
UNIVERSITY OF CAPE TOWN

FACULTY OF EDUCATION

FEUERSTEIN'S COGNITIVE TRAINING CURRICULUM:
EFFECTS ON THE ACCOUNTING SKILL PROFICIENCY OF STANDARD SIX
STUDENTS (GRADE 8)

A DISSERTATION PRESENTED IN FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

MASTER OF EDUCATION

BY

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ABSTRACT

This study was conducted to address a concern about low performance among Accounting students. Researchers in Accounting Education such as Deleo and Letourneau (1994) and others point out that, many Accounting students have learning difficulties. Employers as well are concerned about the competence of Accounting graduates, Graham (1993). To remediate this problem, Accounting educators suggest that cognitive training should become an integral part of the Accounting curriculum in order to enhance students' learning, Weil (1990), Chalupa (1992).

In this study Feuerstein's cognitive approach, Instrumental Enrichment (IE) was used. This approach was found suitable for this study because of its aim to enhance the learning processes of inefficient learners.

The experimental group was exposed to selected Instrumental Enrichment exercises. Pretest and posttest measures of Accounting Achievement and Verbal Reasoning were administered to the experimental group and the control group, and the scores were compared. The assumption was that the experimental groups would perform better than the control group on the criterion measures as a result of the exposure to IE.

The subjects were 31 standard six (grade 8) class pupils in one of the high schools in the Western Cape. From this class, the experimental group was exposed to IE exercises for 3 weeks.

No significant differences were found between the scores of the experimental and control groups on the tests used. These findings may be due to several reasons: short duration of the intervention, inefficient teacher training and the attrition rate of the subjects. From these results, future researchers are advised to: increase the length of their studies, provide efficient training of the teaching of IE and control the attrition rate of their subjects.

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CHAPTER 1

CHAPTER 1

INTRODUCTION

Over the past decade or so, the course content and teaching practices in Accounting Education have come under intense critical scrutiny. Gurr (1985) pointed up the existence of many deficiencies in the content of many Accounting courses with the result that the attrition rate among Accounting students is very high". Teachers are becoming concerned about high drop-out rates and failures of their Accounting students". (p.11) Supportive evidence was provided by Weil (1990) who pointed out that the pass rate for black students in elementary Accounting was 25% to 30%. According to Gurr (1985), Accounting is a very detailed and complex activity which demands a very high degree of accuracy and thus students require more assistance than they do in other business courses. "These students needs are not met in many institutions, especially in the secondary schools" (p.11).

Concerns and criticism extend beyond the issue of attrition or drop-out rate. The competence of Accounting graduates and their ability to deal with the new evolving and complex market place requirements is also under serious question. In 1986, the American Accounting Association issued a strong statement which concluded that Accounting graduates were not well prepared to enter the profession. Such concern was echoed by potential employers of Accounting graduates who revealed their concern for the adequacy and competency of the graduates who were about to enter the business field. (Graham, 1993).

Some authors have been critical of the attention paid in Accounting Education to the body of knowledge and to coverage of the syllabus rather than to the process of learning. (Weil, 1990; Chalupa, 1992; Graham, 1993).

Others, Beegle and Coffee (1991) focused their criticism on the teaching techniques in Accounting which they feel had been relatively static for decades.

In discussing the need for content change Emore and Cress (1989), stated that the "Existing Accounting course requirements and course content have not been changed significantly for the last 50 years" (p.361). Similarly Whitney (1992), in describing the stagnation of the Accounting Education curriculum, stated, "The traditional first year Accounting taught in almost every high school and business college in the century is basically the same course taught way back in the days of the horse and buggy". (p.27). Teacher variables such as competency, ability to communicate and awareness of the needs of Accounting students have also come under scrutiny (Emore et al 1989) as have the content of the Accounting curriculum and its implementation (Jackson and Johnson, 1991; Chalupa, 1992; Graham, 1993).

Weil (1990) shifted the focus of critical attention from the content and implementation of the Accounting curriculum to the cognitive characteristics of accounting students. Weil suggested that one of the reasons for the poor performance in Accounting is the lack of relevant thinking skills on the part of the students who are thus unable to effectively process Accounting information. Support for this assumption was offered by Deleo and Letourneau (1994) who suggested that "... many Accounting students learn to solve specific problems but have limited ability to solve unfamiliar problems as new laws and pronouncements alter their framework". (p.263).

Given the criticism and concern, described above regarding the state of Accounting Education, it is not surprising that the literature on Accounting Education is replete with calls for the need for change. An example is Kullberg, Gladstone, Scanlon, Cook, Groves, Horner, O'Makey, and Kangas's (1989) call for a "Coordinating committee of all major constituencies.....to address issues that impact on the educational process and to guide the academic community in re-engineering the curriculum" (p.3).

A detailed description of the suggested changes in the Accounting curriculum is presented in Chapter 2. Within the general call for the need for change, there appears to be a consensus that the development of critical thinking skills in Accounting should be a central component in any new curriculum, Weil (1990) and Chalupa (1992) all have suggested that Accounting Education must emphasize conceptual knowledge and logical reasoning in order to enhance the cognitive abilities of its students.

CHAPTER 2

CHAPTER 2

REVIEW OF THE LITERATURE IN ACCOUNTING EDUCATION: THE NEED FOR CHANGE

The call for change in Accounting Education resulted in an extensive reaction replete with numerous types of modifications which address every aspect of this program. These changes can be categorized in the following manner:

- A. Modification in the Accounting Education curriculum and its specific course content.
- B. Changes in defining and prioritizing the Accounting skills necessary for graduating students in order for them to succeed in the market place.
- C. Changes in teaching practices. This category includes changes in Accounting teachers' training and competency. Changes in teaching methodologies and delivery of content. Changes in Accounting students' evaluation by their instructors.
- D. Changes in application, training and mastery of technological changes relevant to the Accounting profession.
- E. Changes in government policies and in government attitude toward Accounting Education

A. Modification of the Accounting Education curriculum, its course content:

Most publications written in the last 10 years (Emore et al. 1989; Spiegelberg 1992; May, Windal, Sylvestre 1995) single out the present day Accounting Education syllabus for criticism. They describe it as archaic, non-relevant and in a need of change. While presently, most Accounting programs are directed toward Financial Accounting, it is suggested that in the future they should contain subjects from other disciplines such as technology, marketing, industry etc. Other suggested modifications in the Accounting curriculum include the inclusion of liberal arts subjects, courses in mathematics and statistics (Emore et al 1989).

In several recent issues of the Journal of Education for Business and the Journal of Accounting Education, the call for curriculum modification focused on the inclusion of a thinking skills program. Numerous articles Walters (1991); Sormunen and Chalupa (1994); Kimmel (1995) elaborated on the need to include a critical thinking skills program as part of the Accounting curriculum. In order to illustrate the importance of the inclusion of a critical thinking program, Kimmel (1995) suggested that "Critical thinking become the objective of the Accounting Education program" (p.299).

B. Defining and prioritizing Accounting skills necessary for coping with new market demands:

The critical comments in the literature also suggest that recent graduates of various Accounting programs lack important skills relevant to the business environment.

Emore et al (1989) stated that the present Accounting Education program is not preparing its graduates for the rapidly changing demands office business environment. "There appears to be a consensus that accountants need a broader education and more diverse skills" (p.361).

Surprising even a lack of adequate mathematical skills and insufficient language skills in graduates are discussed by Markell (1988).

Hoyt (1996) suggested that "The primary role of the secondary Accounting teacher is to develop in students a working knowledge of the concepts, procedures, and applications of Accounting." (p.30).

Several publications have singled out specific skills which need to be highlighted and developed as part of the modified Accounting program e.g. cognitive ability. Most authors strongly recommend the development of higher cognitive skills, such as, analytical thinking and critical thinking, and some have attempted to use different cognitive training programs in a variety of situations and locations. For example, Shute (1979) conducted a study with university Accounting students in which Piaget's theory of cognitive development was applied. From this study, Shute was hoping to find these students to be at a formal-operational level (having abstract reasoning) but the results showed that a large proportion were at a concrete-operational level.

Shute suggested that Accounting programs should place more emphasis on thinking processes than on the content to encourage cognitive growth of the students. Another approach was taken by Senatra (1983) who suggested the use of flow charts to help students in understanding and preparing the statement of changes in a financial position.

In explaining the importance of flow charts, Senatra (1983) pointed out that "Flow charts are useful aids from a teaching standpoint because they provide structure and a visual reference for the verbal explanations" (p.96).

Some researchers have suggested the use of a problem-solving model in teaching Accounting. Deleo et al (1994) explained that problem-solving develops a variety of cognitive skills. In their study, they introduced problem-solving to 62 undergraduate Accounting students. The results indicated that teaching problem-solving along with the Accounting content improve students' learning and facilitated analytical and conceptual thinking.

Lindquist (1995) advised teachers to use active approaches such as, cooperative learning because it helps students to be more active in their learning. Other researchers such as Cottell and Millis (1992) supported the benefits of cooperative learning. They pointed out that cooperative learning enhanced students' attitudes and achievement.

Lindquist conducted a case study to implement this suggestion. Subjects were 49 senior year Accounting majors students at a university. Subjects were asked to make responses to the following statements;

1. Did they prefer active learning versus passive learning. Half of the participants strongly agreed that they preferred active learning.
2. They agree with the benefits of an oral presentation in Accounting. Ninety percent strongly agreed.

3. Did they believe that cooperative learning enhanced students' cognitive processes. Seventy percent agreed.

Weil (1990) also supported the infusion of cognitive skills in the Accounting content. Weil pointed out that "Very little research has been done in Accounting to address the needs of incorporating thinking skills in Accounting" (p.212).

Weil made an attempt to address the needs of "disadvantaged" Accounting students to improve their thinking skills using Feuerstein's model of MLE. This study was done in South Africa. The subjects in this study were 200 first year university students described as "culturally and educationally" disadvantaged. The subjects were interviewed before the study to determine their cognitive difficulties. Weil constructed self-teaching materials in order to address the students' cognitive difficulties. The self-teaching materials were constructed in such a way that the Accounting concepts were made easy for the students to understand and the students were helped to use the cognitive skills that were required by the specific topics focused on in this study.

At the end of the study data were collected by means of an Accounting achievement test. The results showed that the experimental group performed better than the control group although the results were not significant.

Sormunen and Chalupa (1994) suggested that a business requires workers with cognitive skills. They argued that "this interest in teaching higher order thinking is based on evidence about the lack of thinking ability of American students". (p.172).

However, Chalupa (1992) suggested that teachers who themselves lack critical thinking skills are unable to develop these skills in their students. She emphasized that "Staff development in critical thinking should first stimulate and develop critical thinking in teachers and aid them in changing their teaching and learning strategies to incorporate critical thinking". (p.21).

Chalupa (1992) reported on their thinking skills projects which involved high school educators. The objectives of these projects were:

1. To help teachers to include critical thinking skills in their Accounting lessons in order to enhance students's critical thinking skills.
2. To change the learning styles of students in Accounting.
3. To use appropriate evaluation techniques.

The participants were given critical thinking skills materials and they were asked to remodel the traditional lesson plans by including critical thinking skills. The results (which were collected using a qualitative approach) revealed that all the participants (teachers) expressed that there were benefits to the critical thinking approach in their lessons and that as teachers, they benefited professionally.

C. Accounting Teaching Methodology:

Teaching methods in Accounting have been criticized as being passive, and, as a result students are denied the opportunity to be critical thinkers. Gurr (1985) reported that teachers were concerned about high failure rate.

She emphasized that the cause of this failure were that Accounting is a detailed and complex subject and for this reason, students need more help but that this is not offered especially in high schools. Gurr points out that most Accounting teachers view Accounting as a lecture subject, hence, individualized instruction is not provided. In addition, Accounting has many pitfalls in relation to the following topics: Accounting equation, debit/credit, transaction analysis, journalizing, posting, trial balance, worksheet, adjusting and closing entries and financial statements. In order to help students learn these topics effectively, Gurr suggested the use of Instructional Support Systems. He stated that teachers can use supplementary materials which are simple and short, and provide a computerized instructional lab to help students learn the basic Accounting concepts.

Emore et al (1989) suggested that recent changes in Accounting practice is against traditional passive instruction. Beegle et al (1991) pointed out that university level Accounting professors teach their students the way they were taught. In addition, "Most Accounting instructors have little or no formal training as classroom teachers". (p.90). Deleo et al (1994) pointed out that there is conflict between two teaching philosophies. That is, content and skill teaching. He argued that there is no balance between these approaches.

Other researchers argued that teachers concentrate on the coverage of the syllabus, rather than on the process of learning, (Graham 1993; Weil 1990; Chalupa 1992; Deleo et al 1994). Chalupa (1992) in her study in which teachers were involved in the development of critical thinking skills, found out that teachers were more concerned about covering the content than about critical thinking.

Accounting teachers often begin to doubt the effectiveness of their teaching. Graham (1993) reported that, in response to a survey, Accounting teachers wrote: "How do I make my Accounting course more relevant for the 90's; do I make the significant changes in the curriculum that several accounting organizations have proposed over the last decade, or do I change the way I teach Accounting, or both?" (p.30).

To address this question, teachers who participated in this study visited businesses in Pittsburgh to interview business employers. The results revealed that "Beyond the knowledge of the Accounting cycle, employers overwhelmingly agree that Personal Computer skills are a prerequisite for all Accounting employees" (p.31). In addition, most employers explain that Accounting employees are required to have critical thinking and communication skills, these skills as the employers suggested, are important for their employees to have because they equip them with "the ability to solve problems, to analyze business situations, to understand and apply basic economics concepts, and to communicate the language of business both internally and externally". (p.31). This survey answered the teachers (participants) question that there is a need to change both content and methodology.

The conclusion drawn by May et al (1995) from their study of Accounting education best represents the general consensus expressed by teachers, about their teaching. "The majority of the Accounting Education faculty argue that fundamental changes are needed in the methods of teaching Accounting". (p.27) In their study they reported that 81.3% of the teachers questioned replied that they believe that Accounting faculty should be trained in a variety of teaching methods.

D. Changes in application, training and mastery of technological changes relevant to the Accounting profession:

The majority of the publications reviewed which address the issue of "change" in Accounting Education emphasized the urgency of the need for graduates to become skillful in the latest technological advances. Most researchers emphasized the need to introduce computerized Accounting at the secondary school level.

This is vital to those who might join the workforce immediately after high school graduation. Spiegelberg (1993) explained that small businesses usually hire high school graduates and these businesses require computer skills since they use microcomputers for financial record keeping and analysis.

Hoyt (1993) also emphasized the need to incorporate computer technology at the secondary school level to prepare students for a technologically-oriented employment market. He pointed out that "Accounting teachers are meeting this challenge by integrating computer applications as an integral part of the Accounting program" (p.39). Hoyt (1996) pointed out that even if Accounting is computerized, students must at the same time understand the concepts and the principles of Accounting. Price and Murvin (1992) expressed a similar view and argued that "...the overall understanding of the Accounting cycle by the students seems to be enhanced by integrating manual and computer operations ..." (p.27). McNulty (1995) agreed that manual Accounting should be mastered first and that "Students would see that relevance of the manual system with which they are familiar" (p.36). However, she argued that the integration of computers into the Accounting curriculum is essential if the demands of market place are to be met.

In order to make a success of the integration of computers into the Accounting curriculum, teachers should upgrade themselves by learning about computers.

Gueldenzoph (1995) and McNulty (1995) advised teachers that computers should not replace them (teachers) instead, computers should be used as support tools. McNulty further pointed out that a computer have the following benefits:

- (a) They enhance different learning styles.
- (b) They enhance students' productivity as future employees.

Price et al (1992) also supported the inclusion of the computer in the Accounting curriculum. They explained that computer skills prepare students for today's jobs. But they pointed out that computers do not make Accounting content simple. Students must understand the concepts and principles before they can use computers. Price and Murvin emphasized that computers should be an integral part of the learning process.

Price et al (1992) conducted two studies: 1. An in-class checklist survey, in this study 100% of the students explained that computers helped them in understanding Financial Accounting, and they suggested the inclusion of computers in Managerial Accounting.

2. Integrated manual and computer operations. In this study students' reading levels were compared, that is, which were below and above 12th grade. The results showed that students who were below reading level improved. The success rate increased from 60% to 71%.

Clemmensen (1988) argued that "While programs in the past emphasized the typewriter, programs of today must be computer-based". (p.15). He affirms that the integration of computers in Accounting Education would meet the needs of a rapidly changing world. Clemmensen emphasized that computers should be used throughout the high school business programs. Support for this position is found in Graham (1993) who also argued that computers should be introduced at the high school level because some employers hire high school graduates. For example, the results of a survey showed that 48% of the companies interviewed hire high school graduates. Graham explained that "Many schools, at both high school and college level, still delay the integration of PC applications to higher level courses" (p.31). Emore et al (1989) pointed out that it is the accountant's responsibility to use computer technology wisely in terms of its strengths and weaknesses.

In short, the changes to curriculum content and instructional methodology in Accounting Education that appear to be most commonly called for in the literature are;

1. Introduction of technological innovation (computer programming etc.).
2. Analytical skills.
3. General business knowledge.
4. Communication skills. (oral and written)
5. Vocabulary building.
6. Human relational skills.
7. Critical thinking skills:
 - a. affective components
 - b. cognitive components
 - c. behavioral components.

These skills areas need to be fully integrated into the basic Accounting curriculum. Albin and Crocket (1991).

E. Change in government's funding and financial assistance (both to schools and faculties).

This category contains suggestions for changes in government financial support and for students and faculties for the expanded use of technology in the classroom.

Generally, this category contains discussions of the role of government in promoting and improving the status of the Accounting Education and of ensuring a high quality of training to its students. While most researchers in Accounting Education emphasized the importance of integrating computers into the Accounting curriculum to meet the needs of students in the rapidly changing business environment, not all schools and colleges can afford to do this. Gueldenzoph (1995) stated that "It is nearly impossible for educational institutions to maintain a budget while accommodating or adapting a curriculum to keep up with the changes that occur in computer technology". However, addressing this issue, other researchers such as Gurr (1985) have pointed out that. "For schools whose budget difficulties prevent the purchase of professionally prepared materials, it is a relatively simple to have teachers develop materials which will accomplish the same goals as the professionally produced.

Further, Bouillon Doran and Smith (1990) have stated that "Accounting departments have experienced increased demand for their classes during the last two decades, but their ability to respond by increasing the supply of classes has been hampered by a shortage of qualified faculty, facilities and funds." (p.23).

Clemmensen (1988) has indicated that "Colleges and Universities provide valuable assistance in helping business instructors update their knowledge and skills. State Departments of Education are also important in giving teachers assistance in improving their programs". (p.17).

SUMMARY

This review of the literature in Accounting Education reflects an unanimous concern among theorists and investigators with regard to the quality and effectiveness of such programs. A variety of suggestions for major curriculum modifications and changes in teacher training procedures have been made within a general call for an overall of Accounting Education. Within this general call for change, the studies unanimously suggest the need for an increased emphasis on the development and inclusion of a cognitive enhancement component as part of Accounting Education programs. These studies repeatedly call for the inclusion of cognitive education programs which will develop critical thinking (Kimmel 1995), analytical thinking (Albin and Crockett (1991) and meta cognition (Weil 1990).

CHAPTER 3

CHAPTER 3

REVIEW OF THE LITERATURE ON COGNITIVE EDUCATION

The emphasis and the development of higher order cognitive skills among Accounting students is not only relevant to Accounting Education. In the last 30 years, a body of literature in the field of education and psychology gives evidence that the teaching of thinking skills should be one of the major objectives of education in general. Nickerson, Perkins and Smith (1985) suggested that the teaching of thinking skills is an imperative educational objective. They emphasized that thinking skills and subject content should go hand in hand because "... the development of either to the neglect of the other will produce a less than superb fabric." (p.62). The need to teach thinking skills evolved out of a concern that education systems focus on covering subject content and its acquisition by learners (Graham 1993; Weil 1990; Chalupa 1992; Deleo et al. 1994).

Other researchers such as Floyd (1976) suggested out that the educational system promotes teaching methods that, "... are teacher-centered, they interfere with learner's thinking because it turns him/her into a passive recipient of information." (p.12). The passiveness of a learner denies him/her the opportunity of using his/her thinking skills, and this affects the learner's performance. When the learner's performance is low, teachers do not attempt to find out what caused the poor performance, instead they conclude that a learner is not intelligent.

The wide spread interest in cognitive education evolved also as a political response to many studies (primarily in the U.S.) that concluded that the cognitive abilities of many low SES students are significantly lower than the cognitive functioning of main-stream, middle class, American students (Jensen 1962). Repeated statistical analysis of achievement tests scores comparing the cognitive performance of minority student populations to that of the middle class white populations concluded that significant differences (in favour of the latter) exist between the groups. While politicians debated the political implications of these results, psychologists and educators debated the issue of nature versus nurture.

The Nature Versus Nurture Dilemma-Relevance to Education.

This heredity versus environment debate is still much discussed in psychology today. Nature theorists view intelligence as innate potential, i.e., something an individual is born with. For example, earlier theorists cited in Scar-Salapatek (1975) argued that Intelligence is native and peculiar to an individual. That means that intelligence is an inherited characteristic. The hereditists use scores obtained by individuals on mental tests to label the person's level of intelligence. Mental test scores are compared to find individual difference in intelligence. Those who obtain low scores are labelled as unintelligent. It is believed that they cannot be helped to improve because of the notion that intelligence is inherited: it is therefore a fixed entity which cannot be changed or improved.

Binet and Simon (1903) who were pioneers in designing mental tests, did not hold the idea that intelligence is inherited. They did not want their mental tests to be used to label. Binet pointed out that the aim of his mental tests was to identify mentally defective children.

According to Binet, mentally defective children are those children who do not profit much from instruction given in the classroom and they cannot work within a group of normal children. Consequently, these children require special instruction and should be separated from their normal peer group so they can be given such help. Despite Binet's intention, his mental tests have been misused. Gould (1981) suggests that American psychologists used Binet's mental tests to support the hereditist theory of Intelligence. They used Binet's clinical findings as norms for average, below average or above average intellectual performance and thus established a static "yard-stick" to measure children's intellectual functioning. In a similar way, North American psychologists adapted the work of Weschler, (1940) norms that were developed to evaluate students' intellectual ability to make predictions about students' academic performance. They redefined intelligence test performance to be an indication of the learner's learning ability. They assumed that the norm structure does not change in one's lifetime (Cole 1978)). But as Lidz (1991) stated in her introduction to the "Practitioner's guide to Dynamic Assessment", special mention should be made of the fact that Binet and Simon, "Who despite having fathered the traditional I.Q. tests, did not adhere to the concept of fixed intelligence". (p.8).

Another point of view has been presented by Piaget, (in Sund and Trowbridge 1974) known as a key contributor in development psychology, who did extensive studies of how children think, and who developed a theory of intellectual development. Sund (1974) explains that Piaget focused on the nature and functioning of intelligence, not on individual differences.

Richardson (1991) explained that in Piaget's view "... intelligence is something that develops through a process of change, involving active responses of the individual ... " (p.106) Piaget emphasized that an individual learns things about his environment without help from others. He constructs his own explanation of what is going on around him. Piaget's view of intelligence is in some ways similar to the hereditist theory in the sense that both view intelligence as something genetic which unfolds with age.

Piaget explained that the processes which are inherited are assimilation and accommodation. Sund (1976) described assimilation as "... a process which involves taking in information from the environmental and incorporating it into existing mental schemes and structures". (p.7). Sund (1976) described accommodation as " ... a process which involves the modification or fabrication of mental schemes and structures". (p.7).

Another approach is social constructivist theory which stems from the growth of educational sociology. Social theorists view intelligence as something relational between an individual and society. It is something an individual learns from his environment, i.e. objects, events, social interaction with other people.

Vygotsky (in Cole, John-Steiner, Scribner and Sourberman 1978). Vygotsky believes that a child's social interaction enables him to acquire the 'tool' (abilities) of learning and thinking. The key concept of Vygotsky's theory is the zone of proximal development. Vygotsky define the zone of proximal development as " ... the distance between the child's actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance "... Cole et al (1978). (p.86). Unlike the previous theorists, (who claim that intelligence is static and unchangeable) Vygotsky and others argue that intelligence is something that can be learned from the environment.

This implies that intelligence can be taught and, therefore, can be improved. Thus, the advocates of this view argue, that schooling experience and stimulation can have a significant effect on all learners, including inefficient learners (Feuerstein 1979).

The belief that the learner's intellectual potential can be modified by the environment (schooling) led to the development of a number of cognitive training programs whose objectives were to teach thinking skills and to consequently improve intellectual performance.

Crutchfield (in Nickerson et al 1985) stated that " ... high-level thinking skills can be improved by training, and it is not safe to assume that such skills will emerge automatically as a matter of development or maturation." (p.59).

Theorists who subscribe to the notion that the individual possesses the capacity to modify his/her own potential, responded to those early research findings which claimed that intelligence is static and unchangeable. (Jensen 1962).

Cognitive psychologists (Feuerstein 1979, De Bono 1973) began to refute the hereditist position, which stated that intellectual differences are caused by genetic factors. Their efforts resulted in a flood of cognitive training procedures that were designed to enhance the intellectual (and consequently the academic) performance of students whose learning capacity was considered to be impaired.

Thus the interest in the development of cognitive education programs evolved from the need to enhance the learning capacity of many students who, due to their cognitive inefficiency, were unable to achieve adequate educational goals.

Cognitive Training Programs-Sample Suggestions

In the early 80's, according to Anderson (1980), "Cognitive psychology attempted to understand the nature of intelligence and how people think." (p.3). Cognitive psychologists defined thinking as a tool for learning. In a learning process, a learner thinks about the information presented to him/her. As a result, his/her thinking skills are utilized and this helps him/her to become more aware of how he/she learns.

Kopp (1985) pointed out that teaching thinking skills means teaching learners to think. As a result of the growing interest in the process of "learning how to learn" and in the development of more efficient thinking skills, several cognitive training programs surfaced.

Some of these cognitive programs are described below:

1. Cognitive Research Trust (CoRT) designed by De Bono (1973). It is described as a ten week program, consisting of six units which are divided into sixty-three lessons (given once a week for three years). The target group consists of learners from 8 to 22 years of age. CoRT can be used with slow to bright learners. The program focuses on three areas: problem-solving, interpersonal discussion and creative thinking. De Bono emphasizes that more focus should be on the skill of thinking than on the content of problem-solving. The effectiveness of the program is enhanced by using mnemonics and visual aids. CoRT lessons are taught independent of other subject content, and it is said that transfer can occur spontaneously.

CoRt has been used in Britain, Venezuela, Australia, Africa and other countries. Nickerson et al (1989) indicated out that researchers who implemented this program reported increases which were statistically significant. For example, Edwards and Baldauf's study in Australia reported that "In general, the CoRT operations seem more suitable for contexts of decision-making and informal reasoning in humanistic, social and design contexts." (Nickerson et al 1985:p.220).

2. The Productive Thinking program: This program was developed by Covington, Crutchfield, Davis and Olton (in Nickerson et al 1985). It was developed for fifth and sixth graders. It consists of fifteen lessons used for a period of one semester. The goal is to teach the skills of analysis and inference. Students are encouraged about the possibility of modifying their thinking skills. In addition, students learn persistence. Researchers who implemented the Productive Thinking program reported that their results were not significant.

Nickerson et al (1985) suggested that significant results by some researchers were obtained only when the program was used with small groups. This program has been criticized for its short duration and use of very concrete problems. The Productive Thinking program has not been evaluated formally. It supposedly helps students to be aware of their thinking skills.

3. Whimbey and Lochhead (in Nickerson et al 1985) developed a short program in analytical reasoning. This program takes ten to forty hours. Students are encouraged to use it regularly because of its brief duration. Problems used in this program are similar to the ones used in intelligence tests. The emphasis is on accuracy and thoroughness. Students are encouraged to "think aloud". This program is said to develop thinking skills that are underdeveloped.

4. Accent on the Development of Abstract Process of Thought (ADAPT)^j. This program was developed at the University of Nebraska (U.S.). Nickerson et al (1985). The objective is to teach thinking skills to college freshmen in order to enhance their reasoning. The theoretical background is that of Piaget's developmental stages. According to Piaget, college students would function at the formal operational level. ADAPT is said to help students who are at the concrete operational stage to get to the stage of formal operational thinking.

ADAPT has been evaluated and it is reported that "evidences of positive effects include the finding that students consistently exposed to ADAPT showed significantly greater gains in formal operational reasoning than did several control groups. They also showed greater gains in conceptual and in critical thinking". (Nickeson et al 1985).

5. The Philosophy for Children program: This program was developed by Lipman (in Nickerson et al 1985). Lipman strongly believed that children have philosophical thoughts. The program is based on class discussion. Lipman suggested that class discussion encourages children to use their thinking skills. The teacher's role is to guide the discussion. The materials used in this program are novels and manuals for teachers. Teachers who implement this program are required to undergo formal training to enable them to use the materials.

The Philosophy for Children program has been used in several schools in the U.S. and it has been evaluated. Researchers who have used it have reported significant results that favored the experimental groups over the control groups.

For example, an evaluation done by Educational Testing Service in New Jersey, Nickerson et al (1985) reported that "The test results were generally supportive of the conclusion that the Philosophy for Children program was effective in improving the intellectual performance of the students (fifth and sixth graders). (p.289).

6. Feuerstien's Instrumental Enrichment program FIE Several of the above programs are curriculum related and were designed primarily to enhance language comprehension abilities. Others were more general in nature (De Bono, ADAPT) and attempt to enhance and strengthen overall cognitive abilities, yet they remain focused on specific reasoning abilities.

One of the most comprehensive cognitive training programs which attempts to increase the efficiency of the learner's overall cognitive functions is Feuerstein's Instrumental Enrichment FIE. Unlike the other cognitive interventions discussed above, FIE offers an overall cognitive program which is independent of academic content. This program is discussed in details in the next chapter.

CHAPTER 4

CHAPTER 4

Feuerstein's Instrumental Enrichment - A Model For Cognitive Intervention

Introduction

As discussed earlier, the nature versus nurture controversy continues to be a major issue in the study of human behaviour and human intellectual performance. While some researchers (Plomin 1986) are trying to produce additional data which will support the genetic basis of intelligence, other cognitive theorists have concluded that such research does not contribute significantly to current urgent educational issues. (Budoff and Hamilton 1976, Feuerstein 1978, Gardner 1983). The real important challenge facing education today is not how to define intelligence; the real challenge is how to increase the intellectual potential of students who at the present time are not considered efficient learners (Feuerstein 1978).

Rather than establishing students' (IQ) scores and attributing negative implications of low IQ scores for academic performance, it is important to develop adequate educational programs which will enhance the learning abilities of those who are currently inefficient learners. Since the early 60's, researchers Brown and Campione (1978) and Belmont (1969) have attempted to determine methods by which they could enhance the learning abilities of inefficient students. Unlike theorists who focused on the measurement of the product of learning, other cognitive psychologists focused on the examination of the process of learning. Among them, a well known Israeli psychologist, Professor Reuven Feuerstein, who challenges the earlier notions regarding the definition and measurement of intelligence.

Like many other cognitive researchers who subscribe to Piaget's and Vygotsky's theories of learning, Feuerstein states that the human organism is in a constant state of flux and so its cognitive structure and processing undergo fundamental changes with development and experience. This opinion differs from the "static" position of other North American learning theorists who view learning ability (IQ) as "fixed" and unchangeable" (Feuerstein 1978). Feuerstein argued that IQ tests fail to measure learning potential.

Feuerstein's definition of learning potential is related to the elasticity of the brain and its capacity to improve as a result of certain types of experience. In other words, his approach is that the human organism's ability to learn can be improved provided we furnish the individual with adequate, relevant and meaningful intervention. Feuerstein's intervention program, the Instrumental Enrichment IE is a model of cognitive development derived partly from work done at the University of Geneva (Piaget 1969; Rey 1934). The basis of this theoretical model is the assumption that it is possible to identify in every individual a set of cognitive functions that are both prerequisite to and fundamental to content learning and performance across a wide spectrum (Haywood 1978).

Instrumental Enrichment program - content procedures and objectives

The Instrumental Enrichment program contains 14 units which were developed for the purpose of enhancing the development of basic mental operations in adolescents in whom the basic operations of thinking and reasoning had not developed fully. Instrumental Enrichment IE directly reflects the theoretical model of the nature of intellect as a dynamically evolving fluid set of processes.

Instrumental Enrichment consists of sets of instructional units called "Instruments," amounting to over 400 hours of classroom instruction spread over a period of at least 2 academic years. IE is not given instead of regular content-oriented curriculum, but in addition to it.

Various instruments in the IE program have been prepared specifically to alleviate cognitive difficulty at the three formal levels of cognitive functioning described earlier. These exercises depend heavily on the skill of the teacher to stimulate the interest of the learner, although the materials are themselves intrinsically interesting.

The FIE offers fourteen instructional units which address the development of cognitive skills on the input, elaborational and output levels of the mental act. FIE offers a comprehensive approach to the teaching of cognitive skills at each of these levels:

On the input level, the FIE program emphasizes the development of attending skills, planning skills, scanning skills, focusing skills and the reduction of both impulsivity and trial and error responses.

On the elaborational level, the FIE curriculum offers activities in the areas of comparison, integration of information, hypothesis testing, analysis and synthesis, sequential thinking, analogical thinking and summative behaviors.

On the output level, the FIE program focuses on the development of accuracy and precision, development of necessary evidence, development of adequate verbal expression and the effective communication of the products elaboration.

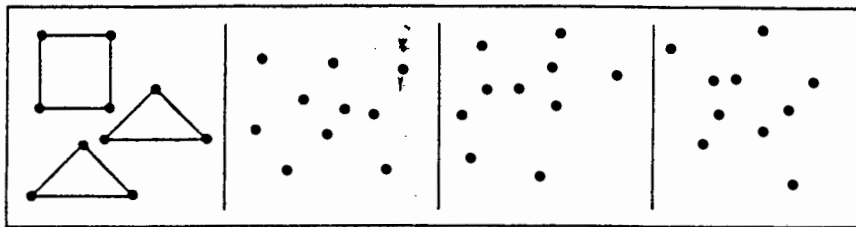
The FIE program has been researched in many countries, and the results of this intervention (which involves an intensive teacher's training program) are encouraging. The effects of the program are particularly significant with populations comparable to those described earlier as "resistant to change". While the research results varied from one research site to another, they evoke a general interest in and optimism in FIE's potential for bringing about cognitive change among inefficient or impaired learners.

This potential of FIE to enhance the cognitive potential of inefficient learners has attracted the attention of researchers and educators around the world. The FIE program is seen as a promising vehicle for the remediation and enhancement of the information processing skills of impaired learners. A particular interest was expressed by Third World country leaders who share a major concern for the intellectual and academic performance of their respective generations of people.

The material presented below is representative sample of the hundreds of pages in the 14 instruments of IE. Organization of Dots focuses on the organization of discrete stimuli into meaningful perceptual units. The learner is expected to find, within an amorphous cluster of dots, geometric figure(s) presented in a model box. The essence of the task is to join the appropriate dots to reproduce the figure(s) shown in the model box. In the beginning there are simple geometric shapes and obvious cues for organization (Figure 1). And the learners progress through the instrument, the figures become more complex and the cues are less obvious (Figure 2 & 3).

The students learn various strategies in order to locate the figure in the clouds of dots. The overall goal of organization of dots is to establish the importance of organizational behavior.

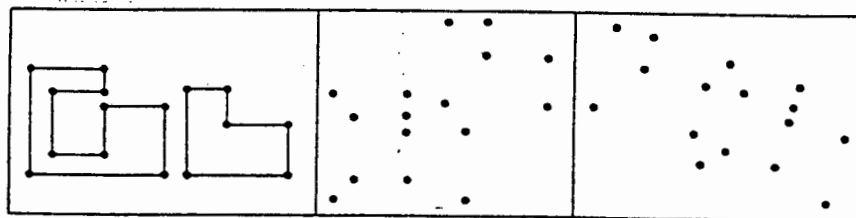
Figure 1.



Organization of Dots (exercises 1, 2, and 3, page 2)

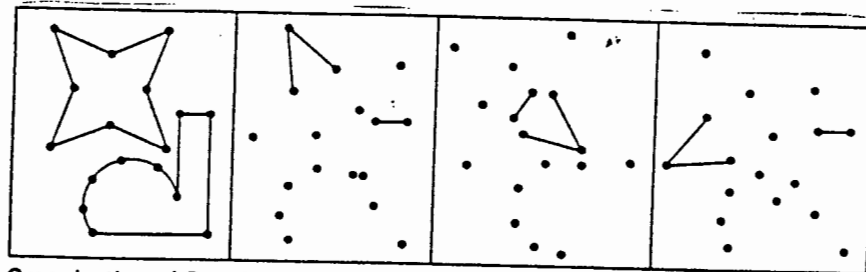
A square and two triangles, identical in size and form to those of the model, must be projected into each frame.

Figure 2.



Organization of Dots (exercises 1 and 2, page 11)

Figure 3.



Organization of Dots (exercises 1, 2, and 3, page 9)

In the absence of angles, the number of dots in the curved line are of assistance in the drawing of the figure.

The goal of Orientation in Space I is to teach learners how to use stable systems of reference for orienting themselves and communicating about the location of objects in their environment. It begins with a representation of real person-object relationships (Figure 4), and ends up requiring the use of abstract figures, verbal descriptions and flexibility, to create spatial relationships. Orientation in Space I focuses on subjective space (front, back, left, right) while Orientation in Space II (figure 5) focuses on the parameters of up, down, between, above, below, beneath and beside. Orientation in Space III (figure 6) focuses on objective reference points (north, south, east, west). These instruments are designed to provide the individual with a stable system of reference by which to describe spatial relationship.

Figure 4.

IV. Fill in what is missing:

Position	Object	Direction in Relation to the bar
1	The tree	
4		right
2		back
	The house	front
3	The bench	
2	The house	
	The tree	left
4		back
	The bench	
		left
3		back
4	The tree	right

Orientation in Space I (page 9)

Figure 5.

In the picture on the right the hat is on the chair.
 In the picture on the _____ the cat is _____ the chair.

In the picture on the _____ the bottle is _____ the table.
 In the picture on the _____ the cat is _____ the table.

Orientation in Space II (exercise 1, page 2)

Figure 6.

IV. Fill in what is missing:

	POSITION	DIRECTION	SIDE
①	4	East	
②	1		Right
③		South	Front

Orientation in Space III (Task IV, exercises 1, 2, and 3, page 7)



Analytic Perception (Figures 7 & 8) focuses on part-whole relationships. The instrument develops the ability to analyze and synthesize various features of objects and to see their relationship. It eventually requires that both analytical and synthetic processes be used in coordination.

Figure 7.

Each section which appears below the given design is composed of a number of parts. On the line beneath each section, write the numbers of the parts it contains.

Analytic Perception (exercise 2, page 27)

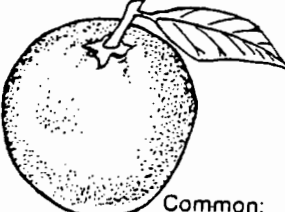

Figure 8.

Place a number in each section.	Color each section a different color.
	
Into how many sections has the whole been divided? _____	

Analytic Perception (exercise 3, page 2)

Comparisons (Figures 9 & 10) is a more basic instrument that is used to promote spontaneous comparative processes in learners. As with all the IE instruments, the students must apply the operations they learn to representations of real-world events, and to abstract symbols without concrete meaning. Feuerstein considers that comparative behavior is the most elementary building block of relational thinking.

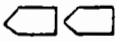





Figure 9.

	
Common: _____	
Different: _____	Different: _____

Comparisons (exercise 3, page 1)

Figure 10.

Circle that which is different between the sample picture on the left and two pictures in the same row.

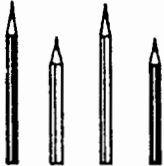
<p>Example</p> 	<p>Picture I</p> 	<p>Picture II</p> 
	<p>direction number color form size</p>	<p>direction number color size form</p>
		
	<p>direction number color form size</p>	<p>direction number color form size</p>

Comparisons (exercises 4 and 5, page 10)

Classification (Figures 11 & 12) often follows Comparisons and concentrates on using both objective perceptual characteristics and semantic relationships as bases for classifying and categorizing in information into superordinate categories.

Figure 11.

CLASSIFICATION OF PENCILS ACCORDING TO SIZE AND COLOR



A B C D

- Classification according to size:
 Classify pencils A, B, C, D according to the headings in the table.
 In each empty square write the appropriate letter.
 Subject of classification: PENCILS
 Principle of classification: size; (1) large (2) small

Categorization (part of exercise 1, page 11)

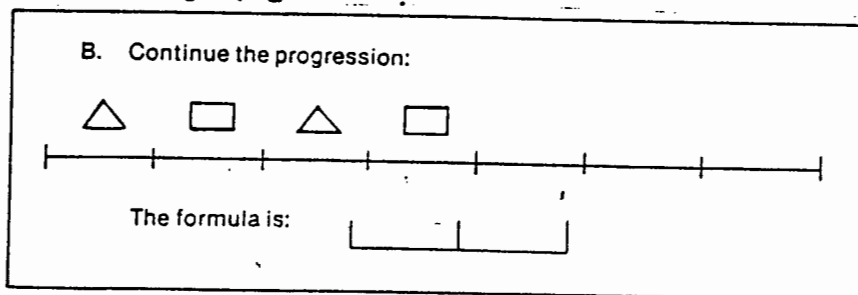
Figure 12.



Categorization (page 19)

Numerical Progressions teaches hierarchical quantitative relationships using numerical and graphic representations of relationships. The students learn to use equations to represent an infinite number of instances of a relationship. The focus of the instrument is the determination of rules and laws that govern sets of circumstances. It teaches induction and deduction of relationships. (Figure 13).

Figure 13.



Numerical Progressions (exercise B, page 1)

Transitive Relations and Syllogisms deal with higher order relationships that constitute formal operations, logical and inferential thinking. The learner ends up using alphabetic symbols to represent dimensions and to show relationships such the greater than, less than and equal to (figure 14).

Figure 14.

<div style="text-align: center; margin-bottom: 20px;"> B $5 \times 2 = 20:2$ </div> <div style="text-align: center;"> A $20:2$ </div> <div style="margin-top: 20px; text-align: center;"> C $5+3 < 5 \times 2$ </div>	<p>Answer the following questions "Yes" or "No"</p> <p>A <input type="checkbox"/> $<$ C? _____</p> <p>A <input type="checkbox"/> $>$ C? _____</p> <p>A <input type="checkbox"/> $=$ C? _____</p> <p>A <input type="checkbox"/> \neq C? _____</p> <p>A <input type="checkbox"/> \approx C? _____</p> <p>Conclusion $5+3$ <input type="checkbox"/> $20:2$ or Conclusion $20:2$ <input type="checkbox"/> $5+3$</p>
---	--

Transitive Relations (exercise 1, page 4)

Instructions: focuses on the decoding of written instructions and their elaboration and translation into motor activity and the verbal encoding of information presented graphically. It aims at enhancing clarity and precision of communication.

Figure 15

<div style="border: 1px solid black; width: 80px; height: 80px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 20px;"> <input type="checkbox"/> <input type="checkbox"/> </div> <div style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> </div> </div> <p>In the upper right of the frame is a <input type="checkbox"/> (1). In the lower right is a <input type="checkbox"/> (1). Draw a circle beneath the triangle and a square above the rectangle (2).</p>	<div style="border: 1px solid black; width: 80px; height: 80px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 20px;"> <input type="checkbox"/> <input type="checkbox"/> </div> <div style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> </div> </div> <p>Draw a square beside the rectangle (2). Be sure that the square is not above the triangle (3).</p>
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Instructions (left: exercise 4, page 3; right; exercise 7, page 3)

Family Relations: provides the learner with the ability to abstract the relationships experienced by him in daily life and to generalize them to other contexts.

Figure 16.

To celebrate the confirmation of their son, the Browns gave a family dinner party. They invited:

2 grandfathers	2 grandmothers
3 fathers	3 mothers
3 husbands	3 wives
1 son-in-law	1 daughter-in-law
2 fathers-in-law	2 mothers-in-law
5 sons	1 daughter
2 grandsons	



The Browns only had eight chairs, but everyone came to the party and all were able to sit down at the table at the same time, and each sat on a separate chair. How can you explain this?

Family Relations (exercise 2 and 3, page 23)

Temporal Relations: is concerned with improving the learner's capacity to conceptualize time and to understand and to order temporal relationships.

Figure 17

Solve the following problems and then indicate the solutions in the table on page 9.

1. A stork flew from Toronto to New York City. On the first day it flew a distance of 15 miles (24 kilometers). On the second day it flew at the same speed, yet covered a distance of 22 miles (35 kilometers).

Explain: _____

Temporal Relations (exercise 1, page 7)

Problem	Distance	Table for the Problems	
		Speed	Time
1	A < B	A = B	?

Temporal Relations (exercise 1, page 9)

Illustrations: is concerned with need to produce in the learner an awareness of the existence of a problem and the need to search for a solution.

Figure 18.

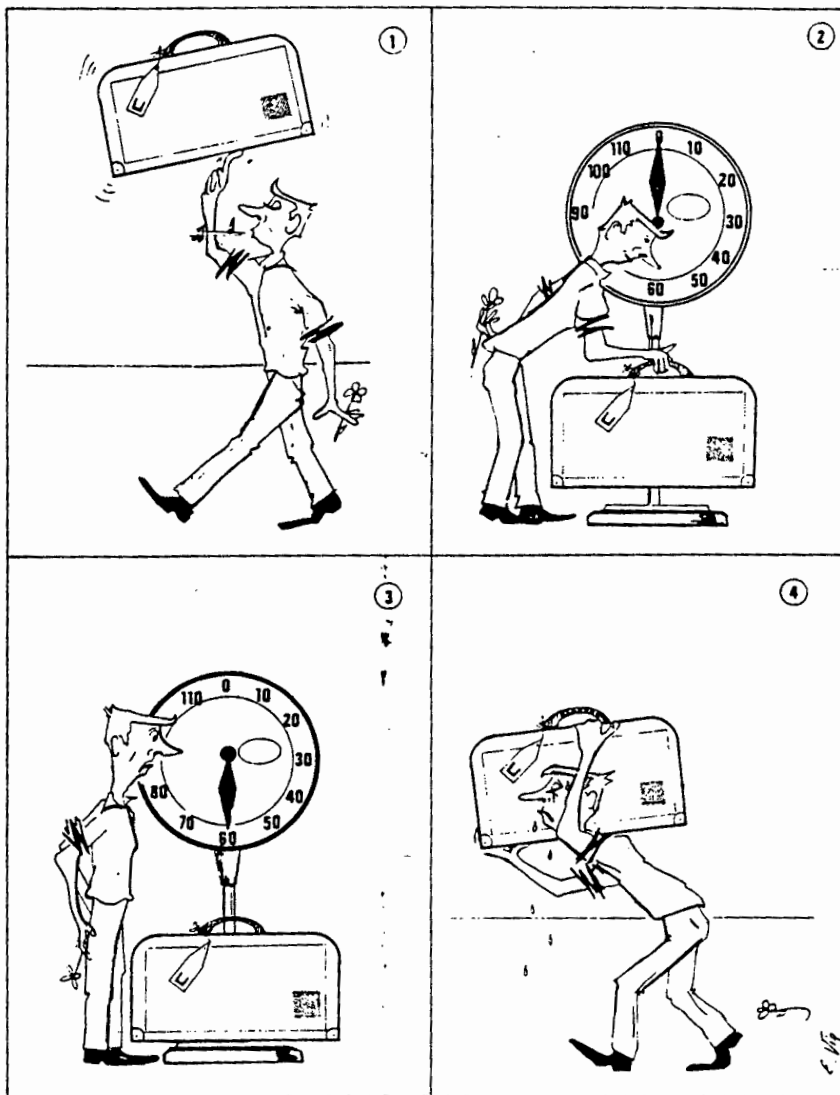


Figure 14. Illustrations (page 4).

The goals of IE

In listing the objectives of the IE intervention program, Feuerstein emphasizes the following:

1. The correction of deficient cognitive functions.
2. The teaching of efficient cognitive functioning - the acquisition of basic concepts and relationships.
3. The teaching of independent problem solving strategies and their generalization .
4. The development of reflective insightful thinking.
5. The development of intrinsic task-related motivation.
6. The development of the sense of self as an effective learner and a generator of information.

Mediated learning Experience (MLE)

The realization of the IE objectives (goals) is achieved through the process which Feuerstein labelled Mediated Learning Experience. Feuerstein et al (1980) state that in order to improve or to enhance thought processes, MLE is required. They point out that there are two modalities by which an individual learns: direct exposure to sources of stimuli and Mediated Learning Experience. Both modalities complement each other.

Direct exposure to sources of stimuli is described as the most universal modality of learning. When learning takes place, interaction occurs between the individual and the sources of stimuli, hence the model is stimuli-organism-response (S-O-R). An organism (the individual) responds and reacts to the stimulus but if the individual does not respond, learning does not occur.

Direct exposure takes place from the earliest stage of development, and continues to do so throughout the lifespan of the individual.

Direct exposure results in the learning of basic associations and concrete concepts. For higher level thinking to develop and for the individual to become an independent learner, Feuerstein points out that MLE is necessary. While working with an adolescent population in Israel, Feuerstein concluded that they had not developed efficient learning strategies from direct exposure, and that they needed a human mediator to interpret the stimuli in the environment to them. A mediator should explain features about a stimulus in such a way that the important things about it do not escape the learner's attention (Feuerstein et al 1980).

Mediated Learning Experience calls upon the learner to assume an active role. i.e. the learner is actively involved in the learning process. In other words, he should become a generator of new information rather than merely a passive receiver of information.

Feuerstein, Klein and Tannenbaum (1991) suggested that most people provide children with Mediated Learning Experience but they are not aware that they are doing so. Feuerstein calls this natural Mediated Learning, but he argues that such mediation may not be sufficient for those learners whose capacity to process information is significantly reduced. Such learners, whom Feuerstein calls "retarded performers" require mediators who are well trained in MLE. This kind of mediation MLE recommended by Feuerstein is "Intensive Mediated Learning", which is applied by using a cognitive intervention program like Instrumental Enrichment.

Feuerstein repeatedly stresses the point that Distal factors such as low I.Q., emotional disturbance, poverty of stimuli (in the learner's family), genetic or organic conditions (down syndrome, cerebral palsy etc.) do not necessarily explain learning inefficiency. Traditionally these distal factors have been considered to be significant predictors of human intellectual and academic performance. Feuerstein argues that the proximal factor of a lack of adequate MLE is the real underlying cause of educational retardation.

Lack of or insufficient MLE (cultural deprivation according to Feuerstein), results in retarded cognitive performance. Feuerstein, like Vygotsky (1978), believes that each culture transmits (through the process of MLE) its values, its concepts, and its patterns of cognitive performance to the younger generation.

According to Reid and Addison (1991), Vygotsky highlighted the social experiences involved in learning to make use of the symbols in the orchestration of behaviour. Not all behaviour is symbol mediated, but even non-mediated behaviour is, from Vygotsky's perspective, socially orchestrated. The mediation of behaviour via socially defined symbol systems is merely one of the most obvious instances of this phenomenon. When a culture fails to "execute an effective" MLE, the learning capacity of many children may be effected and it may produce retarded learning. The retarded cognitive performance is evident at three phases of the mental act. Feuerstein (1980).

1 (a). Input phase. At this phase the individual gathers data which will help him solve a problem presented to him. At this level, the individual will show retarded performance by unplanned, impulsive, and unsystematic exploratory behavior.

(b) Lack of, or impaired, receptive verbal tools and concepts which affect discrimination.

(c) Lack of, or deficient need for, precision and accuracy in data gathering etc.

2. Elaborational phase. At this phase the individual uses information gathered at the input phase. The retarded performance is evident when the learner is unable to select relevant as opposed to irrelevant cues when defining or when solving a problem. Other elaborational problems include the inadequacy in experiencing the existence of an actual problem and subsequently defining it. In addition, many retarded performers show a lack of spontaneous comparative behavior etc.

3. Output phase. Here the learner communicates the outcome of his elaborational processes. At this phase, the inefficient learner shows lack of precision and accuracy in communicating his response. Trail-and-error responses and impulsive acting-out behavior, affecting the nature of the communication process etc. are evident.

The role of the Teacher in MLE

The effectiveness of MLE and the resulting cognitive changes depend to a large extent on the quality of the delivery of the IE program. The role of the teacher in the dissemination of IE is crucial. Feuerstein views the teacher as a "faciliator" of information. In the delivery of IE to the students, the IE teacher engages in the most significant process with his learners and thus he provides them with a meaningful MLE.

Since the role of the mediator is viewed as central in the IE program Feuerstein elaborates in his writings on the need for extensive training for the IE teachers. The role of the IE mediators is different from that of the regular classroom teacher in the sense that the mediator uses the content of the IE as a tool to increase cognitive potential (process) in the students rather than merely teaching the content of the academic curriculum.

When teaching IE, the teacher is trained to focus on the following components of the mediated learning process:

1. Intentionality and reciprocity: The mediator presents the stimuli or activity to the child in such a way that the stimuli capture the attention of the child, and the child shows a willingness to respond to the stimuli.
2. Meaning: The mediator explains the purpose and importance of the stimuli or the activity and the learner comes to be able to discriminate between what is important and what is not important.
3. Transcendence: The mediator goes beyond any current situation connecting and bridging what is currently being learned to what has been learned in the past (past learning experiences).
4. Sharing: The mediator encourages children to share their learning experiences.
5. Regulation of behavior: The mediator helps the child to manage impulsive behavior.

6. Goal keeping behavior: The mediator emphasizes the importance of setting goals and using effective strategies to reach the goals.

7. Individuation: The mediator emphasizes the point that individuals are different and these differences should be respected. This can be taught through the mediation of sharing.

8. Feeling of competence: The mediator assists a child to perceive himself in a positive way by using encouraging remarks and praise.

9. Challenge: The mediator encourages a child to attempt something new and to confront a difficult task. This prepares a child to adapt to the changing and complex world.

10. Self-change: The mediator assists a child in recognizing changes that have occurred within himself, by pointing out a difference between the child's level of performance before and after the interaction.

11. Feeling of belonging: The mediator encourages the child/student to express his own individuality in relation to his group.

12. Search for an optimistic alternative: The mediator encourages a child to be positive in solving a problem whether it is a cognitive or emotional one.

Each of the IE pages (or units) is used as a tool to illustrate the above components. The program in its entirety is viewed as instrumental in provoking higher order cognitive functioning.

When a given page is completed by the students, the IE teacher summarizes the task's main cognitive concepts and encourages the students to become involved in a process called "bridging". The bridging process requires that students to illustrate their understanding of the newly acquired concept or principle or strategy by applying it in other (non-IE) situation. The bridging process facilitates the student's ability to generalize the newly acquired understanding and to transfer it spontaneously. Successful bridging by the student is an indication of the student's interiorization of the newly learned material. "Generalization depends not only on the use of learned strategies outside the learning task, but also on the mediation and combination of strategies to enable the solution of novel problems." (Ashman 1989 p.76-77). While encouraging the students to engage in a generalization process, the trained IE teacher reinforces the mastery of the newly acquired cognitive concepts and assures their permanency in the learner's cognitive structure.

The Theory of Structural Cognitive Modifiability

The positive effects of IE should be evident in the change of the learner's cognitive functioning which, according to Feuerstein are caused by a profound change in the learner's cognitive structure. He refers to this phenomenon as "Structural Cognitive Modifiability" (SCM). This is the core of Feuerstein's work which he formulated from the observations he made when he administered the assessment procedure (LPAD) to adolescents in Israel. From these observations, Feuerstein surmized that cognitive change and modifiability are possible if there is a social kind of mediated interaction between a learner and a mediator.

Feuerstein (1988) explains that structural cognitive modifiability is a concept central to his theory of cognitive development. According to Feuerstein, a person's cognitive functioning can be modified by using an external intervention, such as the IE program. Feuerstein (1988) explains that once a person's way of thinking, problem-solving ability and general reasoning have been modified, "... his personality traits (for example, respect of others' opinions), his approach to novel situations and his general sense of competence also change". In other words, the cognitive structure the overall attitude and approach to interaction with his world has changed. Other kinds of change, "... often leave only minimal traces upon higher functioning because they do not become an integrated part of their personality and structural cognitive endowment". (Feuerstein 1988: p.7). Studies in IE give evidence that retarded performers show structural change in cognitive functioning. Feuerstein points out that structural change is evident even long after the completion of the program. He observed that "Today we find many of the individuals who participated in our research engaged in careers that were beyond any of the original expectations projected for the group". (Feuerstein 1980:p.11).

Results of Instrumental Enrichment in different countries

Many studies that have used the IE program have reported success. IE has shown positive effects on the cognitive functioning of both retarded learners and gifted learners. According to the British Corporation video series "The Transformers", IE studies have been conducted in more than thirty countries in different institutions such as, pre-primary, primary, high school, colleges, universities and prisons.

The first study was conducted by Feuerstein and his colleagues in Israel. The subjects were cognitively low functioning adolescents with ages ranging from 12 to 15 years. The total sample was 218. The experimental group was exposed to fourteen IE instruments for two years. A verbal intelligence test and measures of academic achievement and self-concept were used to collect data. At the end of the study it was reported that the experimental group scored higher than the control group on all the measures used except on the measure of self-concept.

Two years later, data were collected again to find out if there were longer-term effects of the IE program. Two measures were used which were a combination of verbal and non-verbal intelligence tests. The results showed that the experimental group scored higher than the control group on all the measures used.

These results were used by the investigators to conclude that the IE program has a positive effect on the cognitive functioning of retarded learners, and also effects other areas such as, scholastic aptitudes, achievement skills, and classroom behaviors. This study was followed by studies which were aimed at researching and evaluating the IE program. Some of these are reported in the following section.

Savell, Twohig and Rachford (1986) report a study done by Ruiz and Castaneda in Venezuela. The investigators selected twelve schools consisting of both public and private schools. Six schools consisted of pupils from high socioeconomic status families and the other six consisted of pupils from low socioeconomic status families. Pupils' ages were from 10 to 14 years and they were in the fifth grade.

The experimental groups (six schools) were exposed to fourteen IE instruments for a period of 2 years. Subjects were given verbal and non-verbal intelligence tests and measures of classroom participation and concept. At the end of the study, the results demonstrated that the IE groups had scored significantly higher than the control groups on all the measures used. A follow-up study was done two years after the original study to test longer-term effects of IE. The results were similar to the ones found in the original study.

Graham in Savell et al (1986) conducted a study in Canada with 150 ninth-grade pupils. These pupils were from inner-city areas, and were from diverse cultural backgrounds. The experimental group was presented with six IE instruments over 2 years. A test of general intelligence was used to assess impact of the program. The results showed that the experimental group scored higher than the control group.

Beasley, in Savell et al (1986) conducted a study in Britain. He worked with six retarded adolescents aged 12 to 13 years. They were presented with IE lessons for eighteen months. Three non-verbal intelligence tests were used to gather data. The results indicated that the IE group scored higher than the control group on all three measures used.

Howie, Thickpenny, Leaf and Absolum in Savell et al (1986) conducted a study in New Zealand with eight mildly retarded children. These children were taught five IE instruments for a total of 158 hours. A verbal reasoning test was administered as a test of program effectiveness. The results showed that these children improved by 10 points on the test administered.

Martin in Savell et al (1984) did a study with 82 hearing impaired pupils at a secondary school. These pupils were presented with four IE instruments for a year. A non-verbal test was administered to collect data. The results indicated that the IE group showed greater gains on the measure used.

Skuy, Mentis, Anott and Nkwe (1990) conducted a study in Johannesburg, South Africa. They worked with disadvantaged black adolescents in standard five (grade 7) and standard six (grade 8). The total number of the subjects was 120. There were two experimental groups; the first received the IE program, and the second one received a combination of IE program and a program of emotional development and creativity. There were two control groups. The first experimental group was given IE instruction (seven IE instruments) for two years. Verbal reasoning tests and a student feedback questionnaire were used to gather data.

The results indicated that the two experimental groups scored higher than the control groups on all measures used, and on the student feedback questionnaire, the experimental groups indicated that the IE program helped them.

Kriegler and van Niekerk (1993) conducted a study in Pretoria, South Africa. They worked with 40 high schools students. The experimental group was presented with three IE instruments for sixteen months. At the end of the study habits and attitudes subscales were administered to the experimental and control groups. The responses indicated that the experimental group had a higher mean score.

Fridjhon, Green, Lomofsky, and Skuy (1993) conducted a study with 123 first year students at a teacher training college in Cape Town, South Africa. Subjects were comprised of students from diverse cultural backgrounds. They were described as sociopolitically and educationally disadvantaged. Their average age was 18. The experimental group received seven IE instruments for a total of 31 hours. Two verbal tests and one non-verbal test were used as pre-post measures as well as a student attitude questionnaire. The results indicated a significant difference on one verbal test and the trend was in the direction of the experimental group. On the attitude questionnaire, the students indicted improvement in lesson planning abilities.

Narrol, Silverman and Waksman (1982) conducted a study in Ontario, Canada with vocational secondary school students. Subjects were divided into five experimental groups and four control groups. The study was done for one year. Before the study, the experimental group teachers were trained in the teaching of Feuerstein in a 50 hour workshop.

Subjects were selected by the school personnel. They (subjects) were described as having difficulties in coping with and benefiting from the regular instructional school program.

Four IE instruments were used; Organization of Dots, Comparisons, Orientation in Space I, and Analytic Perception. The Lorge-Thorndike Non-verbal Intelligence Test and the Letter Series Subtest of Primary Mental Abilities Test were administered to all groups on a pre-post test basis. Criterion test results indicated that the experimental group benefited from the IE course.

These results revealed that IE can positively affect the cognitive performance of academically low-functioning adolescents. Furthermore, the experimental group showed less disruptive behavior and showed a positive attitude toward school.

Royal-Dawson in Savell et al (1986) conducted a study in Britain with 30 moderately sub-normal adolescents with ages 13 to 14 years. The experimental group was exposed to three IE instruments for ten weeks. A non-verbal intelligence test and a test of general intelligence were used to gather data. The results indicated that the experimental group scored higher than the control group, although some of the subjects in the experimental group did not improve.

Brainin (1982) did a study in the U.S. with 49 underachieving adolescents in grade 6. The experimental group was taught four IE instruments for a total of 59 hours. A general intelligence test, a criterion-referenced test and Behavior Rating Scale were used as measures. The results showed that the experimental group scored higher on the criterion-referenced test but scored lower on the general intelligence and Behavior Rating Scale.

Genasci in Savell et al (1986) did a study in the U.S. with 88 high-achieving pupils in grade 7 and 8, ages 15 to 18 years. The experimental group was exposed to five IE instruments for 19 hours.

A verbal intelligence test and a measure of academic self-confidence were used. The results showed that the experimental group improved significantly on the verbal intelligence test but did not show improvement on the measure of academic performance and self-confidence.

Muttart (1984) did a study in Canada with seventeen grade 7 and grade 8 students receiving a remedial program. The experimental group received three IE instruments for nine months. A verbal intelligence test, an academic achievement test, and a self-concept test were used as outcome measures.

The results demonstrated a significant difference between the experimental group and the control group on measures of academic achievement and self-concept with the trend in the direction of the experimental group on the verbal intelligence test.

Mehl (1985) conducted a study in Cape Town, South Africa, with 86 first year university students described as "disadvantaged" culturally and educationally. The experimental group received MLE (implemented by using booklets specifically designed for use in this study). The booklets were meant to mediate the cognitive functions required to learn Physics. The study was conducted for five years. An academic achievement test was used as a measure. The results showed that the experimental group had significant gains in academic achievement.

Summary of IE research and implication for further studies

The evidence gathered from the various research reports illustrate the popularity of IE. The program has been translated into 7 languages, thus it is available to learners in North and South America, Europe, Middle-East (Egypt), and Africa. The popularity of the program is especially noticeable in the Third World countries and in countries where the educational systems were unable to meet the needs of large segments of the population whose description matched that of Feuerstein's "culturally disadvantaged".

Educators and social scientists are encouraged by the promising (moderately to highly significant) results of the various IE intervention research studies. In addition, the culture-free (and culture-fair) nature of the IE instruments and the methods of the program's delivery, means that IE has the potential to be adjusted to various cultural situations without the need for significant modification.

Moreover, Feuerstein's Structural Cognitive Modifiability philosophy suggests a degree of optimism in regard to the possible cognitive enhancement and advancement for populations who were previously viewed as "hopeless and helpless". The belief in the possibility of modification of human intellectual potential contributes to the enthusiasm generated by the IE intervention and consequently contributes to the increased interest in the expansion of the program.

While programs such as IE were initially introduced to students in primary and high school levels, their usefulness in post-secondary educational settings has been documented by Weil (1990). In his research, Weil focused primarily on the need to include intensive cognitive intervention as part of Accounting Education courses in South Africa.

Cognitive Enhancement - inclusion in Accounting Education in South Africa

The expressed need for modification of Accounting Education courses and programs was evident in a number of publications (Chalupa 1992; Graham 1993; Weil 1990; Deleo et al 1994; Albin and Crockett 1991, and others). The call for the increase in the intensity of cognitive intervention is mostly evident in the areas of curriculum content and teaching methodologies (content delivery).

While the literature reflects a universal concern for the quality of Accounting Education programs and for the performance outcome of its graduates, a growing body of literature underscores a significant and urgent concern pertaining to Accounting training programs in Third World countries. This concern for the status of Accounting Education in Third World countries (American Accounting Association 1978) relates to deficiencies similar to those expressed with reference to North American Accounting programs.

In addition, the situation in the Third World is magnified by the lack of suitable teaching aids, (particularly texts) and the lack of effective teaching approaches. While some of the North American publications express a concern for the absence of awareness pertaining to rapid technological (electronical) changes among accounting students, reports from Third World countries emphasize the scarcity of adequate text books (Enthoven 1982) and the inadequacy (poor training) of Accounting instructors (Enthoven 1978). Moreover, while studying the academic qualifications of Accounting students in Third World countries, Markell (1988) found that most of these students lack adequate mathematical background, as well as language skills. In summarizing some of these findings, Enthoven (1987) concluded that in order to improve the quality of the graduates professional performance "Accounting Education may have to emphasize first of all conceptual knowledge and logical reasoning processes." (p. 24).

Weil (1990) identified the following specific inefficiencies in South African Accounting students' problem solving activities:

1. Conceptual difficulties
2. Lack of thoroughness in analyzing a problem

3. Poor planning behavior
4. Poor perception of relationships between variables
5. Poor visualization
6. Problems with the understanding numerical concepts and with the numerical manipulation
7. Expressed language difficulties

Education in South Africa has not been successful in producing professionally competent graduates who could deal with the economic challenges of the 90's.

In Weil's (1990) summary of several publications he acknowledged that the status of Accounting Education in South Africa does not prepare students adequately to become the business professionals who have to meet the challenges of rapid economical changes (including industrial and technological advancements). He concluded that the rapid economical and social change in South Africa (as well as in the other Third World countries) necessitates immediate planning for a significant improvement in the Accounting Education programs which should be adjusted to serve the existing and projected socio-economic demands. A focal point in Weil's evaluation of the Accounting training program in South Africa is the lack of adequate cognitive components in the course's content. In a study Weil conducted in the University of the Western Cape (1990), he introduced a thinking skills component into an elementary Accounting curriculum. With all the recent interest in the development of cognitive skills (as part of integrated Accounting training program) Weil tried to measure the effect of cognitive intervention on the performance of beginning students. In stating his hypothesis, Weil predicted that such an intervention program would increase the success rate of Accounting program candidates.

In trying to identify the cognitive inefficiencies most common to Accounting students in South Africa, Weil (1990) adapted Feuerstein's list of inefficient cognitive functions and restated them as goals to be achieved with the aid of the intervention program:

1. The students needed to develop "systematic exploration and data analysis". According to Weil, the students in the Accounting program needed to learn to analyze a problem and not to memorize.
2. The students needed to learn to explore data logically and systematically. In addition, the students needed to learn to plan their problem solving approaches.
3. The students needed to overcome their narrowness of the mental field by looking for alternative responses to a problem.
4. The students needed to learn to perceive relationships between types of information and to form hypotheses in regard to the application of these relationships.

Weil (1990), having identified the inefficient cognitive operations most common among Accounting students, offered step-by-step training procedures which would assist the Accounting students to master the objectives of the Accounting curriculum. Weil offered his subjects special study units which addressed the above-mentioned cognitive operations. "In writing these units, particular attention was paid to the choices of suitable pedagogical style and the explication of requisite cognitive operations." (p. 19).

In summarizing his research, Weil (1990) commented on the importance of developing research endeavors which help students to become more independent thinkers and more active generators of information. Weil's study illustrates a model of cognitive intervention which is based on Feuerstein's theory. In his research, Weil demonstrated the possibility of adapting elements of Feuerstein's theory (in particular the list of cognitive efficiencies) and to tailor a program to meet the needs of Accounting students who are experiencing difficulties with the challenges of their course content. The content-free nature of IE and the process of bridging allows for the adaptation of the program to a variety of curricula such as Accounting, business, etc.

Weil, however, did not use the instruments of the IE program, nor did he focus on the specifics of MLE as part of his study units. The research study which will be described in the next chapter will illustrate another intervention model which is based directly on Feuerstein's cognitive intervention. The purpose of the present study was to introduce selected instruments from Feuerstein's IE into a standard six (Grade 8 pupils) and to evaluate the effectiveness of this cognitive education program on the pupil's learning in general and on their acquisition of Accounting principles in particular. This research activity focused both on the instruments and their delivery of MLE.

CHAPTER 5

CHAPTER 5

THE PRESENT STUDY

Introduction

As discussed earlier researchers agree that in order to remediate poor performance in Accounting, cognitive skills programs (to teach thinking skills) should be an integral part of the Accounting curriculum and numerous cognitive education programs have already been implemented. Some of these programs are discussed in chapter 3. Their stated intent was to increase the learner's problem solving skills, comprehension skills and overall improvement of academic performance in specific content areas such as English and English Comprehension and Verbal Communication.

In comparing other cognitive education programs to Feuerstein's IE, Weller and Graft (1983) stated that "Some remedial programs undoubtedly help pupils to acquire specific skills but it is notoriously difficult to encourage the development of generalizable principles and strategies for problem solving (the inefficient learners) problems may in part spring from inadequacies in traditional program". (p.17). Many of these intervention programs do not provide opportunities for the students to develop (and to assess) their own thinking. Feuerstein's program seeks to provide a much wider range of fundamental activities such as planning, comparing, searching and evaluating. Students are encouraged both to think and to evaluate their own thinking (meta cognition). In comparing the IE to other intervention program Weller et al (1983) stated that the IE program is not confined to specific groups of learners. The IE materials are organized and presented in such a way that even low functioning students would get more from this program than from other remedial approaches.

Rationale for the study

1. IE is meant to target pre-adolescents, adolescents and young adults. Thus it would be appropriate for the age level of the population chosen for this study.
2. IE targets individuals from different cultures, and thus would not need to be adapted for the study's South African population.
3. Subjects in this study showed lack of motivation towards learning. This is a characteristic addressed by the IE program.
4. The positive effect of IE intervention on a variety of populations has research support. Other programs (which were discussed earlier) were often presented clinically and they lack the support of research data.
5. While other programs describe themselves as cognitive in nature, only IE attempts to modify cognitive structures of the retarded performer
6. Other programs require a higher level of reading ability, while IE can be taught to students whose reading skills are not well developed.
7. In introducing his cognitive training program, Feuerstein addresses the needs of many students whose capacity to learn has been reduced for variety of reasons. His opinion is that improving thinking skills will improve overall cognitive functioning (at school as well as at work).
8. The instruments attempt to teach concepts which transcend subject boundaries, and teach problem solving skills on the cognitive and meta cognitive level.

9. An analysis of the objectives of the Accounting program and the objectives of IE program shows that both aim toward the development of similar concepts and skills. The Accounting program which is addressed in this study was part of the regular standards six (grade 8) curriculum. The program is broken into various elements which progress from the introduction of terminology to the later practical application of Accounting practices.

The Accounting program requires that the learner masters Accounting labels, Accounting procedures, the relationships and organization of information and the careful management of financial matters. The IE program intends to strengthen the learner's thinking in similar areas; labelling (input), relating and processing information (elaboration) and the efficient storage of information which is the outcome of carefully planned categorization of information. Thus the IE program directly complements and addresses some of the skills that are basic to Accounting training. (see Appendix G).

Procedures

Prior to the study itself, a pilot study was conducted.

Pilot Study:

This study was conducted for the following reasons:

- To gain experience in analyzing Accounting topics according to Feuerstein's list of cognitive functions,

- To gain experience in teaching thinking skills so as to identify existing problems.

- To determine whether it was possible to implement the method of teaching thinking skills in the time available.

The pilot study was conducted in one of the public high schools in Cape Town. The study resembled the actual study in the following ways: both schools (the one where the pilot study was conducted and the school where the experiment was conducted) were coeducational; the sample for the pilot study and the actual study the comprised same age group of 12-15 years; the achievement level was similar; the populations were taken from similar cultural backgrounds.

The results of the pilot study were incomplete because of school boycotts and preparations for June examinations.

The Actual Study

The aim of the study was to compare the achievement and the cognitive functioning of two groups: The experimental group (IE) and the control group (no intervention).

Research Design)

A flip-flop experimental design was used. That is the author taught the IE content to the experimental group and the regular teacher taught the regular Accounting content to the control group. After three weeks of intervention, the author and the regular exchanged classes and both continued to teach the regular Accounting content (no special intervention was offered at this time to either class).

Figure 19

(Flip-flop experimental design)

Phase I
14 Sept 1993

Pretest: (N=44)
1. Accounting (Topic: how to prepare a cash receipt journal and cash payment journal).
2. Verbal reasoning (similarities between objects)

Phase II
15, 16, 20 Sept
5, 6, 7, 8, 11,
Oct 1993

Group I: (N=26)
Topic I: Posting cash receipts journal to the ledger.
Experimental group Investigator (IE)

Group II: (N=18)
Topic I: Posting cash receipts journal to the ledger.
Control group Regular teacher (No IE)

Phase III
12 Oct 1993

Common Posttest: Accounting (N=44)
Topic I: Posting cash receipts journal to the ledger Experimental group & control group. Investigator

Phase IV
13, 14, 15, 18,
19, 25, 27, Oct
1993

Group I: (N=26)
Topic II: Posting cash payments journal to the ledger accounts.
Experimental group Regular teacher (No IE)

Group II: (N=18)
Topic II: Posting cash payments journal to the ledger & balancing ledger accounts. Control group. Investigator (No IE)

Phase V
28 Oct 1993

Posttests: (N=44)
Accounting topics I and II and verbal

After the Accounting Achievement test was administered, the author and the regular teacher exchanged classes to avoid the effect of teachers' bias.

Both classes were taught only the Accounting course content weeks. At the end of that period, another Accounting Achievement test and a Verbal Reasoning test were given to both groups.

Description of the Intervention Materials

The experimental group was presented with four IE instruments. These instruments were: Organization of Dots, Illustrations (Cartoons), Orientation in Space I and Orientation in Space II. The instruments used were chosen for this study because they develop particular cognitive skills relevant to the ones required by topics in the Accounting program.

1. Organization of Dots: This instrument develops the following cognitive skills; numeracy, precision and accuracy, planning behavior, discrimination, visual transport and conservation of constancy. These skills are found to be relevant to the following accounting topics: Posting, Cash receipts and Cash payments journals to the Ledger accounts. All these topics require planning, numeracy, discrimination and precision and accuracy.

2. Orientation in Space I requires the creation of specific strategies for differentiating spatial frames of references; left, right, front and back. This instrument was selected because it develops the knowledge of spatial concepts such as debit (the left side of an account) and credit (the right side of an account). In addition, it teaches the overall orientation of information recording skills. This instrument is useful in organizing information in columns, rows and table form.

3. Illustrations (Cartoons) is an instrument in pictorial form. It requires learners to make relationships between objects in terms of similarities and differences. This instrument presents balance situations (balancing ledger accounts) and the learners are required to examine amounts on the pages and assess their relationships. In addition, learners are required to classify information and categorize it in appropriate groupings.

When recording transactions in cash receipts and cash payments journals Accounting students are required to classify information according to whether it belongs to current income, sundry accounts, stationery and so on. The unit also develops appropriate verbal tools which enhance communication.

The instruments used in this study were taught during the first week of intervention. Bridging was done during the second week. When teaching each Accounting topic, the author explained the relationship between the cognitive skills encountered in the IE instruments and the cognitive skills required by the Accounting topic under study. The Accounting lessons were 45 minutes in length. The students were given 10 minutes of introduction to the IE instruments and 15 minutes of pencil-and-paper work and 20 minutes of summary and discussion.

Setting

The study was conducted in one of the public high schools situated in the inner-city areas of the Western Cape in South Africa. A high school was selected because the author is a high school teacher and that is where the problem was initially identified.

The author requested permission to conduct this study and it was granted. The school was coeducational and it is called a Model C school, which means the school is partially subsidized by the state and the school partially funds itself.

The total enrolment of the school was 480, from standard (6 grade 8) to standard 10 (grade 12). The size of the classes was 25 to 30 pupils. According to one of the teachers interviewed by the author, 20% of those in standard 10 (grade 12) go on to tertiary institutions.

Sample

The total sample used in the study was 44 pupils (20 boys and 24 girls). Their ages range from 12 to 15 years. The sample consisted of two classes originally labelled by the regular teacher as standard 6X (which consisted of 18 pupils) and standard 6Y (which consisted of 26 pupils).

The sample was not randomly selected. Standard 6X was assigned to the control group and standard 6Y to the experimental group. Both classes were of mixed ability. The sample was described by the regular teacher as coming from low income families and she also explained that out of the total school enrolment of 480 pupils, 145 pupils were fully subsidized by the state.

At the end of the study when data were analyzed, 14 of the subjects had to be omitted from the analysis because they did not write all the tests due to absenteeism.

Dependent and Independent Variables

The IE instruments and the use of MLE were the independent variables. The pretest and post test scores on the Accounting Achievement tests and the Verbal Reasoning tests were used as the dependent variables.

Measuring Instruments

The Accounting Achievement test was designed by the author because a Standardized Accounting test was not available at the time of the study. There were three tests; a pretest which was based on a topic taught by the regular teacher (i.e. the topic taught before the study), a posttest I which was based on a cash receipt journal and the ledger and posttest II which was based on a cash payment journal and the balancing of ledger accounts (see appendices: G,D and E)

Validity of Pretest, Posttest I and Posttest II in Accounting

To test for content validity of the Accounting tests the author gave these tests to two standard 6 class teachers to check if the tests contained Accounting subject matter program and if the questions were stated in simple and clear language. The responses of the teachers indicated that the questions had good content validity.

Reliability of the Accounting Pretest, Posttest I and posttest II

Scoring agreement was used to determine the reliability of the tests. The author gave scored papers (scored by the author) to another Accounting teacher to score and matched her (the author's) scores with those of the other teacher.

Pearson product-moment correlation coefficients were performed and the correlation obtained was 99. According to Fraenkel and Wallen (1993), "What is desired is a correlation of at least .90 among scores or agreement of at least 80%". (p.150). The correlation obtained for the tests indicated that these tests had high inter-rater reliability.

Construction of the Accounting Tests

When constructing the pretest, posttest I and posttest II in Accounting the author used the procedure suggested by Gronlund (1982). He points out that subjects like Business Education are concerned with skill outcomes. Gronlund suggests that a test constructor should specify the performance outcomes to be measured and that performance objectives commonly use action verbs like construct, identify and so on. He explains that in Accounting to construct often mean to prepare the books of accounts.

In this study, the author used the term "construct", for example, in the pretest Question 1a, Question 2a, and posttest I Question 1 and Question 3, and posttest II Question 1 and Question 2, these questions required pupils to construct cash receipts journal and cash payments journal (see appendices C,D and E).

Other test items involved filling blanks. They were meant to test knowledge of Accounting concepts, Gronlund (1982) suggests that knowledge of concepts should be tested with short answer items which have blanks at the end. For example, pretest, Question 2b asked students to explain Accounting Concepts, and Posttest I required pupils to group items to show their understanding of the concepts.

The test items also required that the students demonstrate the use of thinking skills taught through IE exercises such as: precision and accuracy, numeracy, clear perception, space concept, labelling and recall. These thinking skills were required by almost every question in each test, with the exception of Question 2b of the pretest and Question 2b of the posttest I which did not require numeracy because they tested knowledge of concepts. 2A Verbal Reasoning Test was constructed by combining the Similarities Subtest of the Wechsler Intelligence Scale for Children-Revised (WISC-R) and the Wechsler Adult Intelligence Scale-Revised (WAIS-R). The Similarities Subtests measure the learner's ability to verbally compare and to describe concepts. The responses were considered to be indicative of the individual's ability to reason verbally.

The author decided to use the combination of the Similarities Subtest of the Wechsler Intelligence Scale for Children-Revised (WISC-R) and the Wechsler Adult Intelligence Scale Revised (WAIS-R) because each is reported to have good validity and reliability. Skuy and Shmukler (1987) and Skuy and Mentis (1990) have found these tests to be useful with South African adolescents. Each subtests has been found to be a good measure of general intelligence as reported by Goldstein and Hersen (1984).

3. Open-ended questionnaire

The author designed an open-ended questionnaire for use in the study. This questionnaire was administered to the experimental group only to investigate whether the students' responses would reflect Feuerstein's cognitive functions and the effect of MLE. The questionnaire consisted of five questions, details of which are presented in Appendix F.

Methods of Analyzing Data

T-tests of the significance of the difference between the mean test scores of the experimental group and the control group were carried out to test the following hypotheses:

1. There would be no significant difference in performance between the experimental group subjects and the control group subjects on the Accounting Achievement test before intervention.
2. After exposure to the principles of MLE and selected IE exercises, the experimental group subjects would perform significantly better than the control group subject on the Accounting Achievement posttest I.
3. There would be no difference between the experimental and the control group subjects when neither teachers (the regular teacher and the author) were using the principles of MLE and selected IE exercises.
4. There would be no difference in performance between the experimental group and the control group subjects on the Verbal Reasoning (Similarities Subtest) before intervention.
5. After exposure to the principles of MLE and selected IE exercises, the experimental group subjects would significantly improve from pretest and posttest on the Verbal Reasoning.
6. After exposure to the principles of MLE and selected IE tasks, the experimental group subjects would perform significantly better than the control group subjects on the Verbal Reasoning Tests.

CHAPTER 6

CHAPTER 6

RESULTS

Introduction

T-Test analysis of the data obtained in this study rendered the following;

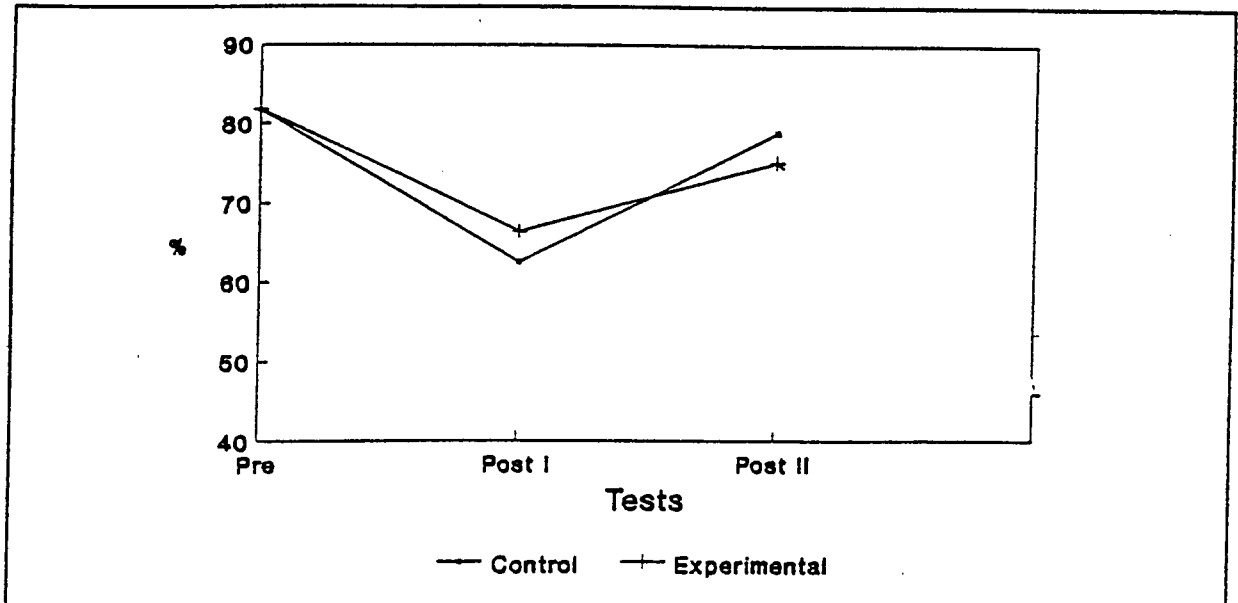
6.1 Accounting Achievement Results

The Accounting Achievement Test results of pretest, posttest I, and posttest II are presented in Table I. The mean scores are plotted in Graph I for the experimental group and the control group.

Table I: Results of the experimental group and the control group on three occasions of testing in Accounting Achievement.

Test	<u>Control Group</u>			<u>Experimental Group</u>			df	t
	N	X	SD	N	X	SD		
Pre	17	81.71	14.8	14	81.79	12.5	290	016
Post I	17	62.59	16.9	14	66.5	20.0	29	0.587
Post II	17	78.94	12.9	14	75.2	11.0	29	0.849

Graph 1:



6.1.1 Pretest: Accounting Achievement

Hypothesis 1

The author hoped to accept the null hypothesis that there would be no difference in performance between the experimental group and the control group subjects on the Accounting Achievement Test before intervention. To test this, a t-test of the significance of the difference between the mean scores of the experimental group and the control group was carried out. The t value obtained showed that there was no significant difference ($p < 0.05$). Therefore, the null hypothesis could not be rejected, i.e. the two groups were equivalent in Accounting knowledge at the start of the intervention.

6.1.2 Posttest I: Accounting Achievement

Hypothesis 2

The author hoped to support the hypothesis that after exposure to the principles of MLE and selected IE exercises, the experimental group subjects would perform significantly better than the control group subjects on the Accounting Achievement posttest I. To test this, a t-test of the significance of the difference between the mean scores of the experimental group and the control group was carried out. The mean score was 62.59. A visual inspection of the values of the mean scores showed that experimental group performed better than the control group, but the t value obtained (0.587) showed that the difference was not significant ($p < 0.05$). The hypothesis is therefore rejected. The trend, however, was in the direction of the experimental group.

6.1.3 Posttest II

Hypothesis 3

The author hoped to accept the null hypothesis that there will be no significant differences between the experimental group and the control group on the Accounting Achievement test when the teachers exchanged classes and that neither was using the principles of MLE and IE exercises. A t-test of significance of the difference between the mean scores of the experimental group and that of the control group was computed. The mean score of the control group was 78.94, and the mean score of the experimental group was 75.2. A visual inspection of these mean scores shows that the control group performed better than the experimental group, but the value of the (calculated 0.849) showed that the difference was not significant ($p < 0.05$). The hypothesis therefore was rejected.

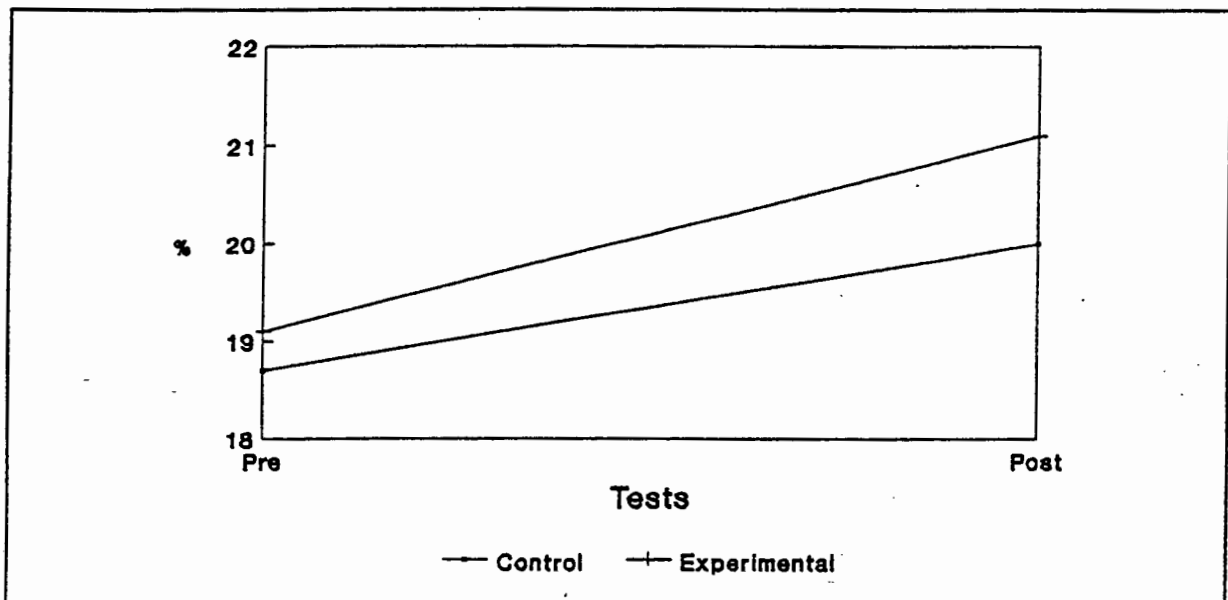
6.1.4 Results on the Verbal Reasoning Test (Similarities Subtest)

The pretest and the posttest results of the experimental group and the control group are presented in Table 2, and the mean scores are plotted in Graph 2.

Table 2: Results of the experimental group and the control group on two occasions of testing on the Verbal Reasoning Test (Similarities Subtest)

Test	<u>Control Group</u>			<u>Experimental Group</u>			df	t
	N	X	SD	N	X	SD		
Pre	17	18.7	5.0	14	19.1	2.5	29	0.333
Post	17	20.0	4.0	14	21.1	2.7	29	0.859

Graph 2:



6.1.5 Pretest: Verbal Reasoning Test

Hypothesis 4

The author hoped to accept the null hypothesis that there would be no difference in performance between the experimental group and the control group on the Verbal Reasoning Test before intervention. To test this, a t-test of significance of the difference between the mean scores of the experimental group and the control group was carried out. The t value obtained (0.333) showed that there was no difference between the experimental group and the control group on this test. The null hypothesis could not be rejected, i.e. the two groups were equivalent on the Similarities Subtest at the beginning of the intervention.

6.1.6 Posttest: Verbal Reasoning Test

Hypothesis 5

The author hoped to support the hypothesis that after exposure to the principles of MLE and selected IE exercises, the experimental group's subjects would perform significantly better than the control group subjects on the Similarities Subtest. To test this, a t-test of the significance of the difference between the mean scores of the experimental group and those of the control group was carried out. The t value obtained ($t=0.859$) indicated that the difference was not significant ($p<0.05$). Therefore, the hypothesis could not be accepted, i.e. the experimental group did not significantly perform better than the control group on the Verbal Reasoning Test. The trend however was in favour of the experimental group.

6.1.7 Pre and Posttest (Experimental Group only) Verbal Reasoning Test

Hypothesis 6

The author hoped to support the hypothesis that after exposure to IE exercises and the principles of MLE, the experimental group's performance would improve significantly from the pretest of the Verbal Reasoning Test to the posttest of the Verbal Reasoning Test. To test this, a t-test of the significance of the difference between the mean scores of the pretest and posttest of the experimental group was carried out. The t value obtained indicated no significant difference within the experimental group from pre testing to posttesting. Therefore, the above hypothesis is rejected.

6.1.7 Open-ended Questionnaire

Following the termination of the intervention, an open-ended questionnaire was administered to the experimental group (N=22) only. The students' answers were interpreted according to Feuerstein's cognitive functions and his criteria of MLE; i.e. each of the subjects' verbal (written) responses to each question was compared to a possible correspondence on Feuerstein's list.

6.2.7 Question 1: List the things you learned from these tasks: Organization of Dots, Orientation in Space I and III, and Illustrations.

Answer Type	No. of Pupils	Cognitive function/MLE Criterion
Learned how to think before answering questions and how to organize the task	18	Planning Behavior

Boring	5	Misperception and narrowness of the psychic field (misunderstanding of the intent and the meaning of the task)
Tasks were long	5	Judging the task on the basis of its concrete appearance (missing the real meaning of the task)
No response	5	

6.5.7 Question 4: What did you like about the Accounting lessons?

Answer Type	No. of Pupils	Cognitive function/MLE Criterion
Interesting and fun	12	Intent and the indication of the understanding of the meaning of the task
Understood the way the topics were explained	6	Competence, clarity of the intent of the goal of the task
Alright	3	Inefficient verbal expression (poor ability to sum up)
No response	1	

6.6.7 Question 5: What did you not like about the Accounting lessons?

Answer Type	No. of Pupils	Cognitive function/MLE Criterion
Some topics were difficult	11	Indication of understanding or lack of understanding the goal, but shows awareness of difficulties-complexities

Did not get enough time for the Accounting lessons because of IE tasks	3	Lack of understanding of the intentionality (lack of understanding of the relationship between IE & Accounting)
Some of my classmates were noisy and made it difficult for me to learn	3	Inability to define nature of problem (lack of clarity)
There was nothing I did not like	3	
Other: No response	1	
Did not like writing the tests	1	Egocentricity-judging the task as it relates concretely to oneself

6.7.7 Summary

This chapter presented the findings of the present study with regard to the following:

Accounting Achievement Test

There was no significant difference in performance between the experimental group and the control group on the Accounting Achievement Test before intervention.

After exposure to the principles of MLE and selected IE exercises, the experimental group did not perform significantly better than the control group on the Accounting Achievement Posttest I, although the trend was in the direction of the experimental group.

There was no significant difference on the Accounting Achievement Test between the experimental group and the control group after the classes were "flipped". However, the trend was in the direction of the original experimental group (taught by the author).

The results obtained on the end of year Accounting Examination showed no significant difference between the groups, therefore the author concluded that there was no long-term effect of IE on the experimental group.

Verbal Reasoning Test

There was no significant difference in performance between the experimental group and the control group on the Verbal Reasoning Test before intervention.

After exposure to the IE tasks and the principles of MLE, there was no significant difference between the experimental group and the control group on the Verbal Reasoning Test.

After exposure to the IE tasks and the principles of MLE, the experimental group did not improve from pretest to posttest on the Verbal Reasoning Test.

Open-ended Questionnaire

The experimental group responded in ways which reflected the criteria for MLE as identified by Feuerstein, and this suggested that mediation had occurred.

A detailed discussion of all the findings is presented in the next chapter.

CHAPTER 7

CHAPTER 7

Discussion of Results

The results are discussed under the following headings;

7.1.1 Comparability of both groups (experimental and control) prior to the intervention.

7.1.2. Discussion of the pre post comparison between the groups on the Accounting Achievement Test (pre-post I, post II) and on the Verbal Reasoning Test.

7.1.4. Discussion of the results of the open-ended questionnaire (Experimental group only).

7.1.5. The last section summarizes the overall outcome of this study (as reflected by the results) and its implication for future research.

7.1.1. The comparability of both the experimental and control groups was established by administering the dependent variables (the Accounting Achievement Test and the Verbal Reasoning Test) prior to the beginning of the intervention. The results of the pretest comparison indeed showed that the groups were similar.

7.1.2. The results of the pre-post I, II comparison between the IE group and the control group on the Accounting Achievement Test show that the IE program did not significantly improve the performance of the experimental group.

In fact, a careful examination of the results indicate that the scores of both the groups dropped from the pretest to posttest I. These negative results are not only indicative of the failure of the treatment to impact the experimental group, but they also raise serious questions as to the reasons for the drop in performance scores in both groups.

The lack of treatment effect (of the IE on the performance of the experimental group) can be attributed to the very short duration of the intervention, inefficient teacher's training leading to poor delivery of the IE as well as to inefficient bridging of the IE concepts to Accounting concepts. The drop in the performance scores of both groups (who were comparable on the pretest) could be due to:

1. The nature of the dependent measure and the poor test-retest (pre, post I and post II) reliability.
2. Teacher in effectiveness (teaching competency, style and ability to maintain interest).
3. The drop in students' motivation from pretest to posttest I.
4. The ongoing increase in the complexity of the Accounting program (with the introduction of new concepts and the demand for mastery of new Accounting skills), caused the poorly prepared students to experience more difficulties. The cumulative effect resulted in an increased loss of interest.

The lack of treatment effect is also evident from the results of the Verbal Reasoning (Similarities), pre-post comparison. Both groups seemed to improve slowly, yet the gains are not significant and can be attributed to chance and to the variables discussed above.

7.1.3. The analysis of the performance of both groups on the end of year Accounting competency exam revealed that there are no differences between the groups and that the IE treatment did not have any impact on the experimental group members. These results were probably effected by:

- a. The short duration of the IE intervention (3 weeks).
- b. The lack of adequate teacher training.
- c. The insufficient time for generalizability of IE concept to the relevant Accounting concepts.

7.1.4. In analyzing the responses to the Open-ended questionnaire, the author tried to verify the IE related impact on the participants in the experimental group. The verbal responses of the participants (in responding to each of the questions analyzed) were compared (in terms of their relationship) to Feuerstein's list of cognitive functions and to the list of the components of MLE.

Whenever a respondent expressed an idea which could be easily recognized as related to Feuerstein's terminology the author would note it. These various responses were merely indicators of the degree to which the IE revealed any type of effect on its students.

The analysis of those variable responses suggested that in some cases effects were noticeable: reduced impulsivity, (in some students), presence of intentionality and presence of cognitive egocentricity. While the Open-ended questionnaire is not validated, it was introduced as another possible tool which could indicate the presence (or absence) of change as a result of the IE intervention.

7.1.5. The overall results of the study indicate the following:

a. The IE intervention program did not produce the anticipated changes in the performance of the experimental group (when compared with the control group) on the dependent measures used.

b. The IE intervention did not effect the experimental group performance on the Accounting tasks.

c. The IE intervention did not significantly effect the experimental group's performance on the Verbal Reasoning Test.

7.2 **Conclusions**

The study failed to produce the predicted positive gains as a result of the IE intervention. However, the nature of the study's limitation discussed in section 7.1.2., preclude the author from drawing any conclusion in regard to the effectiveness of the IE program with reference to enhancing the performance of students in an Accounting program. The study does offer some insight which should guide future research activities in the areas of cognitive intervention and its relevance to Accounting Education.

The study highlights the following:

1. The need to examine the content and delivery of the current Accounting Education program.
2. The need to change the Accounting Education course content by including cognitive components such as the model offered by IE intervention.
3. The need to offer cognitive intervention over longer period of time. Short term intervention does not produce significant cognitive changes.

Perhaps structural cognitive changes require an 'incubation' period. Unlike the teaching of concrete skills, the mastery of cognitive concepts involve the process of generalization which entails a higher level of cognitive modifiability and such modifiability may not be immediately observable or evident on test measures.

4. The need for thorough and complete training for IE teachers. Future cognitive trainers should be trained over a longer period of time and should be completely familiar with the materials and with the intervention procedures.
5. The intended IE teacher should be well versed in teaching of the entire program. At the same time, such a teacher should be familiar with the Accounting curriculum of his/her intended experimental group students.

The teacher's familiarity with both programs, their specific goals and objectives would facilitate the process of bridging and would enhance the students' ability to internalize and to transfer acquired concepts from one area to another.

6. The need to carefully identify and address the cognitive inefficiencies of the Accounting students as they enter their course of study. Failure among Accounting students can result from a variety of reasons: poor mastery of skills, lack of motivation, loss of interest in schooling, external (home) variables and emotional variables. Prior to teaching a cognitive program (or any other intervention), it is necessary to know the population and to identify it according to its needs.

7. Other valid reliable and more sensitive independent measures should be used to determine program impact.

7.3 Implications for further research

The results of the study suggest that future investigators should examine new tools (measures) which assess more adequately the cognitive profile of their subjects. Existing tools focus more on the product of cognitive processing itself. Similarly in future studies the specific cognitive elements which are required to master the specific Accounting concepts should be identified and analyzed. The identification and the examination of the cognitive components in the Accounting curriculum will enable the future investigator to select the relevant cognitive intervention. Further, research studies in this area should involve longer interventions, should include larger samples and should attempt to control attrition rate. The mediating teacher must be well trained and familiar with both cognitive remediation and Accounting Education principles. These elements would assist future investigators to increase the strength, the meaningfulness and the generalizability of their findings.

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APPENDICES

APPENDIX A

Woolsack Residence
U.C.T.
Private Bag
RONDEBOSCH
7700

26 August 1993

Dear Sir

After reading research findings in the teaching of thinking skills to improve achievement and learning I decided to do a study in this area towards an M.Ed degree of the University of Cape Town. Last year I underwent training in how to teach thinking skills and bridge that into subject content.

In this study I want to do classroom teaching at Standard Six class level in accounting to find whether teaching thinking skills will have any effect on achievement and learning. This will help me as well as other teachers to gain knowledge in how students learn and think. And to avoid interfering with your school programme I would like to know if it will be possible to give extra lessons.

I would very much appreciate your permission to let me conduct the study in your school. And looking forward to hearing from you. If you would like to meet me to discuss what I am planning to do I am willing to do that anytime convenient for you. My telephone number is 689-2001 or 685-4050 x 230.

Thanking you in anticipation.

Yours faithfully,

VERONICA MASILO

APPENDIX B

CAPE TOWN HIGH SCHOOL

Government Avenue, Cape Town. 8001

Telephone: 24-2168

TO WHOM IT MAY CONCERN

This certifies that Ms Veronica Masilo has been given permission to gather data for her M.Ed research at our school.

PRINCIPAL

APPENDIX C

1.

Name: _____

Class: _____

Date: _____

Accounting Pretest

Topics: Cash Receipt Journal and Cash Payment Journal

Write your answers in the spaces provided below except questions 1(a) & 2(a).

1. On 1st January 1993 A. Collins opened a hairdressing salon. Record the transactions in the Cash Receipt Journal and close it at the end of the week.

a) January 1993

1	Open current bank account with Capital of	R18000.00
2	Current income collected from clients	R 800.00
3	Current income collected from clients	R 550.00
4	Current income collected from clients	R 900.00
5	Current income collected from clients	R 650.00
6	Current income collected from clients	R 700.00
7	Current income collected from clients	R 850.00
7	Rent received from H. Lindsay	R 400.00
7	Rent received from R. Paul	R 300.00

(46)

- b) Answer the following questions after closing the cash receipt journal of A. Collins.

- i) What is the total current income received?
- ii) How much capital did A. Collins invest in his business?
- iii) What is the total amount in the bank?
- iv) What is the total amount of sundry accounts?
- v) What is the total amount of rent received?

(5)

2.

2. Record the following transactions in the Cash Payment Journal of McCarthy Personal Services. Close the journal at the end of the week.

a) April 1993

2	Bought buildings from Browning Estate Agents and paid by cheque (cheque no.001)	R 70.00
3	Purchased furniture and equipment from Office Requisites Ltd. (cheque no.002)	R 652.00
3	Purchased Motor Vehicles from ABC Garage (cheque no.003)	R8200.00
3	Bought consumable stores from Delco Industries (cheque no.004)	R 285.00
	Bought stationery from Delport Industries (cheque no.005)	R 150.00
7	Paid wages by cheque (cheque no.006)	R 300.00
7	Paid Insurance on buildings (cheque no.007)	R 244.00
7	Paid sundry expenses for licence to Cape Municipality (cheque no.008)	R 100.00
		(45)

b) i) What is the difference between the cash receipt journal and cash payment journal?

ii) Name a document used to make cash payment of the business

iii) What is the meaning of the term, Casting?

iv) What is the meaning of the term cross-casting

(4)
Total: 100

APPENDIX D

Name: _____

Class: _____

Date: _____

Accounting Common Posttest I

Topics: Cash Receipt Journal and Ledger Accounts - Prepare Cash Receipt Journal on the page provided.

1. Record the transactions in the Cash Receipt Journal of XY Services and post to the Ledger.

Provide your own document numbers.

May 1993

1st	B. Smith Commenced business depositing R20 000 in bank account of business	
3rd	Received services fees from customers	R204
13th	Received rent from A. Adam for store room	R150
13th	Received service fees from customers	R480
24th	Received service fees from customers	R495
30th	Received service fees from customers	R391

2.
 - (a) How many ledger accounts were opened in question one?
 - (b) How many asset accounts were opened? Name them.
 - (c) How many income accounts were opened? Name them.
 - (d) How many entries were made in the capital account?

- (e) Group the following accounts under the headings given below: the accounts are; Motor Vehicle, Rent income, Rent expense and Capital.

Assets	Owner's Equity	Income	Expense

3. Post from the Cash Receipt Journal to the ledger.

Cash receipts of Johnson's Personal Services - April 18

Doc. No.	Date	Details	Fol.	Analysis of receipts		Bank		Current Income		Sundry Accounts		
										Amount	Fol.	Details
1	01	J. John		40 000	00	40 000	00			40 000	00	L1 Capital
CRT 1	07	Service Fees		914	20	914	20	314	20			
CRT 2	14	Service Fees		1 091	30	1 091	30	1 091	30			
CRT 3	21	Service Fees		344	50	344	50	344	50			
CRT 4	28	Service Fees		1 041	20	1 041	20	1 041	20			
						43 991	20	3 991	20		40 000	00
						L13		L10				

[19]

TOTAL = 100

APPENDIX E

Name: _____

Class: _____

Date: _____

Accounting Posttest II

Topics: Cash receipts journal, cash payments journal and ledger accounts.

1. Record the transactions in the cash receipts journal of Benson's Personal Services. Provide your own document numbers. Post to the ledger at the end of the month.

July 1990

1st	Opened current bank account with capital of	R10000.00
7th	Service fees received from customers	R 894.50
14th	Service fees received from customers	R 691.00
21st	Service fees received from customers	R 744.50
28th	Service fees received from customers	R 941.20
		(45)

2. Record the transactions in the cash payments journal of Fixall Shoe Repairs. Post to the ledger.

July 1990

17th	Paid rent to M.N. Estate Agents (cheque no.237)	R400.00
8th	Drew cash from bank for stationery (cheque no.238)	R300.00
13th	Cashed cheque and paid Daily Echo for advertising (cheque no.240)	R 36.10
		(40)

3. Answer the following questions after closing the CRJ and the CPJ. Write the answers in the space provided.
- i. How many ledger accounts were opened in question one?
 - ii. What is the total current income in question one?
 - iii. How many asset accounts were opened in question one? Name them.
 - iv. How many expense accounts were opened in question two? Name them.
 - v. How many income accounts were opened in question one? Name them.
 - vi. How much Capital was invested in Benson's Personal Services? How many entries were made in the capital account?
 - vii. What is the meaning of double-entry? Explain in two sentences.
 - viii. What is the meaning of casting?

(15)

Total = 100

APPENDIX F

Open-ended questionnaire

Question 1: List the things you learned from these tasks: Organisation of Dots, Orientation in Space I, and II, and Illustrations.

Question 2: List the things you liked about the tasks mentioned in Question 1.

Question 3: What did you not like about the tasks mentioned in Question 1?

Question 4: What did you like about the accounting lessons?

Question 5: What did you not like about the accounting lessons?

APPENDIX G

Relationship between Cognitive demands of the Accounting and IE Cognitive demands

Concepts introduced in the Accounting Program

Relevance to Instrumental Enrichment (IE)

A. Terminology

Accounting

Fixed assets

Current assets

Liability

Capital contribution

Income

Expenditure

Balance sheet

Accurate labelling of all these terms one of the goals of IE on the input level

Precise labelling is the beginning of efficient thorough processes.

B. Understanding of the business process and transaction:

1. How to start a business
2. How to register a business
3. The opening of an account

IE philosophy describes a clear understanding of the process and logical sequential thinking when organizing an activity.

C. Understanding of the financial transaction between client and financial institution

Establishing relationship between two sources of information (elaboration Level)

D. Keeping information in an organized manner, books, files, computer-daily recording, record keeping

IE demands efficient organization of information
Precise and accurate output

E. Following Financial and Accounting procedures according to prescribed routines and instructions

IE emphasizes precision in data gathering, storage and reporting (input, elaboration and output)

F. Understanding the various aspects and the relationship in the Accounting process

IE emphasizes relational thinking between variables

ABSTRACT

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EFFECTS ON THE ACCOUNTING SKILL PROFICIENCY OF STANDARD SIX
STUDENTS (GRADE 8)

A DISSERTATION PRESENTED IN FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

MASTER OF EDUCATION

BY

VERONICA 'MACHAO MASILO

SEPTEMBER, 1996

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