and emotional functioning of the elderly.

The FIE-E program is a series of paper and pencil activities which the elderly participant can engage in on an individualized or small group basis. The activities are designed to stimulate or establish cognitive functions, using visual, motor, auditory, and verbal means of interacting. It can be done for short periods of time, as little at 10 minutes or up to 45 to 60 minutes, on a daily basis or scheduled 3 or 4 times per week. It can be done in the elderly's natural environment, without any need for special equipment or modifications, other than the program materials. It is highly interactive, creating an active relationship between the program provider (the "mediator") and the participant. The mediational relationship creates a need for active involvement of the elderly participant with the tasks of the program, and extending beyond the program into the full range of daily life interactions.

The FIE-E is the application of the theories of Structural Cognitive Modifiability (SCM) and Mediated Learning Experience (MLE) developed and implemented by Professor Reuven Feuerstein, an internationally recognized cognitive psychologist, and founder/director of the Feuerstein Institute (formerly, International Center for the Enhancement of Learning Potential (ICELP), in Jerusalem, Israel. Rabbi Rafi Feuerstein has elaborated the program by adding tools for use with younger learners that have great value for older and elderly populations, to overcome more severe cognitive disabilities. It has been used for almost 50 years in a variety of settings and populations, adapted for application to specialized populations, and has been well researched with positive outcomes for the majority to whom it has been applied.

Although the FIE-E adaptation has not as yet been widely applied in large measure to the elderly population, a large body of clinical evidence, and some initial research studies show that FIE-E appears to have significant promise in addressing the needs of the elderly (cf. Cohen and Englander, 1995; Lifshitz, 1997), as well as utility in neurophysiological rehabilitation (cf. Katz and Hadas, 1995; Hadas-Lidor, 1997a; 1997b). What is now needed, and we believe holds great promise at a variety of levels of care, is larger scale outcome studies on various factors of implementation. There are strong indications that significant benefits can be identified and demonstrated if we are able to study these issues from several perspectives, in different settings and with diverse populations of the elderly, on a larger scale of activity. Below we will present the parameters of a training curriculum for caregivers of the elderly, which we believe to be an essential component of application of the program, and leading to the activation of the potential for neuroplasticity.

The training curriculum, and the application of FIE-E as a central aspect of it, conforms to the known elements of stimulation and exposure that promotes neural plasticity:

- ❖ **Activation:** the need for active participation
- ❖ **Specificity:** interventions are related to specific cortical functions

- ❖ **Repetition:** activities must be repeated, for assimilation; but also varied to provide for elaborated learning (transformations)
- ❖ **Intensity:** exposure must be extensive, over longer periods and extended duration to become established in the neural structure
- ❖ **Novelty:** activities must be new and challenging; tasks that are over-familiar tasks do not stimulate the changes creating neural plasticity
- ❖ **Persistence:** different forms of plasticity occur at different time and pace, thus requiring continued and repeated efforts over time to secure effects
- ❖ **Salience:** the stimulation must be meaningful and relevant for the learner
- ❖ **Optimal Timing:** while the individual is modifiable at all ages, certain stimulation is more optimal at certain ages and developmental levels, and thus stimulation must recognize and calibrate interventions accordingly
- ❖ **Spread of Effect:** changes in functions from one intervention will affect other areas not initially targeted, leading to a transference of learning and behavioral responding
- ❖ **Selection Effect:** activities must be selected to stimulate existing and needed cognitive functions, and adapted to observed changes in behavior

### **A Brief Description of the FIE-E Program**

The FIE-E program consists of 14 instruments that represent organized activities to stimulate mental development through activities requiring perceptual and motor planning, searching for relevant information, solving problems of increasing complexity, using rules and strategies in situations that vary from one another but elaborate from what has been learned and practiced to higher levels of complexity and abstraction. The learner develops accuracy at gathering information, applying information to solve problems, using strategies on both similar and different problems, and applying what has been learned to a wide range of life experiences.

The FIE-E program exposes the learner to a variety of learning activities that stimulate thinking and adaptive responding, using known practices to stimulate neuroplasticity, and providing both repetition and variation, and systematic activity to build, practice, and reinforce learning: among them are

- ❖ searching and finding geometric forms in a cloud of amorphous dots (**Organization of Dots**),
- ❖ identifying relative positions in personal and geographic space (**Orientation in Space-I; Orientation in Space-II**),
- ❖ considering characteristics of objects in order to compare create relationships among them (**Comparisons**),
- ❖ analyzing part/whole relationships using geometric forms (**Analytic Perception**),
- ❖ manipulating relationships in time and space (**Temporal Relations**), in family systems (**Family Relations**),
- ❖ classifying objects and events in groups and subgroups (**Categorization**),
- ❖ following complex directions in verbal and figural modalities (**Instructions**),

- ❖ decoding visual patterns and numerical patterns according to rules and relationships (*Representational Stencil Design and Numerical Progressions*), and
- ❖ using analogical and transitive thinking to develop complex, abstract relationships (*Syllogisms and Transitive Relations*).

In a separate document we provide examples and brief explanations of how the tasks/activities of the program meet and facilitate the learning objectives of the program—with particular reference to the needs of the elderly population.

## **Frameworks for Application**

The FIE-E program can be applied in a number of different settings, each of which will have their own strategic and care provision options (that must be reflected in the program implementation and caregiver training models—see below). The differing venues for application are:

- ❖ adult day care settings
- ❖ in-home, individualized care
- ❖ independent living environments
- ❖ skilled nursing facilities
- ❖ hospitals and rehabilitation settings
- ❖ community centers

## **What are the research and development issues of potential interest regarding program implementation?**

In general, research activities related to the implementation of the FIE-E program will promote further understanding of the processes of neural plasticity, with particular reference to the elder population. Specific issues of effects on brain deterioration or damage (with reference to the elderly but also in younger populations who have suffered brain injury or dysfunction due to disease or other causes) can be addressed.

For the elderly participant:

- (1) Differential effects on various populations of defined need: e.g., memory loss, dementia, palliative care, in various settings, etc.
- (2) Differential effects in various settings: e.g., day care, residential, home care, etc.
- (3) Interactive effects in regimes of medication management

(4) Considering effects on variables such as intensity and duration of program exposure, mental functioning defined in terms of time and space awareness, self care awareness and skills, short term and long term memory, etc.;

(5) Changes in social functioning consequent to differential aspects of intervention: social awareness defined as general awareness of surroundings, verbal and nonverbal interaction, self- and other-awareness, autonomy, etc.

For care providers:

(1) Comparative effectiveness of FIE-E in relation to other interventions on the basis of: cost of implementation, context related outcomes (to be differentially defined according to situational variables identified by various settings, but might include time studies on care provision, staffing cost differentials, indices of other necessary care interventions, etc.).

(2) Resource management/provision variables related to program implementation: What does it take to bring an intervention such as this into being? Changes in institutional organization, goals, directions, etc.

(3) Changes in functional abilities and effectiveness of care providers consequent to training, attitudes toward elderly, changes in care taking skills and repertoire, etc.

(4) Retention, satisfaction/morale, staff participation in program development and evaluation consequent to training.

## **A Proposed Curriculum Model for Implementation**

The curriculum model proposed will enable the caretaker to undertake the usual and needed interventions with clients, but do so in the context of cognitive awareness, adaptive responses, sensitivity and empathy toward clients, and problem-solving abilities that achieve these goals. The learning processes are oriented toward using the natural and needed tasks in the environment, but also the learning of specific tools that will enhance functioning and client outcomes.

**Place of the Curriculum in the Training Spectrum:** The proposed curriculum assumes that caregivers have basic training in the principles of care. At the in-service level, they will have interactions with clients and experience fulfilling the required roles of the setting. As an “outcomes-based” curriculum, it will be necessary to define successful and efficient functioning. Some of this definition will come from the setting and its “external” needs and demands. However, some should also come from the caregiver him or herself, as insight and awareness is experienced in the provision of care, and observations are made about the needs of the client and the efficacy of functioning. At the in-service level, it is assumed that this level of professional and functional self insight

serves the needs of the setting, and improves outcomes for all involved—the client, the caregiver, and the provision setting.

Any curriculum model must be responsive to governmentally and professionally based requirement for both content and time of training exposure, in direct pre-service and ongoing continuing education (in-service) activities. In addition, variations in content and scope of training should be differentiated according to the specific needs of the provision setting. That is, the amount of time and the modality of presentation will be adjusted according to setting needs, the functional levels of the caregivers, and the nature of the population served.

**Structural Elements of the Care Giving Program:** In order to achieve the goals of a curriculum that builds a cognitively oriented approach to the provision of care, and acquire the ability to use mediated learning experience as the primary interactional modality—certain essential elements will be included.

- (1) **AWARENESS:** The development of a need and belief system in the caregiver. This is paid special attention to because the model represents a new paradigm for care of the elderly. It capitalizes on the caregiver's recognition that caretaking is a positive life and mentally enhancing experience. The caregiver learns that the adult client can learn and be modified to improve the quality of life. This gives the caregiver impetus to develop (or access) skills that enable him/her to use cognitive skills and awareness to interact in a meaningful and systematic way to facilitate this adaptability. The recognition develops that the environment of the elderly client can be changed in order to facilitate this adjustment, and that the caregiver has the potential to affect change, and this potential is *self-enhancing* as a meaningful human interaction. A clear goal of this level of training is to have the caregiver believe, and convey to the elderly client that he/she can change, will change, and is not too old to be able to learn, retain, and develop competence. This awareness will be identified and enhanced through specially designed activities, related to self interest and the nature of the care situations that are being experienced.
  
- (2) **ASSESSMENT:** Strengthening and going beyond awareness, caregivers will experience cognitive modifiability and mediated learning experience through the application of the Learning Propensity Assessment Device (LPAD). This procedure exposes the trainee to learning activities in the areas of gathering relevant information, analyzing and planning strategies for problem solving, and formulating and communicating solutions to problems. The assessment process observes responses, teaches how to overcome weaknesses or deficiencies in thinking, and provides insight into how they learn and how they can bring cognitive experiences to others (Feuerstein, Feuerstein, Falik, and Rand, 2002). It has been used in a number of training settings, in the US and other countries (South Africa, Brazil, etc.) has proven to be useful in orienting participants to the nature

of cognitive modifiability, their own styles of learning, and aspects of cognitive functions that they focus on in their own learning process and by extension to those for whom they care. Furthermore, this dynamic assessment procedure will enable the trainers to adapt the instruction to those cognitive functions that are not well established, and help trainees to overcome difficulties that would interfere with learning if not otherwise identified and planned for in the instruction.

**(3) TASK ANALYSIS:** Analyzing the needs of the clients and the setting in which the care giving occurs. This is done as a learning experience, to focus on needs and objectives, and to build upon (1) and (2) to create a process of problem solving and focusing. An outcome-oriented case planning model can serve as the basis for this component: Using the SOAP criteria:

- S: Identifying the problem, what are the needed outcomes, what is desired to occur to address the *stated* problem.
- O: What has been *observed*, what data has been gathered, how is the task defined.
- A: Determining the reason why the problem exists (*assessment*), gathering additional data and focusing on relevant issues.
- P: Developing a *plan* of action, what will be done and how will it be done.

We suggest adding two additional criteria to the model:

- E: *Evaluation* of outcomes, to what extent does or has the plan of action been successful.
- R: *Revision* of the plan and action based on the above.

Activities will be undertaken that bring related strategies into competence, from the caregiver's work experience, and from a heightened awareness of both what is needed and what is possible (given an understanding of the cognitive modifiability potential of the elder client). A direct relationship between task analysis and mediated learning experience (MLE) parameters will be taught. (8-10 hours, on-line and direct contact learning)

**(4) INTERVENTION:** Based on the above, strategies will be developed from internal (needs of the client) and external (requirements and structure of the care provision setting) needs and goals. Activities and exercises will be provided to move from task analysis to problem solving through the application of MLE. Lessons from the Feuerstein Instrumental Enrichment (FIE) program will be used to build relevant problem solving skills (Feuerstein and Hoffman, 1996).

- (5) **CONSULTATION/COACHING:** On-site observation and coaching of caregiver's implementation of strategies learned. This includes demonstrations, de-briefing of activities observed, and the identification of problems or difficulties encountered in the setting, with related consultation to address problems. (10-20 on site hours, depending on the number of caregivers in the training group).
- (6) **EVALUATION/CALLIBRATION:** Ongoing formative evaluation to assess the degree to which the training program is meeting needs and affecting change in the caregivers and their clients. Adjustments of time and content of training will be made, in consultation with the caregivers being trained and the supervisory personnel of the care provision setting.

### **Suggested Ways of Getting Started**

- (1) Meet with and discuss training needs with care providing settings.
- (2) Provide awareness presentations for both care providers and caregivers within specific settings. These sessions will orient participants to the nature of the curriculum and learning activities—specifically the LPAD and FIE, related learning tasks, and the like—what and how will the learning occur.
- (3) Propose an individually designed training curriculum, differentiating both content and mode of presentation (e.g., on-line and direct contact learning).
- (4) Negotiate cost of program.
- (5) Plan specific intervention program

The Feuerstein Institute is interested in working with appropriate governmental and non-governmental organizations to meet the needs of the elderly and provide both research and demonstrations of the effectiveness of the FIE-E program. We believe that the FIE-E has important contributions to make, from the perspective of the effects of implementing a cognitive development program, or as a tool for the research into various conditions and outcomes related to cognitive processes of the elderly. In this regard, we wish to be informed of program and research opportunities, resources to be explored, and further contacts to be made. The guidance you can provide will be greatly appreciated and acted upon in a timely and professional manner.

### **Who to Contact?**

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