

carefulness therefore required from the mediator. This contrasts with historical tolerance of creativity and concurrent rebelliousness which, it is suggested, is neither necessary nor desirable in the current South African context. Nickerson *et al* (1985) suggest four components of creativity:

- a. Abilities with specific reference to "ideational fluency" (Nickerson *et al*, 1985:89) i.e. the capacity to produce a great deal of appropriate ideas easily and quickly; "remote associates" (Nickerson *et al*, 1985:91) or the retrieval of information not readily associated with the situation at hand.
- b. Cognitive style, specifically a tendency to explore and readiness to change - problem finding rather than problem solving (Getzels & Csikszentmihalyi in Nickerson *et al*, 1985).
- c. Attitudes, referring to the orientation of creative people towards autonomous judgment independent of social influence, with *caveate* as detailed below; the valuing of complexity, an unusually strong need to find order, a greater degree of self-reference in work, wide breadth of interest, commitment to work, valuing of feedback, the possibility of multiple perspectives.
- d. Strategies involving deliberately long searches for solutions, close analogical thinking, and possibly brainstorming, although empirical support of this latter is unconvincing (Nickerson *et al* 1985).

These criteria correspond directly with Feuerstein's (1991) definition of the mediation of Transcendence in that the essence of transcendence is an extension of the learner beyond the immediate problem or activity. This extension implies retrieval of information not readily associated with the situation at hand, a tendency to explore and readiness to change, the possibility of multiple perspectives, and strategies involving deliberately long searches for solutions.

Studies have shown extensively that the capacity to think creatively can be taught, most successfully when both cognitive and emotive factors are accounted for, when there is sufficient motivation and structure, and teaching conditions which allow for involvement, practice and interaction with teachers and peers. Further, deliberate and direct teaching of

Lack of MLE and consequent cultural deprivation is suggested as the proximal aetiology of low cognitive performance (Feuerstein, Miller, Hoffman, Rand, Mintzker & Jensen, 1981; Glanz, 1989;).

The following discussion explores the specific dimensions of MLE in terms of certain cognitive process. These processes are creativity, cognitive autonomy, attribution, and locus of control.

2.1 MEDIATION OF TRANSCENDENCE: PRECONDITIONS OF CREATIVITY

Intellectual functioning, detailed in the paradigms adopted above, implies but does not specify a notion of creativity. In this study creativity is taken to mean the capacity for thinking which is

- Independent of the original stimulus or content
- active rather than passive in the projection and creation of new forms of thought within the individual, i.e. generative (de Bono, 1976)
- evaluative, divergent and convergent rather than previous notions that divergence is a sufficient condition of creativity (Gullford, 1967; de Bono, 1976; Tucke-Bressler, 1992).

This capacity is founded, like other cognitive functioning, in a context of Mediated Learning Experiences, i.e. it is promoted by the presence of a mediator who could extend the learners innate imaginal capacities. In the absence of such mediation, it is suggested that full creative potential is unattainable. Most significantly for teaching purposes, creativity is incremental in nature (Welsberg, 1986). Theorists have focused on various aspects of the creative process: personality, mechanisms of creative acts, environmental influence, and the manifestations of the creative act (Torrance, 1963; Khatena, 1982). In this study no one aspect is focused upon at the expense of another, in an attempt to support the definition of creativity itself.

The conceptual approach to creativity, outlined here, is founded in an understanding of cognitive processes which are used in a socially and personally responsible manner, and the

in which all learning occurs and specified it as the provision of five dimensions: intentionality of the mediator, transcendence from the immediate situation, assignment of meaning by the mediator, a feeling of competence on the part of the learner, and the regulation of behaviour through modelling differentiated rhythms of action. Currently MLE is also specified by the provision of reciprocity i.e. the evocation of the interest of the learner; sharing or attending to needs for interdependence and co-operation; individuation i.e. the valuing of uniqueness; the means for goal planning and finally challenge which is the mediation of both intrinsic motivation and self-change. Most important for this study is the notion that the

...parameters of mediation, as defined by Feuerstein and his collaborators, embrace and promote an integration of the different dimensions of human functioning - cognitive and affective; individual and social; divergent and convergent; culture-specific and universalistic...mediation may provide a key to interdimensional and intercultural co-operation (Skuy, 1992:2).

An understanding of mediation as the capacity to "perceive and take perspectives other than one's own, and thus to engage in empathy" (Skuy, 1992:12) is pivotal to the way in which provision of MLE is undertaken. The fundamental responsibility of the mediator in providing tools for cognition and metacognition to both the learner and him or herself in processes of self-growth, cannot be overemphasised.

Feuerstein posits that MLE is the necessary precondition for all learning (1979). Feuerstein notes that MLE is intentional and volitional, requiring the active participation of the mediator. MLE is a prerequisite of autonomous use of environmental stimuli, resulting ultimately in reflective thinking, inner representation and operational behaviour. Early MLE is preverbal and based in the opportunity for repetition (Feuerstein, 1979 b:1981). Feuerstein (1982) maintains that MLE is not equivalent with parenting although parenting does include a mediational role specified by Klein (1992) following from the original "mediating mother" (Feuerstein, 1981:97).

Most significantly, when mediating within the paradigm of intercultural co-operation (Skuy, 1992), MLE is the modality for cultural transmission, paralleling Vygotsky's notion of the cultural and historical antecedents of higher intellectual processes. Cognitive deficiencies are seen consequently as a failure in the provision of MLE by immediate mediator (mother/teacher) or broader mediating systems, a failure in the provision of culture and the scheduled transmission of information, values and attitudes it embodies (Feuerstein, 1979).

CHAPTER ONE : LITERATURE REVIEW

1. INTRODUCTION

Cognitive development in South Africa has been compromised by Apartheid in different ways for different racial groups in profound and complex ways. For black pupils in the state education system, it is suggested that autonomy of thinking, radical capacities to imagine and metacognitive skills have been seriously impaired. Cognitive and metacognitive skills are developed primarily by processes of mediation, i.e. an interposed adult intentionally transforming and organizing random stimuli into meaningful groups, frames and order. Change is engendered in both stimuli and learner with regard to the meaning of the former and the latter's perceptions and attitudes to the stimuli.

Mediation in South Africa has been through a cultural transmitter systemically bound up in a political hegemony invested, it is suggested, in producing cognitive dependency. It is further suggested that the impairment produced has transformed cultural difference into cultural deprivation (Skuy & Mentis, 1992).

There have been various attempts by organizations partial to change in South Africa to reverse these destructive educational trends. Interventions of remediating thinking skills have proved effective in specific situations. In particular, Feuerstein's Instrumental Enrichment programme as a vehicle for enriched Mediated Learning Experience has been applied and evaluated, largely positively, in different contexts of cognitive and affective modification, remediation and enrichment.

The aim of this study, in the light of the above, was to explore the benefits of the pervasive, system-wide application of IE in a school, rather than a special class or similar circumscribed approach. This system-wide approach is an attempt to redress imbalance as effectively as possible. These benefits were examined in terms of what type of subject benefits, and in what manner from the teaching of Instrumental Enrichment. The examination thus includes exploration of opportunities for MLE both outside and inside the VCC.

2. MEDIATED LEARNING EXPERIENCE

Feuerstein (1979) originally described Mediated Learning Experience (MLE) as the setting

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ABSTRACT

In the light of deficits in the Black Education system, historically entrenched by the ruling political hegemony, Black education has been severely compromised in S.A. In an attempt to redress the situation CEFSA, a non-governmental organisation, has set up a technical high school for adolescents, founded on the principles of Feuersteins Instrumental Enrichment Programme. Five Instruments were taught in 1992. This study is an evaluation of the changes in the students over the year on dimensions of Cognitive Processes, Learning Styles, Creativity and Self-esteem. Changes were related to both the FIE programme, as well as to broader Mediated Learning Experience opportunities both within and outside the school. $N = 114$. Statistical procedures included a range of descriptive statistics, a stepwise regression and a principal components analysis. Results indicated that changes on the above dimensions occurred in both positive and negative directions. T-tests highlighted significant changes. Demographic variables were used to explain these changes in a stepwise regression procedure. Competence on Instruments were found to be significantly positively related to end of year academic results, irrespective of demographic variables. The influences of the IE intervention were then discussed, both positive and negative in an attempt to gain understanding of future directions to be taken in teaching thinking skills within a rapidly changing socio-political context.

DECLARATION

I hereby declare that this research report is my own work. It is being submitted for the degree of Master of Education (Educational Psychology) in the Division of Specialized Education, University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.

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**INSTRUMENTAL ENRICHMENT IN A TECHNICAL
HIGH SCHOOL FOR DISADVANTAGED
ADOLESCENTS: A PILOT EVALUATION**

Degree awarded with distinction on 30 June 1994.

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Skuy, Mentis, Nkwe, Arnett & Hickson, 1990a and b).

Circumscribed interventions of teaching thinking skills have proved effective (Mentis, 1988; Skuy *et al.*; 1990 a & b). In particular, Feuerstein's Instrumental Enrichment programme as a vehicle for enriched mediated learning experience has been applied and evaluated, largely positively, in numerous different contexts of cognitive modification, remediation and learning disabilities (Feuerstein, Krasilowsky & Rand, 1974; Passow, 1980; Beasley, 1984; Shayer & Beasley, 1987; Rand, Tannenbaum & Feuerstein, 1979; Feuerstein & Hoffman, 1982; Skuy & Mentis, 1992; Burden, 1987; Burden, 1990; Feuerstein, Miller, Hoffman, Rand, Mintzker & Jensen, 1981; Skuy *et al.*, 1990 a & b; Feuerstein, Hoffman, Rand, Jensen, Tzurial & Hoffman, 1986; Arbitman-Smith & Haywood, 1980; Haywood, 1981; Savell, Twohig & Rachford, 1986; Kanief, 1992; Skuy *et al.*, 1993).

IE has been most successful when measured by standard non-verbal measures of intelligence which emphasise skill in processing spatial information (Feuerstein, Hoffman & Miller, 1980; Savell, Twohig & Rachford, 1986). Subsequently results on verbal measures have been positive (Skuy *et al.*, 1990; Skuy *et al.*, 1993). The effectiveness of IE, however, is difficult to determine with objective, normative tests although subjectively positive features are obvious and from initial implementations there have been "mild but promising" results (Arbitman-Smith & Haywood, 1980; Baltas, 1986; Dixon & Baltas, 1986). The principles of IE have been extended into the common therapeutic situation of co-existent learning disabilities and self-esteem problems (Skuy *et al.*, 1993).

It is noteworthy that IE has indicated important gains in adolescents' cognitive performance in a variety of culturally deprived settings (Haywood, 1981) supporting the notion of reversibility irrespective of age (Rand, Tannenbaum & Feuerstein, 1979). More recent results of initial and follow-up studies in Israel, Venezuela, Toronto and Phoenix, USA are "striking and suggest the possibility (at least with culturally disadvantaged students) that FIE is capable of producing some lasting improvement in the ability of some students to do well on at least some measures of intellectual ability" when sufficient instruments are taught over sufficient number of hours by teachers also teaching other subjects (Savell *et al.*, 1987:390; Watts, 1984; Waksman, 1986; Emerson, 1987; Stavros, 1989; Hoon, 1990). Most significant are

the information before it is processed and the use of error as a field for learning (de Bono, 1976). In particular, perception appears to be the foundation stone for thinking clearly, with the specific meaning of attending to as much information as possible, encoding, inferring relations, mapping from one part of a pattern to the next, applying the relation to all parts of the pattern and finally selecting optimal alternatives (de Bono, 1976; Sternberg, 1984).

Feuerstein follows on, theoretically speaking, from a combination of the Piagetian cognitive-developmental constructs of schema arising from accommodation and assimilation; Sternberg's Intellectual processes; de Bono's concepts of teaching thinking, and Vygotsky's notion of mediation in the zone of proximal development. All of these appear to be intrinsic to Feuerstein's notion of cognitive modifiability founded in directed or mediated learning experiences (Link, 1980) and the development of his Instrumental Enrichment programme as a product of modifiability enhancement theory and change (Jensen, 1992).

Feuerstein's focus was initially on retarded performers and consequently on the correction or reversibility of deficiencies (Feuerstein, 1979; Arbitman-Smith & Haywood, 1980; Haywood, 1981; Skuy & Mentis, 1992). These included e.g. impulsive and unsystematic exploratory/ perceptual behaviour; impaired capacity to deal with more than one source of information at once; failure to identify and define problems; insufficient comparative behaviour; poor hypothesis-testing; insufficient use of logic; inadequate planning; difficulty in synthesising aspects of experience (Sternberg, 1984). Correction involves the acquisition of basic cognitive concepts, labels, vocabulary, operations and relationships, the development of self-motivational and self-reflective processes, motivation towards task-orientation rather than immediate self-gratification and movement from passive reproducer of information to active generator (Feuerstein, 1979).

Subsequent to the early focus on deficiencies and delays, IE has been used with all categories of learner, both to remediate and to enhance. Following his own notion of Intelligence as comprising three components, input, elaboration and output, Feuerstein addresses remediation or enhancement to all three (Narrol & Bachor, 1975; Passow, 1980). This approach is theoretically congruent with recent thinking on intellectual processes as it teaches metacomponential and performance componential aspects of thinking skills (Sternberg, 1984:

"create" and "interact with" each other respectively. A single sign-using process brings them together (Hickmann, 1985). The nature of this creation/interaction is most evident from Vygotsky's assertion that development (cognition) lags behind learning (culture), although not in any fixed manner. This engenders the space in which the child can act on both nature and culture; in which generative mechanisms operate to transform 'flowers' to 'fruit', thus enabling people to transform their conditions of existence by practising what they do not yet know (Miller, 1989).

In the South Africa of the 1980's and early 90's, i.e. the school-going years of the subjects of this study, potentials for change have been dismissed or suppressed. Subject matter was limited and badly taught by frequently underqualified teachers. More important than content, however, learning processes have been 'mediated' with the intention of perpetuating the dominant political ideology and the obstruction of autonomous thinking skills. People who have been 'educated' in this manner have not only been critically hindered in their crossing of the zone of proximal development but also have come to employ thought processes developed in and by a political hegemony dependent upon its subjects not thinking. The crisis currently faced by major South African universities which have traditionally assumed 12 years of training in the basics and now frantically attempt to condense these 12 years into 'bridging programmes', is a testimony to the extent of damage to people minimally affected by the "success" of the Black Education System. This is not a denial of active agency on the part of the black learner, but it is an attempt to draw attention to the subtle but extensive psychological damage caused over many generations.

4. INSTRUMENTAL ENRICHMENT : SUBSTITUTIVE MLE

In the light of the above, it appears that the teaching of knowledge, although crucial, is perhaps less immediately important than the teaching of thinking skills in the context of an optimally mediating vehicle (de Bono, 1976; Vygotsky, 1978; Feuerstein, 1979; Sternberg, 1984; Skuy & Mentis, 1997; Haywood & Switzky, 1992). The instruments are means rather than ends (Sternberg, 1984), vehicles to focus the mediated learning experience provided by the teacher.

Any thinking skills programme must account for deliberateness, broad perceptual sweep of

The new organization through language is crucial to the mastery necessary for voluntary activity and choice, evidenced by internal locus of control and greater imaginal capacities. If intentions can be formulated, there is a shift from the outcome to a focus on problem-solving, from the product to the process. The construct of intention is interwoven with the idea of activity as voluntary: "...signs are used to master the self" (Vygotsky, 1978:33). Voluntary activity is thus a function of historical-cultural development of behaviour.

In South Africa, access to the English language has been limited within the education system, excluding the majority from a full experience of both the language and the mainstream culture. In addition, there has been an emphasis on teaching circumscribed content without also teaching thinking skills. The capacity to evaluate the content has not been taught, compromising metacognition generally and the metapragmatic aspects of language use in particular.

In mitigation of an assumption of isomorphic adverse effects inherent in the abuse of metapragmatic language, de Bono (1976) draws attention to non-equivalence of thinking and semantic thinking. Although the relationship is close (Vygotsky, 1978) thought appears to contain language and is predicated upon affect which in turn is created in terms of perceptual clarity provided by thought (de Bono, 1976). The relationship of thought and language, rather than their identity, is taken up by Feuerstein (1979) in his description of early Mediated Learning Experience which appears at a preverbal level. In addition, Levitt (1989) notes that individual positioning within a range of available discourses means that consequences are not linearly affected and can be contradictory. Effects of adversity cannot be assumed and must take into account factors such as developmental level and resilience (Dawes and Tredoux, 1989). It is the present intention to clarify the positions adopted by black adolescents rather than to assume damage.

The scope for compromise in intellectual development in terms of mediation has been explored above. Development is further compromised, it is suggested, in terms of traversing of the gap between achievement and potential -the zone of proximal development- which permits the ongoing possibilities of both change and the entrance of mediated learning (Vygotsky, 1978). Cole (1985) and Hickmann (1985) maintain that culture and cognition

allows them to persist despite failure. It is necessary to build upon this hope through mediation towards intercultural co-operation.

3. **MEDIATED LEARNING EXPERIENCE AND COGNITIVE DEVELOPMENT IN SOUTH AFRICA : THE NATURE OF THE COMPROMISE**

It is clear from the above that cognitive processes are mediated, and occur in the traversing of a space between actual and potential intelligence (Vygotsky, 1978; Feuerstein, 1980). This immediately calls into question the nature and quality of mediator and mediation in the movement from practical intelligence to higher mental processes (Wertsch 1985; Feuerstein (1979); Schwebel, 1992). The Black Education System embodies the filter through which the child comes to impose meaning upon his/her world both directly from school age and indirectly through his/her parents who have already been subjected to the teachings of that system or other apartheid-informed systems (Skuy & Mentis, 1992; Skuy, 1992).

Mediation in South Africa has been based in the deviant creation of a chasm between the usually interwoven practical and cultural elements of cognitive functioning. Frequently conventional schooling has been guilty of this (Donaldson, 1984); but in South Africa both elements have been additionally used separately and equally to divide and rule; practical limitations have been racially "established" and cultural elements mediated within suitable tribal confines (Skuy & Mentis, 1992). The education system has been an effective builder of higher mental processes that reflect South African "cultural forms which, in turn, embody the constraints of these processes" (Miller, 1989:5).

Moving to developed higher mental processes is beset by contextual difficulties. These are exacerbated because these processes are dependent upon speech and language (Vygotsky, 1978). The importance of language in creating thought and of linguistic construction in social life cannot be overemphasised (Shotter & Gergen, 1989). Symbolic activity has a "specific *organizing* function that...produces fundamentally new forms of behaviour" (Vygotsky, 1978:24). The child masters his environment through speech; thus forming new relations with environment; which in turn influences a new organization of behaviour in the child.

internals assimilate and use information better. This may be because they are more apt to recognise the pertinence of information for their purposes, because they are more certain of their purposes and values and therefore are more ready to perceive the opportunities that will facilitate value realisation (Lefcourt, 1976). Locus of control has also been examined in relation to attention. In studies of locus of control and attention, internals were found to show variable attentiveness, concern and interest, depending on the situation. If the task was challenging or competence important, then internals became more deliberate. Less important decisions elicited some carelessness and impulsivity from internals. Other studies quoted by Lefcourt (1976) point to the fact that externals seem to require more structure before they can perform optimally on tasks, whereas internals search for the meaning of a task without being told to do so.

Internals engage in their life tasks with curiosity as to the purposes and meanings of those tasks. Externals, although not bereft of the desires for accomplishment, do not seem as likely to question the point of the demands made upon them and as a consequence they find less reason to participate with enthusiasm until they are instructed as to the potential value of the task" (Lefcourt, 1976:78).

It is clear from these descriptions of Internals and externals that their state is a function of the quality of MLE available. It is suggested that mediation of personal challenge linked with mediation of goal planning is a method of shifting the positioning of an individual from an external orientation (which may have been necessary historically) to an internal orientation (which is necessary for productive members of a changed South African society). In turn, such a shift in locus of control is predicated upon opportunities for MLE of self-change which explicate the need, meaning and means for internality.

The necessity of mediation of challenge and goal planning is clear when examining locus of control as an important predictor of achievement behaviours, although its exact operation remains unknown. Wiener in Lefcourt (1976) has concluded that choosing to engage in an achievement activity is a function of internal variable factors. People who perceive that outcome in achievement activity is determined by their own effort will find more pleasure in engaging in their pursuits. Persistence despite failure is more likely if the causes of the failure are seen to be variable. It seems that being ineffective and defensive and a sense of helplessness exacerbate each other, although in which way is not clear. Research has pointed to the better use of coping mechanisms that internals employ which allow them to accept failure with greater ease than externals. Internals retain an idea of residual hope, and this

situations, the individual comes to be deprived of a sense of self-determination inevitably. In general, perceived control is positively associated with access to opportunity. (Lefcourt, 1976:31).

In discussing social antecedents of locus of control, Lefcourt (1976) cites the studies of Stevens and Watson, who argue that the perception of contingency is probably necessary in the transition from one developmental stage to another. They assign an antecedent role to causal perceptions in generating intelligence and reflective activity. Locus of control becomes crucial to the development of metacognitive activity as a function of cognitive autonomy.

Looking at the research of familial origins of locus of control Lefcourt points to an optimal situation of an attentive, responsive, critical and contingent milieu as a precursor of the development of an internal locus of control. Conversely, poverty and deprivation create a climate of fatalism and helplessness reflected in the scores that individuals obtain on locus of control measures. Groups with minimal power due either to class or race tend to score higher in the external control direction (Dyal, 1984). Political-situational uncertainty increases externality, and control ideology is influenced by both cultural and situational factors in unknown ways (Reimanis & Posen in Dyal, 1984).

Internal locus of control parallels notions of the autonomous self, described above. Further, acceptance of responsibility derives from the persons' maintenance of a framework of personal causation and the ability to differentiate and assess the quality of demands made on him : "... the maintenance of an internal control orientation is a bulwark against unquestioning submission to authority." (Lefcourt, 1976:46). People who resist unquestioning obedience to authority, and maintain the framework of personal causation that applies in normal situations, are able to differentiate between legitimate and illegitimate demands. Self-direction entails more active cognitive processing of information and is reflected in the types of strategies that characterise an internal or external locus of control individual.

Locus of control has been correlated with several cognitive dimensions, indicating that

It is suggested that the balance of internal/external attributions made by black South African adolescents has been shifted in the course of their cognitive development to inappropriate externalization. In addition, modes of attribution which undermine the metacognitive process of intrinsic motivation, (Deci & Ryan, 1985) developed and encouraged multi-generationally do not end abruptly and externalizing causation can continue albeit in different guises (Steele, 1990). Initial attempts to redress such entrenched imbalances through enriched MLE programmes may be unsuccessful if viewed in isolation from each other. The parameters of what constitutes success or failure of the individual programme in the context of radical socio-political and educational change are unclear. However, persistence with such programmes will, it is suggested, have a long-term positive effect, following the tenets of cognitive modifiability.

2.4 MEDIATION OF GOAL PLANNING & CHALLENGE : LOCUS OF CONTROL

An individual's perception of control or locus of control can be described as the extent to which he perceives a causal link between his actions and their outcome (Lefcourt, 1976). Unlike attributional processes, locus of control is a static description of an individual, not of what he does but rather what position he adopts. Individuals with an internal locus of control, upon which intrinsic motivation depends, perceive their own efforts as contributory to success rather than luck. Learning disabled people tend to be more extrinsically motivated, have higher expectations of failure and attribute failure to events beyond their control, thus setting up a detrimental cycle of: belief - obstructed learning - belief (Haywood & Switzky, 1992).

When an aversive event is predictable its effects are minimised, (Lefcourt, 1976). The corollary is that "perceived lack of control over valued reinforcements can help to create the passive acceptance of aversive stimulation", (Lefcourt, 1976:16). Lefcourt (1976) concludes that the perception of control is a significant determinant of the response to aversive events. To people who live in continually aversive circumstances life does not appear to be subject to control through their own efforts i.e. they are fatalistic. Fatalism is prototypic of the outlook of disadvantaged groups and Lefcourt points out that it would be foolish and "intropunitive" for many individuals to view themselves as being in charge in these situations. Despite the positive aspects of attributing external causality in disadvantaged

2.3 MEDIATION OF SHARING: MAKING ATTRIBUTIONS

One cognitive process pertinent to effective thinking is that of attribution i.e the drawing of inferences from overt behaviour about the internal state of self or other. If MLE is to occur within the framework of "interdimensional and intercultural co-operation" (Skuy, 1992) then it becomes important that attributional processes are mediated with the end-purpose of empathic metacognitive capacities (Skuy, 1992). The manner in which attributions are made can be from an empathic or a non-empathic stance, thus associating attributional processes with the mediation of Sharing.

Attributions are important for prediction i.e. making sense out of the incoherence of other peoples' behaviour. Self-concept is founded in how these predictions are made. An individuals' experiences of success and failure are attributed to four sources: ability to perform the task; amount of effort expended, difficulty of task and luck (Haywood & Switzky, 1992). Attributions to effort rather than luck are predictive of greater task success (Haywood & Switzky, 1992). The way in which Black South African youth have come to impose meaning upon an existence fractured through history has been influenced by mediated learning experiences directed away from empathic responses:

... people 'speak through' the ideologies that are active in their social context and which reveal themselves in the everyday formal and informal practices of people...In essence, attributions are mediated by the ideological context, the individual's level of consciousness and the experience of oppression (Seedat in Davies, 1989:19)

Central to prediction of causality is "whether to attribute a given act or event to internal states or to external forces" (Freedman *et al*, 1978:104). The cause can be perceived to be stable or unstable. Significantly, "...when a person is seen as not being under the control of environmental circumstances, his statements are perceived as more sincere and trustworthy reflections of his true internal attitudes...he has more persuasive impact under such conditions" (Freedman *et al*, 1978:113). If MLE is offered by mediators who are experienced by learners to be relatively independent of an "establishment", and to be more personally invested in the mediation process, the chances of cognitive modifiability are optimized. The students' perceptions of their teachers becomes a factor possibly detracting from quality of mediation. It is suggested that this historical factor must be accounted for in any evaluation of MLE programmes which involve both black adolescent pupils and white Afrikaans teachers.

achieved by an infant or young child as he begins to exist as an agent and to acquire a minimal repertoire of skills for producing intended effects, and that achieved by normal adults, able to reflect critically on their wants, needs, and situation, and thereby to make their life their own in a sense not applicable to any creature incapable of critical reflection (Haworth, 1986:20)

The second level of autonomy is characterised by critical reflection, or metacognition (Feuerstein, 1979, 1982, 1986; Nickerson, Perkins & Smith, 1985) which makes choices part of an individual's own life, whether this conforms to others or not, i.e. the person may be procedurally dependent but not substantively, led by his own agency rather than by others.

Rather than contradicting creativity, the reasonableness implicit in this second level of autonomy is fully in accord with the active agency required for true creativity, which is contained by identity and gives rise to knowledge (Albert & Spangler, 1992; MacKinnon, 1992). One "effect of critical reflection is to cause the activity it guides to come out from under the control of other people" (Haworth, 1986:28).

In summary, autonomy corresponds with competence, procedural independence and self-control when making decisions. Haworth (1986:125) refers to a "domain for autonomy" between the extremes of opportunity and constraint, in a "tissue of practices embodied in institutions, a structured environment that grounds autonomy" (Haworth, 1986:125). Liberty, if exercised without such autonomy is destructive to self and others (Albert & Spangler, 1992). Finally, cognitive autonomy includes the capacity for metacognition which has been isolated as a group of teachable thinking skills, i.e. effective planning and strategizing, monitoring and evaluation of own knowledge and performance, recognition of the utility of a skill, ability to access information and to transfer it (Nickerson *et al*, 1985; Butterfield, Slocum & Nelson, 1992; Crawford & Das, 1992). Cognitive autonomy, or the provision of mediated self-regulation and individuation, is crucial to any programme teaching thinking skills, particularly in the current context of change in South Africa (Skuy, 1992).

classroom but in daily life (Feuerstein, Krasilowsky & Rand, 1974). Included in the deliberate exploration notion of thinking is a focus on errors commonly made in thinking - partialism, initial judgment and extremes (de Bono, 1976); confusions between truth, consistency, polarity and validity, inductive and deductive argument forms, the use of or's and and's, ineffective use of negative information *inter alia* (Nickerson, *et al.*, 1985).

2.2 MEDIATION OF SELF-REGULATION & INDIVIDUATION: THE PROVISION OF COGNITIVE AUTONOMY

Autonomy is defined here as self-rule guiding the independence of thought processes enabling the individual to move from passivity through minimal competence to active agency, intrinsic motivation and self-determination (Deci & Ryan, 1985; Haworth, 1986). This definition is analogous to Feuerstein's (Feuerstein, Klein & Tannenbaum, 1991) description of the MLE dimensions of self-regulation and individuation.

The competent, creative, human or functional self is arrived at through the developmental sequence described above much in the same way as higher mental processes. The developed person is aware of self both as object and as subject or agent in three modes: knowing oneself and one's worth through concepts (self-concept); awareness of self in the feeling mode (self-esteem); and awareness of one's active agency (sense of competence) in both specific acts and general attitude to life (Haworth, 1986). Metacognitive capacities, it is suggested, are crucially impeded without a mature and textured self-understanding (Damon & Hart, 1988).

The connection of minimal competence with minimal autonomy results from the involvement of the self in both. An autonomous person rules himself, and this excludes domination of and by others and by his own impulses. A self is thus effectively interposed and mediates these influences. But this self is nothing other than the competent human, the human who has acquired an ability to produce intended effects (Haworth, 1986:14).

All of these aspects are focal points of Mediated Learning Experience (Feuerstein, 1979) which crucially promote the capacity for critical reflection. This capacity directs the movement of the child from the first (minimal) to the second (normal) level of autonomy, where the first is

creative thinking is most effective (Torrance, 1972, Khatena, 1982; Nickerson, *et al.*, 1985). The successful teaching of creative thinking is one of the principles of Feuerstein's Instrumental Enrichment programme and is therefore important to its implementation at Vaal Career College.

It is noted that knowledge, intelligence and thinking are not unitary (de Bono, 1976; Nickerson, Perkins & Smith, 1985). Nor are they discrete entities and the furtherance of the one is contingent upon the availability of the others (Haywood, 1981; Sternberg, 1984; Nickerson, Perkins & Smith, 1985; Anastasi, 1986; Goodnow, 1986; Horn, 1986; Humphreys, 1986; Zigler, 1986).

Intelligence is conceived of here as multifaceted, multidetermined, inherited polygenerically, is insufficient *per se* to produce effective goal-directed thought, problem-solving or adaptive social interactions (Haywood & Switzky, 1992). These latter are instead accounted for by a set of thinking skills and motivational processes (Haywood & Switzky, 1992:28).

The manner in which these processes reach adult format is revealing of the extent to which processing can be compromised both in terms of the interactive environment-heredity phenomena and developmental trajectories posited by Haywood & Switzky in their transactional model of intellectual development (1992).

Cognitive processes are acquired by direct person-environment transactions or by mediation of these transactions, a mediation which can be supplied by educators (Haywood & Switzky, 1992) or withheld even though this is not the apparent intention but rather the result of the "inextricable link between politics and education" (Skuy, 1993:4). In addition, cognitive processes operate concomitantly with creative processes (de Bono, 1967, 1976) and are inextricably interwoven with self-concept (Feuerstein, 1979).

Thinking skills, which operationalize cognitive processes, and which develop in a context of mediation (Feuerstein, 1979) do not only cover logic and reason but rather "the deliberate exploration of experience for a purpose" (de Bono, 1976:33), an unrestricted purpose which includes understanding, decision-making, planning and problem-solving not only in the

express appropriate feelings, liking for oneself, and satisfaction with one's attainments.

The following description of the version of the DAP used in this study is taken from Rosenbaum (1989). In a study carried out by Braun (1988), the self-report technique was found to be an unreliable measure of self-concept in black disadvantaged children. The DAP test, however, is a widely used culture-fair measure which was considered to be particularly useful in the present study because it could overcome the obstacle of the pupils' lack of familiarity with English, the standard language.

The Draw-a-Person Self-Concept Scale (DAP-S-CS), developed and validated by Bodwin & Bruck (1960) was used to score the DAP. This method of assessment was chosen on the basis of its successful use in three previous studies with black disadvantaged children. The first was that of Gordon (1983), who showed that the self-concept of black pupils in Soweto was significantly related to school failure. Subsequent research carried out by Skuy & Westaway (1985) made use of this scale, in a study which suggested that both self-concept and temperament was significantly correlated with school performance in black children.

The DAP S-CS was designed to measure self-concept in terms of self-confidence, freedom to express appropriate feelings, liking for oneself, and satisfaction with one's attainments. Bodwin & Bruck (1960) found that drawings judged for certain characteristics correlated significantly with a psychiatric interview. Some of these characteristics include reinforcement, shading, erasures, sketchy lines, transparencies, incompleteness, opposite-sex identification and immaturity. Drawings are scored according to the presence of these characteristics which are considered to reflect self-concept. The characteristics are rated on a 5-point scale which ranges from markedly present (scores 1) to markedly absent (scores 5). Appendix C (scoring system) illustrates allocation for each item. One of the difficulties regarding the use of the DAP S-CS is that some of the items, for example, item 12 (primitiveness) and item 13 (immaturity) tend to be ambiguous, resulting in subjective interpretation and subsequent scorer bias. In an attempt to minimize scorer bias, workshop sessions were held where scorers discussed each item, and consensus was reached on how each item of the DAP S-CS should be scored.

affective involvement. Structure-factor ratios are balanced by positive or negative affective involvement. In general, there are positive outcomes when the S-F ratio is at a level of difficulty which the student can handle.

In addition, the LPQ addresses metalearning i.e. the student's awareness and control of his or her own learning processes. Biggs' (1987) definition of metalearning refers to the individual knowing both content and that (s)he is involved in the act of learning per se i.e. knowledge of own motivation and strategy choice. "Students show lack of metalearning capability when they choose strategies that are incongruent with their motives..." (Biggs, 1987:5). Evidence of metalearning is apparent in deep and deep-achieving approaches (Frielick, Moelwyn-Hughes, and Kriel, undated).

4.3. Raven's (1958) Progressive Matrices

The Raven's measures the capacity to compare, reason analogously and to think logically. The test consists of 60 designs each with a part missing. Six or eight alternatives to fill in the missing part are provided. The designs are grouped into 5 sets, each with 12 matrices of increasing difficulty. Reliability is from .71 to .90; validity ranges between .80 and .90 (Anastasi, 1988:303).

4.4. Similarities (WISC-R)

Reliability coefficient = .81; stability coefficient, .81 (Wechsler, 1974). This subtest of the Wechsler Intelligence scale for children -revised, elicits capacities to abstract meaning, to categorize and to associate ideas in the verbal sphere i.e. verbal conceptualization. Pairs of words are read out to the subjects and they have to note what is the same about each word in the pair. Scoring is according to the WISC-R criteria.

4.5. Draw-a-Person

The Draw-a-Person test has been described as an acceptable screening instrument of nonverbal cognitive ability, easily administered in group settings as well as a projective technique designed to elicit self-concept (Goldberg, 1983; Koppitz, 1968; Ogilvie, 1978; Rosenbaum, 1989). The Draw-a-Person Self-Concept Scale (DAP S-CS) was used to score this test. This scale has been validated (Bodwin & Bruck, 1960; Gordon, 1983; Skuy, Snell & Westaway, 1985) as measuring self-concept in terms of self-confidence, freedom to

determine length and type of disruptions and changes as well as outings, standard repetitions, and achievements. Further questions elicited information about time and money constraints.

From the list of biographical data, parental education level was taken as one independent variable against which to correlate changes in scores on other measures, competence on IE measures and end-of-year results.

Living arrangements were also investigated i.e. with whom the subject lives, whether or not electricity is supplied, where (s)he has spent most of the time, whether or not a study place at home and/or in the library, help for homework and time for oneself are available. Based on living in uncrowded, electrified conditions with parents, space and time for oneself a "good living conditions" score was accorded. If there were more than 5 people per dwelling, no electricity, no individualized time and space, a "bad living conditions" score was accorded. Living conditions then became the other independent variable correlated with change measures, IE competence scores and end-of-year academic results.

Independent variables were grouped in this way (2) in order to reduce the data to be analysed.

Refer to Appendix B for precise details of the content and structure of this measure.

4.2. The Biggs Learning Process Questionnaire (LPQ)

This assesses an individual's motives for acquiring knowledge (and therefore his or her intrinsic motivation and locus of control factors) as well as learning strategies. The measure distinguishes 3 sets of factors:

Presage factors independent of the learning situation, including personal factors (IQ, LOC, age) and situational factors (stress, training);

Process factors which refer to whether strategies and motives are combined in various associations of deep, surface or achieving. Different combinations result in different learning outcomes with deep achieving processes being optimal.

Performance factors, broadly divided into ratios which reveal the extent of cognitive involvement in relation to factual knowledge (i.e. a structure-fact ratio) as well as

identifying relevant parameters of comparison; and the role of comparison in other areas of functioning are mediated.

3.3.4 *Categorization:*

This comprises 31 pages in modalities of verbal, pictorial, schematic and figural modalities. Based on skills learned in comparisons, this teaches the capacity to discriminate details and to categorize while gathering data. This teaches the capacity to elaborate gathered data through organizing it hierarchically into superordinate categories. It is designed to counter the exclusive use of associative cognitive styles. One attribute taught is the ability to subsume new experiences and new stimuli within already existing schemata, another is the capacity to define the rules for categorization and to encode the operation, presenting information in diagrammatic form. Purposes and limitations of categorization are indicated, as are such issues as the dependence on a chosen organizing or defining principle of a given categorization of phenomena.

3.3.5. *Analytic Perception:*

This comprises 38 pages dealing in increasing complexity with analysis in terms of the relationships of parts to each other and to the whole. It teaches the capacities to analyze and synthesise, to observe, label and compare and plan in problem-solving. It aims *inter alia* to mediate relationships of individuals to society; of specific tasks and principles to a general universe of learning.

4. THE MEASURES

4.1. Biographical questionnaire

This questionnaire has been devised for this study to provide a comprehensive profile of each subject. The aim of collecting this information was to facilitate accurate description of the sample as well as to correlate biographical data with outcomes on the other measures. In this way descriptions of the kind of individual who benefits most from Instrumental Enrichment have been refined.

General questions about background included religion, home language, parental employment and educational level. In addition, questions eliciting subjects' school history were asked to

- promoting awareness and an understanding of the need for organization and planning and acquisition of principles, criteria and methods of organization and planning;
stimulating communication,
- correcting deficient cognitive functions,
acquiring basic concepts, vocabulary, labels, operations and relationships;
- producing intrinsic motivation, reflective processes and changing perceptions towards an internal locus of control.

The task requires isolating figures, internalizing them and projecting of virtual relationships via conservation of constancy, visual transport, precisely and accurately, summing, restraining impulsivity, discriminating, and segregating proximate elements, using error as a source of critical thinking. Above all, the Instrument serves as a basis for mediating and thus bridging the objectives into all spheres of functioning.

3.3.2. *Orientation in Space I :*

This comprises 16 pages. This attempts to "break the egocentrism of the children, to teach them to divide space and to organize it in objective terms, to be able to see more than one alternative at once" (Narrol & Bachor, 1975); it promotes hypothetical thinking, and consideration of the opinions and perspectives of others. The Instrument taught deals with the concepts of right/left and front/back, and thus with concepts of relative space, and relativity generally.

3.3.3. *Comparisons:*

This comprises 22 pages. The first unit introduces concepts of commonality and difference in pictorial and verbal modalities. Comparison of two items is imposed on discrete dimensions, beginning with size, form, number, spatial and temporal concepts and concluding with abstract characteristics such as function, composition and power. Perception is tailored to recognizing commonalities and discriminating differences. "Verbal discrimination becomes finer as the children practice justifying their choices during teacher-led group discussions" (Narrol & Bachor, 1975:12). Subjects such as comparison as the basis of concept-formation are covered, and such issues as the importance of methods of

The teachers were given precise instructions for the administration of the measures below, which they did in March and December of 1992. See Appendix A for details of teacher instructions. Teachers' attitudes to the teaching of the dimensions of MLE is reported in the Results chapter following. Measurement of attitude is described below.

Measures of cognitive and creative processes were administered early in 1992 and again at the end of that school year. Two teachers completed both advanced workshops on Instrumental Enrichment presented by accredited trainers Skuy, Rautenbach and Mentis at the University of the Witwatersrand. The first five Instruments of Feuerstein's Instrumental Enrichment Program were taught during the year and this, together with IE incorporation into the general curricula comprised the intervention. IE *per se* was taught for three periods a week, each period lasting 50 minutes for 40 weeks, totalling 100 hours. In each of the school subjects, the principles of IE were incorporated in that subject matter was related back to Organization, Analytic Perception etc. In addition, mechanical workshops have been arranged according to these principles so that, for example, tools are categorized and work space is organized. All the teachers constantly made efforts to bridge from the Instruments to their subjects. Competency on these Instruments was established through measures designed specifically for this purpose by the Cognitive Research Team of the University of the Witwatersrand.

3.3. THE INSTRUMENTS

In order to circumvent barriers of culture and language, the Instruments are abstract, representational and avoid factual and knowledge-oriented content (Narrol & Bachor, 1975; Link, 1980). The following descriptions are from Feuerstein *et al.*, (1980). Instruments used in the present study were non-verbal (Organization of Dots and Analytic Perception); those involving a limited vocabulary (Orientation in Space I and Comparisons); and one requiring independent reading and comprehension skills (Categorization). These are described in detail below.

3.3.1. *Organization of Dots:*

This comprises 26 pages, each with between 14 and 18 exercises. The task is to organize an amorphous mass of dots into a prescribed structure with the following objectives:

3.1.2. Participants : The teachers

The teachers at VCC are white Afrikaans-speaking males and females. Two have university degrees, and the technical subjects are taught by artisans-turned-trainers. The teachers live in and around the Vanderbijlpark area which is a politically conservative stronghold, surrounded by the townships of Sebokeng and Bolpatong *inter alia*. These have been focal points for IFP-ANC (Inkatha Freedom Party - African National Congress) and police violence in the last 2 years. The male artisan-teachers refused to permit qualitative video-monitoring of MLE activities in their classes, despite the fact that videotaping had been agreed to and was required by the director of VCC, at whose invitation this study was carried out. This prevented an observational analysis of the quality of IE/MLE implementation at the school.

3.2. INTERVENTION AND PROCEDURE

The teachers mediated either the IE Instruments themselves (described in section 3.3, below), or specific subject matter according to the tenets of MLE, following the MLE Working Manual of Skuy, Mentis *et al* (1991). **Mediation of Intentionality** is found in the deliberate guidance of an interaction by selecting, framing and interpreting stimuli. **Reciprocity** is mediated by evoking demonstrated interest and attention to the mediators intention by the learner; **Meaning** is the conveyance by the mediator of the significance and purpose of the activity. **Transcendence** occurs when the interaction extends the issues beyond the immediate problem or activity. **Competence** is mediated when the learner develops self-confidence sufficient to engage with a sense of success in a given act. **Self-regulation** and control of behaviour and **Self-change** are mediated by raising to consciousness the need to self-monitor and adjust behaviour. In line with internal individual criteria, **sharing** points to the need for interdependence and co-operation and is oriented to the development of empathy. **Individuation** is the fostering of a sense of uniqueness and difference; encouraging autonomy and independence. **Goal planning** is the deliberate involvement of the learner in setting, planning and achieving goals by making the process explicit. **Challenge** is mediated when the mediator instills in the mediatee a feeling of determination and enthusiasm to cope with novel and complex tasks.

MLE which underlies FIE, both in and outside the VCC.

2. HYPOTHESES

- 1 Following training in IE, there will be positive changes in pre-post measures. Specifically, there will be positive change on
non-verbal and verbal Intellectual functioning (Ravens Standard Progressive Matrices; Similarities subtest of the Wechsler Intelligence Scale for Children - Revised) (Hypothesis 1.1)
creativity (Torrance Unusual Uses Test, Khatena-Morse Multitalent Perception Inventory; Khatena-Torrance Creative Perception Inventory) (Hypothesis 1.2);
learning styles (Biggs LPQ) (Hypothesis 1.3);
locus of control (Nowicki-Strickland LOC scale) (Hypothesis 1.4);
self-concept (Draw-a-Person Test) (Hypothesis 1.5).
- 2 Demographic variables will be related to pre and post interventions scores in the above measures, as well as to changes in these measures.
- 3 Demographic variables will be related to competence on the IE instruments.
- 4 Competency on the IE instruments is related to measures of academic achievement (end-of-year marks).

3. METHOD

3.1 SAMPLE

3.1.1 Subjects: the students

The sample consisted of the entire male student population (96%) of Vaal Career College (VCC) in the first year of study. One hundred and fourteen Black adolescent male subjects, who had been selected for the VCC from township schools, primarily in the area of Vanderbijlpark, took part in this study. Age ranged between 14 and 23, with a mean age of 18.

[See Results for a detailed description of the sample].

- developing communication skills needed for working and living;
- linking the teaching of theory and practice as required for careers and career choices;
- preparing students professionally for training and work in fields where skilled people are urgently needed for economic and human development.

CEFSA has formed the privately funded Vaal Career College. This is situated in the Vaal Triangle due to the heavy industries concentrated there and the absence of a training institution specifically catering to their needs. The school appointed its first staff members in September 1990 and opened to students in 1991.

The aims of CEFSA are analogous to the provision of Mediated Learning Experience and thus the adoption of the principles and techniques of Instrumental Enrichment to create a vehicle for this provision follows logically. IE has been pervasively incorporated into the school. IE is taught as a subject, other subjects are taught with IE incorporated, all teachers are trained in IE and the two teachers who teach IE *per se* have been provided with advanced training.

The aim of this study, in the light of the above, was to explore the benefits of the pervasive, system-wide application of IE in a school, rather than a special class or similar circumscribed approach. This system-wide approach is an attempt to redress imbalance as effectively as possible. These benefits were examined in terms of what type of subject benefits, and in what manner, from the teaching of Instrumental Enrichment. The examination thus includes exploration of opportunities for MLE both outside and inside the VCC.

Specifically, the demographic variables of the subjects have been used to predict competence on the IE Instruments, academic results as well as changes in cognitive functioning and self-concept. In addition, the interrelationships between competence on IE Instruments, academic results, cognitive functioning and self-concept have been explored. A model-building process has been designed to describe and explain the conditions under which IE benefits subjects optimally, in what manner they are benefited, and the impact these benefits have on their cognitive and affective development. These conditions, are the same as those which enhance

CHAPTER TWO : THE STUDY

1. RATIONALE, SCOPE AND OBJECTIVES OF RESEARCH REPORT

Cognitive development in South Africa has been compromised by Apartheid in different ways for different racial groups in profound and complex ways (see Chapter 1 Section 2 and below).

For black pupils in the state education system, it is suggested that autonomy of thinking, radical capacities to imagine and metacognitive skills have been seriously impaired. Cognitive and metacognitive skills are developed primarily by processes of mediation, i.e. an interposed adult intentionally transforming and organizing random stimuli into meaningful groups, frames and order. Change is engendered in both stimuli and learner with regard to the meaning of the former and the latter's perceptions and attitudes to the stimuli.

Mediation in South Africa has been through a cultural transmitter systemically bound up in a political hegemony invested, it is suggested, in producing cognitive dependency. It is further suggested that the impairment produced has transformed cultural difference into cultural deprivation (Skuy & Mentis, 1992).

There have been various attempts by organizations partial to change in South Africa to reverse these destructive educational trends. Interventions of remediating thinking skills have proved effective in specific situations. In particular, Feuerstein's Instrumental Enrichment programme as a vehicle for enriched Mediated Learning Experience has been applied and evaluated, largely positively, in different contexts of cognitive and affective modification, remediation and enrichment, as detailed in the previous chapter.

In one attempt to redress deficiencies in the state education system, the Career Education Foundation of South Africa (CEFSA) was formed in 1979.

The aims of CEFSA relevant to this study are:

- the developing of thinking skills;
- creating an understanding of the Industrial system and its social, economic and ecological implications;

autonomy; as the mediation of sharing as making attributions; and the mediation of goal planning and challenge in the positioning of Locus of Control. The aim of this study was to explore the benefits of the pervasive application of IE in a school, rather than a special class or similar circumscribed approach. These benefits were examined in terms of what type of subject benefits, and in what manner, from the teaching of Instrumental Enrichment. The examination thus included exploration of opportunities for MLE both outside and inside the VCC.

the maintenance and even increase in these gains over time (Savell *et al.*, 1987).

Providing the holding environment or MLE is the crucial role of the teacher who thus requires special training as well as creativity and a flexible attitude. Sternberg (1984) notes the extent of teacher-training required for IE as one of its weaknesses, although this is questionable as all teacher-training requires a novel paradigm. Nevertheless, it is clear that not all teachers are capable of learning how to teach IE (Arbitman-Smith in Sharron, 1987; Samuels & Price, 1992), particularly when it comes to bridging (Sternberg & Bhana, 1986). Only those who are able to make "learning a positive experience, who encourage original thinking, who develop positive self-regard, who emphasise co-operation, who have respect for divergent thinking, and who have few disciplinary problems...tend to be more successful in teaching the IE program" (Sharron, 1987:193). Skuy & Mentis (1992) have found that the addition of a component of socioemotional development improves the effectiveness with which teachers implement IE. The same authors note that teaching IE can perhaps affect teachers positively and render them more capable of teaching it. This supports the notion that MLE is the prerequisite of learning and that IE is an effective substitute and has been found as such in a South African study and suggests that FIE counters the damage described in section 3 above. (Feuerstein, Hoffman, Rand, Jensen, Tzuriel & Hoffman, 1986, Skuy *et al.* 1993).

Skuy (1992) points out that white teachers are fairly optimistic about educational integration despite their fears of the problems entailed. However, the majority of teachers in South Africa are black and have not received education or teacher-training equal in quality to that of their white counterparts, which is itself questionably stated in Apartheid ideology. If the teaching of IE offers MLE to deprived teachers, and not only the students, imbalances in the ecosystem are appropriately addressed at several levels. (Skuy & Mentis, 1992; Skuy *et al.*, 1993).

In the light of the above, FIE has been the programme of choice at Vaal Career College to promote MLE and the movement towards autonomous and responsible students. "Autonomous" and "Responsible" are defined here as the outcome of mediation of transcendence as creativity of self-regulation and individuation as the provision of cognitive

MEASURE	MEAN SCORE		SD		MEAN DIFFERENCE	SD	N	T-TEST
	PRE-INTERVENTION	POST INTERVENTION	PRE	POST	PRE - POST CORRECTED (R ²)			
Surface Motivation	31.99	31.34	3.36	3.64	-0.60	4.65	81	-1.16
Achievement Motivation	35.30	23.55	3.42	3.53	-1.70	3.75	80	-4.05 ***
Surface Strategy	17.61	16.68	4.23	4.12	-0.60	5.82	80	-0.92
Deep Motivation	24.11	23.54	3.33	3.71	-0.43	3.49	79	-1.10
Deep Strategy	23.47	23.66	4.40	3.88	0.44	3.93	82	1.01
Achievement Strategy	22.24	21.35	3.86	4.09	-0.95	3.71	81	-2.30 **
Surface Achievement Strategy	39.40	38.02	6.01	6.33	-1.00	8.48	81	-1.00
Deep Achievement Strategy	47.44	47.20	6.79	5.96	0.15	6.28	81	0.21
Achieving Attitude	47.40	44.65	5.95	5.75	-2.74	5.92	81	-4.17 ***

* = $p < .05$; DF = $n-1$, where n = number of pairs of observations

2.1. DIRECTION OF CHANGE IN PRE- POST TEST SCORES

In Table 3.4 the percentage of pupils whose scores changed in the desirable and non desirable directions. The table below indicates the direction of change in all measures pre- and post-training of subjects in IE:

TABLE 3.4 THE PERCENTAGE OF SUBJECTS WHOSE SCORES CHANGED FROM PRE- TO POST TEST IN THE UNDESIRABLE OR DESIRABLE DIRECTIONS FOR CREATIVITY, SELF-CONCEPT, COGNITION SKILLS SCALES

Variable	Percentage of subjects whose scores became worse	Percentage of subjects whose scores improved
<u>A. Creativity</u>		
<u>I. Khatena Morse</u>		
Creative Perception	57	17

MEASURE	MEAN SCORE		SD		MEAN DIFFERENCE	SD	N	T-TEST
	PRE-INTERVENTION	POST INTERVENTION	PRE	POST	PRE - POST CORRECTED (R ²)			
Khatena-Morse Versatility scale TOTAL	114.78	114.68	22.11	21.98	-0.11	21.68	71	-0.04
Locus of Control	20.74	21.52	3.46	4.28	-0.82	4.44	72	-1.57
Draw-A-Person (self esteem measure)	60.95	62.31	7.42	7.28	-1.32	4.47	82	2.67 **
Ravens	45.46	46.96	5.74	5.32	1.54	4.91	87	2.93 *
Similarities	24.32	31.20	6.47	5.90	7.25	7.22	77	8.87***
Torrance creativity - fluency	29.59	34.37	8.04	9.57	4.91	11.40	87	4.02***
Torrance creativity - flexibility	28.58	32.88	7.76	10.45	4.08	11.49	86	3.29 **
Torrance creativity - frequency	13.17	17.09	10.52	9.34	5.40	10.02	86	5.0 ***
Torrance creativity - TOTAL	69.51	84.66	21.72	25.60	16.03	26.45	86	5.62***
Unusual Uses - fluency	19.43	13.23	5.89	6.09	-5.13	6.93	55	-5.49 ***
Unusual Uses - flexibility	13.35	11.01	8.98	4.77	-1.32	7.54	57	-1.32
Unusual Uses - frequency	5.51	3.90	2.83	2.18	-1.32	3.19	53	-3.01 **
Unusual Uses - TOTAL	37.31	27.36	12.02	10.62	-7.44	12.81	57	-4.38 ***
Learning Styles								

TABLE 3.2: TEACHERS' ATTITUDE TO MLE SCALE

SCALE	MEAN	SD	MEDIAN
Intentionality & Reciprocity	93.33	6.12	95
Meaning Transcendence	84.44	13.79	90
Competence	93.56	7.68	90
Individuation	85.56	8.82	85
Goal-planning	96.11	6.51	100
Challenge	83.89	8.94	85
Self-change	97.78	3.63	100
Sharing	76.67	17.68	75
Self-regulation	75.00	10.31	75
	90.56	8.08	90

2. CHANGES IN PRE- POST TEST SCORES

The mean pre and post intervention scores as well as the mean pre- post test differences are presented with corresponding standard deviations in Table 3.3. Additionally, in view of the number of subjects whose scores decreased rather than increased from pre to post test, it was decided to present the percentages of pupils whose scores changed in the desirable and non-desirable directions for each test, and the remaining percentage of scores being constant.

TABLE 3.3: MEAN DIRECTION OF CHANGE IN PRE-POST TEST SCORES

MEASURE	MEAN SCORE		SD		MEAN DIFFERENCE	SD	N	T-TEST
	PRE-INTERVENTION	POST INTERVENTION	PRE	POST	PRE - POST CORRECTED (R ²)			
Khatena-Morse creative perception subscale	32.06	30.66	5.31	6.14	-1.94	5.70	72	-2.82 *
Khatena-Morse kind of person subscale	24.22	24.95	4.63	5.43	1.29	4.48	71	2.25 *
Khatena-Morse Multitalent perception subscale	59.56	59.08	17.95	16.02	-0.73	17.04	71	-0.36

Father's occupation : Unemployed Unskilled Semiskilled Semi-skilled Blue collar Qualified artisans Semiskilled White collar Skilled White collar (Managerial)	17% 11% 24% 16% 5% 9% 7%	Most fathers are semiskilled blue collar workers, unskilled or unemployed.
Father's education : none - primary some secondary matriculated tertiary	5% 8% 69% 18%	87% of fathers have matriculation or a tertiary qualification
Mother's occupation : Unemployed Unskilled Semiskilled (blue & white collar) Skilled (blue & white collar)	34% 34% 13% 17%	Most mothers are unemployed and unskilled, although 17% have achieved some qualification in blue and white collar trades or professions.

1.2. TEACHERS

The teachers' attitude to providing MLE indicates the quality of the context of MLE at VCC. Results reflected in the following table show that teachers at VCC have a positive attitude to MLE on all dimensions. The results reflected in the Table 3.2 suggest an optimal context for the implementation of FIE. According to the following table, (Table 3.2), on all dimensions the possible range of scores is 0-100.

TABLE 3.1: DESCRIPTIVE SAMPLE INFORMATION

Age of student: 14 - 15 16 17 18 19 - 20	9% 17% 18% 32% 24%	Slightly under half (44%) of students are aged 17 or younger. The others are aged 18-20 years
Number of people living in a four room house: 2 - 4 5 - 14	24% 76%	6 people per household is the mode. Approximately three quarters of students have between 5 & people living in their 4 roomed house.
Number of brothers: 2 or less 3 - 6	83% 17%	The mode : 2 brothers
Number of sisters: 3 or less 4 - 11	89% 11%	The mode : 1 sister
Electricity : supplied not supplied	75% 25%	Electricity is supplied most frequently
Urban upbringing Rural upbringing	92% 8%	Urban upbringing is most frequent
Place available for study : yes no	45% 55%	Slightly over half of the students have no place available for study
Help received with homework: yes no	41% 59%	Nearly 60% received no help with homework
Use of library :yes no	49% 51%	Slightly less than half of students claim to make use of the library
Own room at home : yes no	43% 57%	Most students do not have their own room at home
Time to themselves :yes no	74% 26%	The mode : the majority had time to themselves
Educational outing experienced :yes no	59% 41%	The mode : more students experienced educational outings
Standard or grade repeated: never once twice	47% 46% 7%	53% of students have repeated a standard or grade
Award previously received: yes no	33% 47%	Most students have received an award previously
Boycott interruption of schooling :yes no	55% 45%	Over half of the students have experienced school related boycotts

CHAPTER 3 : RESULTS

The results of the research are presented in the following sections:

In the first section (3.1), frequency counts on biographic and demographic sample data are supplied. Secondly, teacher attitudes to MLE are presented.

In section 3.2., the direction of changes in pre-post test scores are examined by presenting mean differences and the percentages of desirable and undesirable movements on pre-post intervention scores.

In section 3.3 a stepwise regression has been used to examine relationships between difference scores and demographic variables; competency on the IE instruments and demographic variables; competency on the IE instruments and end-of-year marks.

A Principle Components Analysis was then conducted in order to reduce data.

1. FREQUENCY COUNTS

The following demographic variables were examined: age, number of people in the house, educational level and occupation of fathers and mothers, number of brothers, number of sisters, electricity, urban/rural upbringing, place to study, help with studying, use of library, own room, time for oneself, educational outings undertaken, number of times a standard/grade has been repeated at school, awards received, schooling interrupted by boycotts, and/or serious illness/death, compulsory work unrelated to schooling.

1.1. SUBJECTS

Descriptive sample information about the subjects follows in Table 3.1 overleaf

3. Demographic variables will be related to competence on the IE instruments. This hypothesis was tested by means of a stepwise regression.
4. Competency on the IE instruments is related to measures of academic achievement (end-of-year marks). This hypothesis was tested by means of a stepwise regression.

multivariate approaches were required to reduce the data to manageable proportions. Firstly, the data has been described by means of frequency counts (see 2 below). Difference scores, corrected by a regression to the mean, (i.e. using R^2 excluding error variance) and indicating the magnitude of change between pre-intervention and post-intervention measures were then listed. Thirdly, a stepwise regression delineated the relationships of Biographical variables, Difference scores, Competency on IE Instruments and End-of-year Academic results. A Stepwise Regression was chosen as there was no way of knowing beforehand which groups of variables would emerge from the data and this procedure assists in model-building (Howell, 1982). Following from this procedure, and derived conceptually from it, contingency tables were drawn up. These suggested possible combinations of Biographical variables which had occurred most frequently with Difference scores, Academic results and Competency measures, treated separately. On the basis of these tables, as well as the relationships between Competency and measures of creativity, self concept, and cognitive processes, a Principle Components Analysis was conducted.

Hypotheses tested:

1. Following training in IE, there will be positive changes in pre-post measures. This hypothesis was found using frequency counts, corrected mean differences and $v+$ tests for significance. Specifically, there will be positive change on
 - non-verbal and verbal intellectual functioning (Ravens Standard Progressive Matrices; Similarities subtest of the Wechsler Intelligence Scale for Children - Revised) (Hypothesis 1.1)
 - creativity (Torrance Unusual Uses Test, Khatena-Morse Multitalent Perception Inventory; Khatena-Torrance Creative Perception Inventory) (Hypothesis 1.2);
 - learning styles (Biggs LPQ) (Hypothesis 1.3);
 - locus of control (Nowicki-Strickland LOC scale) (Hypothesis 1.4);
 - self-concept (Draw-a-Person Test) (Hypothesis 1.5).
2. Demographic variables will be related to pre and post interventions scores in the above measures, as well as to changes in these measures. This hypothesis was tested by means of a stepwise regression.

a number of different studies (Nowicki & Strickland, 1971). 36 items of the 40 item questionnaire were included, scored continuously.

4.11. Instrumental Enrichment Competency Measures

These have been designed specifically for this study by the Cognitive Research Programme of the University of the Witwatersrand to measure not only competency on selected items of the Instruments themselves but also levels of increasing transfer and "communicative use of language" (See Appendix F for example) Performance on Instrument items score either a half or whole mark for each correct item. Items requiring the subject to transfer his cognitive skills to school-related problems were weighted by a factor of 3 and to daily-living related problems by a factor of 5. Scores were then totalled (maximum possible scores varied across Instruments between 175 and 180) and combined with a measure of between 15 and 20 points for the extent to which language has been used by the subject in an effectively communicative manner, accessible to the reader. Maximum total score is 200 on any Competency measure. The measures have face validity and a median cut-off was performed to distinguish the categories incompetent-competent.

4.12. Attitude to MLE scales

Nine profiles of "Teacher's attitude to MLE in the Classroom" were collected, representing 100% of the teacher complement (see Appendix G for example). Dimensions for scoring were: intentionality and reciprocity, meaning, transcendence, competence, self-regulation and control of behaviour, sharing, individuation, goal planning, novelty and challenge and self-change. Low MLE was scored as 0%; High MLE was scored as 100%.

4.13. Academic Results

Marks were given by the VCC teachers at the end of 1992 for the following subjects: Communication, Mechanical Trade Theory, Electrical Trade Theory, Engineering Science, Mathematics.

5. DESIGN

The design of this study is correlational pre- and post-test. Several statistical procedures were used to analyse the data collected *via* the measures described above. Both univariate and

4.8. Unusual Uses

This is a test of creativity, requiring the subject to list as many uses for a newspaper as possible within a 5 minute time limit. Unusual Uses is subtest of the Torrance Tests of Creative Thinking (Torrance, 1974). It presents unstructured stimuli devised to elicit creative thinking. Reliability co-efficients range from .70 to .90; and the test has been found to possess concurrent and content validity, with some evidence for construct validity (Khatena, 1982).

Scoring has been derived and used by the Cognitive Research team of Wits University in a number of ongoing projects. In this study scoring was according to criteria of fluency, flexibility and frequency (i.e. infrequency of response is equivalent with originality). Fluency requires the capacity to produce many ideas for a given task, each idea scoring one point. Flexibility requires the subject to shift between categories of thinking (e.g. buildings); each category scoring one point. Originality refers to the capacity to produce ideas which are unusual or remote from the original stimulus. One point is scored for each response given by 8 or fewer subjects (Skuy, Mentis, Nkwe, Arnott, & Hickson, 1990; Rezek, 1990).

4.9. Cognitive Rating Scales

These self-report scales have been developed specifically for this type of study by the Cognitive Research Programme of the University of the Witwatersrand. They are based on the cognitive dysfunctions formulated by Feuerstein (1979) and involve a transformation of each discrete dysfunction into a function - dysfunction continuum, as well as an operationalization of terminology used to describe each function. One form asks teachers to rate students; the other asks students to rate themselves. They were included in the test battery in order to elicit an evaluation of the teachers to their students as well as the metacognitive processes of the students themselves. The 5-point scale has 26 questions of a metacognitive nature, eliciting *inter alia*, cognitive strategies. The questions ask the frequency each strategy is embarked upon, ranging from always to never. (Appendix H)

4.10. Nowicki-Strickland Locus of Control questionnaire for children

Internal consistency = .74; test-retest reliability = .71. The scale is designed to measure externality or internality of locus of control and has proved a useful and valid instrument in

write their names on the top left hand side of the page and then told "draw a picture of a person in pencil. It must be the whole person, not just the head or a stick figure". The teacher then had to draw an example of a stick figure and explain that this was incorrect. The students were told that they were permitted to erase and redraw. On completion, the students were told "Give the person you have drawn a name and an age and to write this in the bottom right-hand corner." Several minutes were allowed for this task although there was no strict time-limit.

Scoring of the DAP S-CS

Scoring was done by Masters Students in Educational Psychology, research assistants and the author. Each DAP test was independently rated by at least 2 scorers to determine inter-rater reliability.

Scoring was in terms of presence or absence of certain characteristics e.g. shading on a 5-point scale, ranging from markedly present (1) to markedly absent (5). Scoring is along seventeen dimensions, which included

- a. Items 1 - 13 ; Bodwin & Bruck's Draw-a-Person Self-Concept scale;
- b. Items 1 - 17 ; a combination of Bodwin & Bruck's scale and four additional items;
- c. Items 1 - 4 (four additional items).

4.6. Khatena-Morse Multitalent Perception Inventory

This inventory has two scales of 50 items each designed to identify leadership, music, art and creative talent of people over 10 years of age. Most subjects can complete the inventory in 10 to 30 minutes. Scoring consists of counting affirmative responses with the total serving as an index of versatility. Reliability co-efficient = .88 on average; validity co-efficient = .72 on average (Khatena and Morse, 1987).

4.7. Khatena-Torrance Creative Perception Inventory

The inventory consists *in toto* of 3 activities used in this study: Picture Construction, Picture Completion and Lines (See Appendix C). Norms are standardized on adolescents between 12 and 20 years of age. Scoring procedure is described in point 8 below. Reliability = .71 - .97; Validity .32 - .75. (Khatena & Torrance, 1973).

Four new items were added by Rosenbaum (1989) to the DAP S-CS. See Appendix C which illustrates the score allocation for each item. Rationale for the inclusion of the four additional items was based on a review of the literature on emotional indicators of the DAP test. The four items consisted of:

A. Size of Drawing

Ogdon (1978) found that unusually small figures reflect generalized discontent, feelings of inferiority, ineffectiveness, inadequacy and insecurity. Koppitz (1968) found that tiny figures (less than 6 cm in height) reflect insecurity, shyness, inadequacy, excessive defensiveness and low self-esteem. Ottenbacher (1981) found that tiny drawings reflect poor self-concept. Large figures (greater than 22cm in height) reflect immaturity, grandiosity and poor self-concept (Koppitz, 1968).

B. Fantasy Figures

These include monsters, clowns, tramps, witches and cartoon characters. Koppitz (1968) found that these figures reflect intense inadequacy and a poor self-concept.

C. Profile View

Machover (1949), found that drawings in profile are indicative of social anxiety, evasiveness and a reluctance to face or communicate with others.

D. Placement on the Page

Central placement suggests a normal reasonably secure person (Lakin, 1956; Urban, 1963); high on the page suggests insecurity (Levy, 1958); low on the page suggests feelings of insecurity and inadequacy, (Urban, 1963; Hammer, 1958); right side of the page suggests possible introversive, inhibited or intratensive tendencies (Buck, 1950; Hammer, 1958); left side of the page suggests possible feelings of uncertainty and apprehension (Machover, 1949). Placement in the corner suggest possible pathological feelings of inferiority (McElhancy, 1969).

The DAP S-CS pre-test was administered at the beginning of the school year with the other tests by the teachers. Pupils were given A4 paper, pencil and erasers. They were told to

It appears that a combination of detractors from MLE both inside and outside the school explain negative difference scores. Most important, however is the situation of the school in a sociopolitical context, of which the educational sub-system sequelae cannot be overemphasised. Even though VCC aims are incompatible with the perpetuation of the hitherto dominant political hegemony, subjects at VCC have already been exposed to the mediation of cognitive dependency rather than autonomy. The first year of such a project cannot, it is suggested, hope to achieve more than the positive results described above. Subsequent years of training in IE, if undertaken, will begin to address more radical change.

2. SCHOOL ACHIEVEMENT

It was hypothesised that demographic variables would affect competence on the IE Instruments. A positive relationship was found between competence on all the Instruments and all final marks, treated separately. However, the relationship is purely correlational and causality in either direction cannot be inferred. In spite of this, the result needs to be deconstructed in order for it to assume the importance that fine examination will provide. Although there has been some investigation of the result in this study, there is indication for further study.

Most significant is the positive relationship between all final scores (except Mechanical Trade Theory) and competence on the Comparisons Instrument. Perhaps this is the Instrument which needs to be the basis of a modification programme to prepare severely MLE deprived individuals for the full IE programme. It appears that the simple knowing that comparing involves both similarities and differences is the one precursor of learning most obviously destroyed by the vagaries of Black Education situated in Apartheid. The capacity to perceive similarity in the face of multigenerational permission to know only difference has been to an extent crippled. Mediation of intercultural empathy may find its beginnings in the MLE encapsulated by the Comparisons Instrument.

3. CONTEXT

It was hypothesised that demographic variables would affect the change in measures of cognitive skills and styles, self-concept and creativity as well as competency on the IE Instruments themselves. The results suggest that changes in all measures were positively

on Similarities (also found in Skuy *et al.*, 1990; Skuy *et al.* 1993) is of further importance as it is primarily a test of the ability to reason abstractly. It appears from these results that such an ability can be taught. This finding is both supportive of Feuerstein's founding notion of Cognitive Modifiability and the extension of MLE and IE; and of using IE to begin to undo the extensive damage to disadvantaged black South African adolescents. The CEFA, aims as implemented at VCC appear, therefore, to be both valuable and practicable.

Positive changes in non-verbal creative responses suggest that, to an extent, IE is addressing thinking skills not only at the level of conventional measures of intellect but also in circumscribed ways on a more profound level. Following the discussion of creativity above, and its relationship to the notion of cognitive autonomy and mediation as fundamental to intercultural co-operation, it is suggested that IE as taught at VCC is indeed addressing these issues. If creativity is pivotal to cognitive autonomy, which is, as argued in chapter 1 responsible thought, then an improvement on only non-verbal measures is perhaps a beginning of a process of MLE which will extend to verbal measures in due course.

However, the negative movement of other measures of creativity and the lack of movement of the measure of self-concept require comment. It is possible that IE has not been used optimally at VCC as a transmission vehicle of the MLE dimensions of Transcendence, Self-regulation, Individuation and Sharing. It is also possible that cognition and metacognition inherent in these dimensions has been compromised outside VCC both historically and currently to the extent where perhaps a bridging type of programme is required before the Instruments themselves can be introduced.

Of equal importance to negative movement in measures of creativity is the negative movement in the Locus of Control score. This suggests that subjects have shifted towards externalising responsibility for events and not perceiving their position in a sequence of events as being causal. It is possible that there has been overzealous structuring of their time at school and a removal of opportunities for them to fail and learn constructively and consequentially. In addition, the subjects have been through a selection procedure to get into VCC and possibly have a distorted picture of maintaining personal responsibility once in the school.

CHAPTER FOUR : DISCUSSION

1. CHANGES

1.1. It was hypothesised that there would be positive changes in measures of cognitive skills and styles, self-concept and creativity after five IE Instruments had been taught to the subjects.

Design limitations preclude knowledge of whether changes were significant or not. The absence of a control group precluded a clear understanding of statistical procedures such as t-tests to analyse the difference scores. Nevertheless, a qualitative review of changes follows.

Positive changes did occur in conventional measures of intellectual functioning in both verbal (Similarities) and non-verbal (Ravens) dimensions. Positive changes also occurred in one measure of creativity (Khatena-Torrance Creative Perception Inventory) which elicits non-verbal creative responses. However, the two measures of creativity requiring verbal responses (Khatena-Morse and Unusual Uses) moved negatively i.e. on these measures most subjects responded less creatively after being taught the IE Instruments.

In addition, half the subjects' Locus of Control moved negatively i.e. their perception of personal causality and responsibility moved in an outward direction from a largely internal locus (70% were Internals on the pre-test) towards the diffusion of responsibility rather than its acceptance. Finally, there were no changes in self-concept after being taught IE.

1.2. The positive changes in conventional measures of intellectual functioning after training in IE supports the substantial body of literature examined earlier with regard to the non-verbal measure (Ravens). The verbal dimension has had supportive results previously which are not furthered by this study. Nevertheless, it is particularly relevant to note that 82% of subjects improved on this dimension. The language component of thinking skills cannot be overlooked, following Vygotsky's theory explained earlier, and as it has a pivotal role in the communication of actual competence as well as in final academic results. The improvement

2.3 Learning Styles	Learning styles: Surface motivation*, Surface strategy* Deep motivation* Achievement Motivation** Deep achieving* Achieving*	
2.4 Locus of Control	Locus of Control, movement towards internality*	
2.5 Self concept		Draw A Person*
3. Demographic variables will be related to competence on the IE instruments	Comparisons*, Categorizations*, Organization of Dots*, Orientation in space*, Analytic perception*	
4. Competency on the IE instruments is related to measures of academic achievements(end of year marks)	Communication*, Electrical Trade theory**, Mechanical trade theory**, Mathematics**, Engineering science**	

As operationalized by the improvement in the majority of scores.
As operationalized by the deterioration in the majority of scores

4. PRINCIPLE COMPONENTS ANALYSIS

As Using Principal Component scores would have resulted in sacrificing between 24% to 27% of the variance in the measures, it was decided not to trade off reduction in information at the expense of loss of significant variance. The results of the Principle Component analysis can briefly be described as follows:

Approximately 3/4 of the variance in the demographic variables could be accounted for by the first Principle Component extracted. In the case of demographic variables 73% of variance was accounted for by Fathers' occupation, help received with homework and interruptions by boycotts and other serious events. 76% of the variance in the creativity variables could be accounted for by the Torrance Creativity and Unusual Uses tests, while 73% of the variance in cognitive skills and styles could be accounted for by Ravens and Deep Strategy Learning Styles.

TABLE 3.8 : SUMMARY OF SUPPORTING AND NON-SUPPORTING EVIDENCE FOR EACH HYPOTHESIS

HYPOTHESIS	SUPPORTING EVIDENCE #	NON SUPPORTING EVIDENCE ##
1. Following training in IE there will be positive changes in measures of:		
1.1 nonverbal and verbal intelligence	Ravens *, Similarities **	
1.2 creativity	Torrance-Creativity ***	Unusual Uses *** Khatena-Morse Versatility Index ***
1.3 learning Styles		Achievement Motivation***, Achievement Strategy ***, Achieving attitude***
1.4 locus of control		Movement towards externality
1.5 Self concept		No change
2. Demographic variables will be related to measures of:		
2.1 nonverbal and verbal intelligence	Ravens * Similarities *	
2.2 Creativity	Torrance Creativity * Unusual uses *	

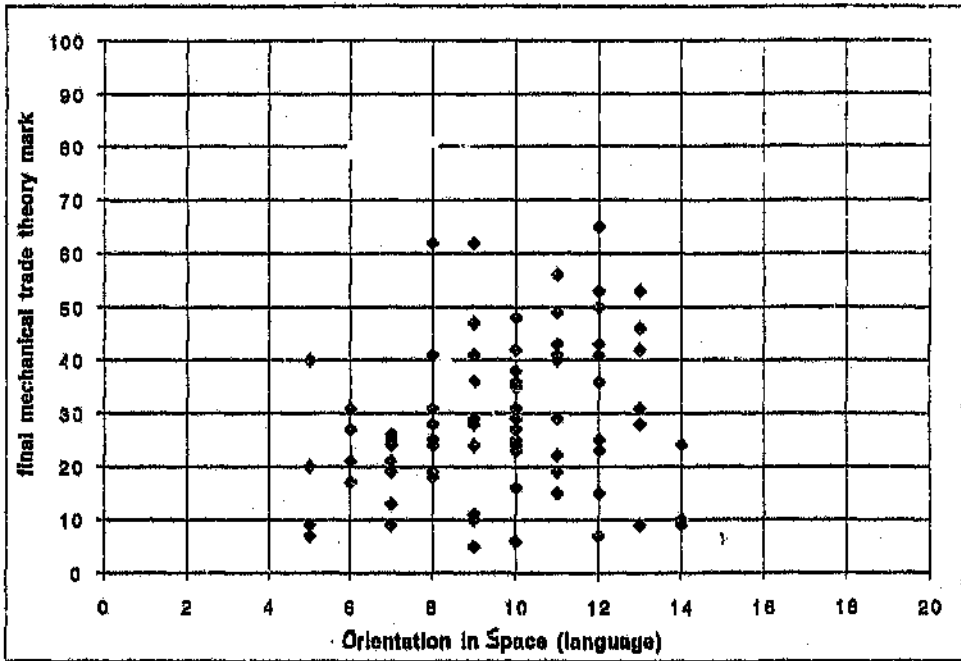


FIGURE 2: SIGNIFICANT RELATIONSHIP BETWEEN COMPETENCY ON ORIENTATION IN SPACE AND MECHANICAL TRADE THEORY MARKS

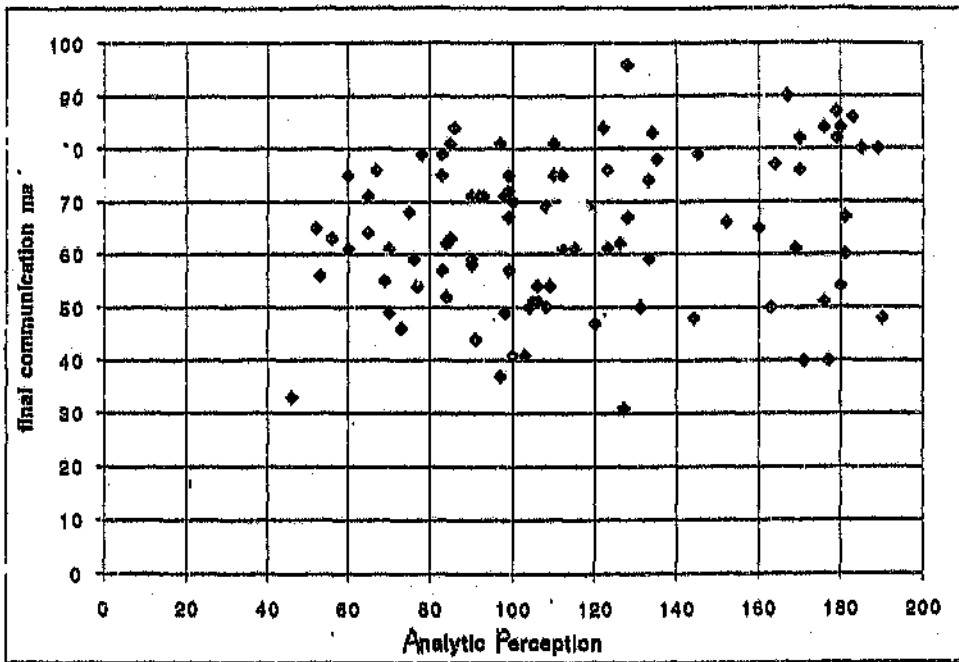


FIGURE 3: SIGNIFICANT RELATIONSHIP BETWEEN COMPETENCY ON ANALYTIC PERCEPTION AND FINAL COMMUNICATION MARK

End-of year Communication scores are related positively to competence on IE Analytic Perception and Comparisons Instruments.

End-of-year Electrical Trade Theory scores are related positively to competence on the IE Comparisons Instrument.

End-of-year Mechanical Trade Theory scores are related positively to competence on the IE Orientation in Space Instrument (language component).

End-of-year Mathematics scores are related positively to competence on the IE Comparisons Instrument.

End-of-year Engineering Science scores are related positively to competence on the IE Comparisons Instrument (language component) and the IE Categorizations Instrument.

Competence on the IE Instruments and their relationship with final marks are illustrated by the figures below:

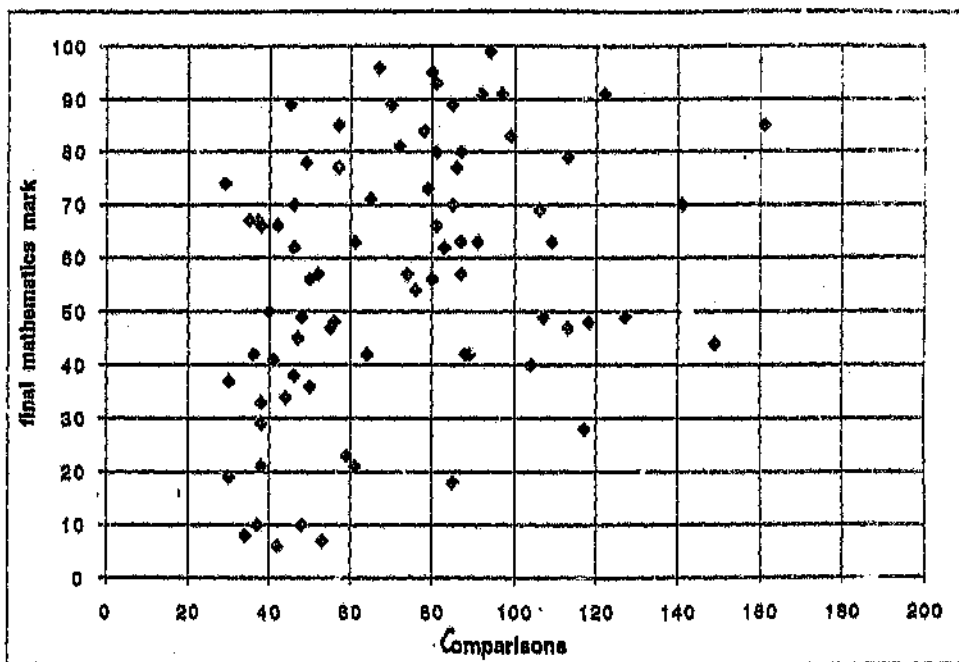


FIGURE 1: SIGNIFICANT RELATIONSHIP BETWEEN COMPETENCY ON COMPARISONS AND FINAL MATHEMATICS MARKS

Competence on the IE Comparisons Instrument is positively related to subjects' having time to themselves.

Competence on the IE Categorizations Instrument is positively related to fewer interruptions in schooling through boycotts or serious events, having more brothers, having time to one's self and being nearer 21 in age than 14.

Competence on the IE Organization of Dots Instrument is positively related to having more sisters, electricity in the home and a place to study. Hypothesis 3 upheld: Demographic variables are related to competence on the IE instruments.

Competence on the IE Orientation in Space Instrument is positively related to fewer repetitions of a grade or standard, having a place to study and fewer interruptions in schooling by a serious event.

Competence on the IE Analytic Perception Instrument is positively related to mothers' occupation, working outside of school, using the library, and having more brothers.

TABLE 3.7 SIGNIFICANT POSITIVE RELATIONSHIPS BETWEEN COMPETENCY ON IE INSTRUMENTS AND END OF YEAR MARKS

Predictor (Competency)	Criterion (Marks)	F	R2	Prob > F
Analytic Perception Total	Communication	7.03	0.13	*
Comparisons (language)	Communication	4.97	0.08	*
Comparisons	Communication	5.57	0.09	*
Comparisons (language)	Electrical trade theory	12.2524	0.24	**
Comparisons	Electrical Trade Theory	4.49	0.08	*
Orientation in Space (language)	Mechanical Trade Theory	13.53	0.22	**
Comparison (language)	Mathematics	13.62	0.22	**
Comparisons	Mathematics	6.13	0.09	*
Comparisons (language)	Engineering Science	5.08	0.12	*

As the above table shows, Hypothesis 4: Competency on the IE instruments is related to measures of academic achievement (end-of-year marks) is upheld as follows:

having one's own room, receiving an award, age, having electricity, father's occupation and having time to oneself. Hypothesis 2 (2.3); H_1 upheld.

Demographic variables are unrelated to self-concept. Hypothesis 2 (2.5) H_0 upheld.

The following table shows significant relationships found between competency on the Instruments and demographic variables of subjects:

TABLE 3.6 SIGNIFICANT POSITIVE RELATIONSHIPS OF COMPETENCY SCORES ON THE INSTRUMENTS TO DEMOGRAPHIC VARIABLES

Predictor: Demographic Variables	Criterion: Competency scores	F	R2	Prob > F
Time to oneself	Comparisons Total	4.15	0.11	*
Age	Categorization	5.71	0.15	*
Serious event	Categorization (language)	5.08	0.14	*
Number of brothers	Categorization (language)	5.37	0.13	*
Age	Categorization Total	5.86	0.15	*
Having time to oneself	Categorization Total	6.53	0.15	*
Electricity	Organization of dots	7.87	0.16	*
Having a place to study	Organization of dots	8.24	0.14	*
Number of sisters	Organization of dots Total	7.22	0.14	*
Number of times standard or grade repeated	Orientation in space	4.32	0.11	*
Number of times standard or grade repeated	Orientation in space (language)	7.83	0.18	*
Having a place to study	Orientation in space (language)	4.2	0.90	*
Serious events interrupting schooling	Orientation in space (language)	4.41	0.09	*
Number of times a standard or grade repeated	Orientation in space Total	4.86	0.12	*
Mother's occupation	Analytic Perception	7.33	0.15	*
Work unrelated to school	Analytic Perception (language)	6.81	0.14	*
Mother's occupation	Analytic Perception Total	6.99	0.14	*

As is shown by Table 3.6, Hypothesis 3 (demographic variables will affect competence on the IE instruments), is upheld in the following ways.

As Table 3.5 shows, Hypothesis 2 which posits that demographic variables will be related to pre and post intervention scores as well as to the measures used, is partially upheld.

Subhypothesis 2.1: non-verbal and verbal intellectual functioning (Ravens Standard Progressive Matrices; Similarities subtest of the Wechsler Intelligence Scale for Children - Revised)

Subhypothesis 2.2: creativity (Torrance Unusual Uses Test, Khatena-Morse Multitalent Perception Inventory; Khatena-Torrance Creative Perception Inventory);

Subhypothesis 2.3: learning styles (Biggs LPQ);

Subhypothesis 2.4: locus of control (Nowicki-Strickland LOC scale);

Subhypothesis 2.5: self-concept (Draw-a-Person Test).

The partial upholding of the hypothesis is detailed below.

Subjects' Internal Locus of Control is related positively to number of brothers and mother's occupation. Hypothesis 2 (2.4); H_1 upheld.

Subjects' Ravens score is related negatively to interruptions in schooling due to a serious event (fewer events, higher score). Hypothesis 2 (2.1); H_1 upheld.

Similarities scores are positively related to educational outings undertaken. (Higher score, more outings). Hypothesis 2 (2.1); H_1 upheld.

Torrance Creativity difference scores are positively related to father's occupation, having one's own room, and having fewer interruptions in schooling by serious events or boycotts. Hypothesis 2 (2.2); H_1 upheld.

Unusual Uses difference scores are related positively to having fewer interruptions in schooling by boycotts, having a place to study and receiving help with homework. Hypothesis 2 (2.2); H_1 upheld.

Learning Styles difference scores are related positively to the number of people in the house,

The majority of pupils improved their scores on seven of the 16 tests. On the other nine tests, pupils' scores either stayed constant or dropped in the undesirable direction. Support for Hypothesis 1 is limited to the former seven tests. Pre- post test changes on the majority of tests do not support the hypothesis. Overall therefore, Hypothesis 1 is only partially upheld.

3 STEPWISE REGRESSION

TABLE 3.5 RELATIONSHIP OF DIFFERENCE SCORES TO DEMOGRAPHIC VARIABLES.

Predictor	Criterion	F	R2	Prob > F
Number of Brothers	Locus of Control	5.54	0.14	*
Mother's occupation	Locus of Control	5.19	0.24	*
Serious school interrupting event	Ravens	6.05	0.15	*
Educational outing	Similarities	4.59	0.12	*
Having one's own room	Torrance Creativity fluency	4.10	0.10	*
Father's occupation	Torrance creativity - fluency	4.11	0.09	*
Having ones own room	Torrance Creativity - flexibility	5.54	0.12	*
Boycott interruption of schooling	Torrance Creativity Total	4.47	0.11	*
Having ones own room	Torrance Creativity Total	4.15	0.09	*
Boycott interrupting schooling	Unusual Uses - Flexibility	5.25	0.17	*
Having a place to study	Unusual Uses Total	4.24	0.15	*
Age	Surface Motivation Learning Style	5.37	0.13	*
Having ones own room	Surface Strategy Learning Style	4.12	0.11	*
Having received an award previously	Deep Motivation Learning Style	4.1	0.11	*
Number of people in house	Achievement Motivation	9.02	0.20	**
Electricity	Achievement Motivation Learning Style	9.02	0.20	*
Having time to oneself	Deep Achieving Learning Style	4.80	0.12	*
Father's occupation	Deep Achieving Learning Style	4.03	0.10	*
Electricity	Achieving Learning Style	4.88	0.12	*

Kind Of Person	38	58
Multitalented perception	58	42
Total Index	58	42
2. Unusual Uses		
Unusual Uses Fluency	79	17
Unusual Uses Flexibility	55	42
Unusual Uses Frequency	65	18
Unusual Uses TOTAL	70	27
3. Torrance Creativity		
Torrance Creativity Fluency	26	65
Torrance Creativity Flexibility	29	66
Torrance Creativity Frequency	32	64
Torrance TOTAL	22	78
B. Self-Concept		
Locus of Control	49	42
Draw-A-Person	3	15
C. Cognitive Skills and Styles		
Ravens	33	62
Similarities	17	82

It was hypothesised (HYPOTHESIS 1) that there would be positive changes in measures of cognitive skills and styles, self-concept and creativity after five IE Instruments had been taught to the subjects. Positive changes occurred in one measure of creativity (Khatena-Torrance Creative Perception Inventory) which elicits non-verbal creative responses. However, the two measures of creativity requiring verbal responses (Khatena-Morse and Unusual Uses) moved negatively i.e. on these measures subjects responded less creatively after being taught the IE Instruments. Half the subjects' Locus of Control moved negatively i.e. their perception of personal causality and responsibility moved in an outward direction from a largely internal locus (70% were internals on the pre-test) towards the Diffusion of responsibility rather than its acceptance. Finally, there were no changes in self-concept after being taught IE. The majority of pre- post test differences showed improvement in the case of the changes of conventional measures of verbal and nonverbal intellectual functioning (Similarities and Ravens dimensions respectively).

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research context. It is suggested that a different and more appropriate research paradigm is evaluated before traditional research questions can be answered.

Secondly, although the fundamental premise of cognitive modifiability is apparently upheld in this study, perhaps there is a level at which subjects have suffered such extensive multigenerational damage that the IE instruments require some bridging to make them even more accessible in the current context.

In conclusion, it appears that whilst some subjects do benefit from IE at VCC, many cannot. Future research, it is suggested, needs to be directed at this latter group, as they are probably more representative of the average black South African adolescent than the former group.

be viewed in a cautionary manner as the need to stay within the confines of job requirements may serve to bias these results. This suggestion is supported by the four teachers who did permit qualitative evaluation by video (Appendix D). Their attitude to MLE was not reflected in their practice of it in the classroom. It is suggested that those who would not permit videoing would perhaps have been even more discrepant in attitude and practice. Two scorers evaluated the video independently.

Thirdly, while some of the teachers involved in the study were extremely co-operative, particularly those trained in advanced IE, others seemed to feel threatened by both the presence of a researcher from the University of the Witwatersrand, which is perceived as radical, and by the agreement between CEFSA and the University that their lessons should be videoed in order to monitor and correct provision of classroom MLE.

As a consequence, it appears that administration of tests and collection of data were compromised. In particular, the study is lacking in qualitative data about how effectively the IE programme was implemented and most significantly about the relationship between teachers and students in the school. This latter is inherently conflictual without racial difference in that the relationship between an adolescent and an adult in a position of structural authority and guidance is essentially fragile (Meeks, 1971). It is suggested that deliberate measures to improve teacher-student relationships before IE programmes are introduced be undertaken with some input for teachers on developmental aspects of adolescent cognitive and affective psychology.

Certain of these deficiencies were exacerbated by the risk of violence when travelling from the university to the school at the time, which reduced personal supervision by the researcher considerably. It is suggested that all of the limitations of this study point to a need for a different type of research to be conducted in the South African context, research which is participatory and community-based.

5. SUGGESTIONS FOR FUTURE RESEARCH

The most important indication for future research arising from this study is not the effectiveness of IE itself as much as the design considerations in a violent and volatile

related to quality of MLE received in the home setting from other family members who were, in turn, in a good position to offer it through level of education or occupation. The quality of MLE at home is further promoted by subjects having space and time in which to benefit from it.

These fundamentally common-sense results have been possibly overlooked in the implementation and evaluation of IE at VCC because of their obvious nature. Nevertheless, to approach re-education in South Africa cannot be decontextualized from ecosystemic issues. In a vicious cycle, MLE has been deliberately undercut over several generations, provided increasingly diminished returns resulting in the current position of maximal MLE required and minimal available from within the basic societal unit, i.e. the family. In setting up schools such as VCC, it is suggested that resources in the community are researched and utilized. Other Non-Governmental Organizations may be able to provide complementary facilities such as community centres which include libraries. The situation of these centres in the community by CEFSA rather than at the school for the exclusive use of students may ultimately begin to redress external MLE deficits. Significantly, if the school is perceived to be part of the community rather than yet another attempt by well-intentioned but separate groups usually associated with establishment and envied privilege, the school will become a focal point of growth on both individual and communal levels. This would, it is suggested, provide an opportunity to change the conflicted forum of "school" which has developed since 1976, from a place in which justifiable grievance and fearful authority clash without resolution, to a centre for the promotion of intercultural mediation and societal growth.

4. LIMITATIONS OF THE STUDY

Firstly, statistical procedures such as t-tests were conducted on the difference scores to establish their significance in the absence of a control group or a split-half design. These design deficiencies mean that discussion on changes can only be viewed as suppositions about tendencies rather than definitive statements.

Secondly, the small N and high scores on the teachers' attitude scale should, as is suggested,

Describe the place where you study?

.....
.....

Is there someone to help you with your homework?

.....

Do you often study in the library?

How many times a week do you study there?

.....

Do you have your own room?

.....

Can you have some time at home just for yourself when your family or other people will not want you to do things for them?

.....

SCHOOL HISTORY

Have you ever gone to another school?

.....

Have you ever gone on any educational outings?

.....

If so where did you go?

.....

Have you ever repeated a standard or a form?

.....

LIVING ARRANGEMENTS:

Do you live with both your parents?

If the answer is no do you live with:

(a) one parent?

or

(b) do you live with none of your parents?

.....

If you don't live with any of your parents, who do you live with?

.....

How many people live in your home?

How many brothers and sisters do you have and what are their ages?

 How many brothers do you have?

 List their ages:

 How many sisters do you have?

 List their ages:

Do you have electric lighting at home?

.....

Have you spent most of your life in the city or in the country?

.....

Do you have a place where you can study which is quiet at home?

.....

APPENDIX B

BIOGRAPHICAL QUESTIONNAIRE

Please fill in the following questions which will help us in the assessment of this project. The information you give will be treated as strictly confidential and only be used by the University of the Witwatersrand Research team for this research project.

Name:

Date of Birth:

How old were you on the 1st day of January 1992?
.....

Male/Female:

Religion:

Home Language:

Is your Father employed?
.....

What is your Father's Occupation?
.....

What is your Father's level of education? . e.g Does he have matric?

Is your Mother employed?
.....

What is your Mother's occupation?
.....

What is your Mother's level of education?
.....

Answer all the questions.

THE STUDENTS' VERSION OF THE COGNITIVE RATING SCALE (FORM 2)

- 10.2 Hand out the students' version of the cognitive rating scale called "The way I think".
- 10.2.1 Say "Write your name in the space at the top which says student's name."
- 10.2.3 Then say "Read each statement and decide if this describes your thinking style. Circle the word which describes how often or how much you use this way of thinking. Answer all the questions and don't leave any out".

7. **THE BIGGS TEST**

Approximate time needed: 45 minutes

Refer to the instructions on the test.

Assist students with careful and correct marking of the computer form.

8. **UNUSUAL USES TEST**

Approximate time: 10 minutes

8.1 Hand out the Unusual Uses form and ask the students to fill in their names.

8.2 Say " I want you to write down as many new, different and exciting things you can think of to make or play with out of a newspaper. You have 5 minutes to complete this exercise. Wait for the signal to start. Any questions?...Start."

9. **TORRANCE CREATIVE THINKING TEST**

Approximate time: 40 minutes

9.1 Hand out the booklet.

9.2 Read out the instructions for Activity 1. Tell students they have about 10 minutes for this activity and after 5 minutes, tell them there are 5 left.

9.3 Read out the instructions for Activity 2. Allow 10 minutes and tell students when there are 5 minutes left.

9.4 Read out the instructions for Activity 3. Allow 10 minutes and tell students when there are 5 minutes left.

10. **THE COGNITIVE RATING SCALES FOR TEACHERS AND FOR STUDENTS.**

THE TEACHER'S VERSION OF THE SCALE (FORM 1)

10.1 The teacher's version of the cognitive rating scale has an extra page attached which is a graph of the categories to be used by the teacher in evaluating the student. **THIS MUST NOT BE HANDED OUT TO THE STUDENTS.**

10.1.1 Fill in the questionnaire on each of your student's thinking styles and problem solving abilities. Circle the most relevant term on the continuum which describes that particular student's thinking skills.

6. THE RAVENS TEST

Approximate time needed: 1 hour

6.1 Each student is handed an answer form and needs a pencil. The test books are then handed out. They must not open the books until everyone is ready. The group does the first 2 examples together.

6.2 Say "open your books on the first page" (you can show the demonstration model for the class to see). "At the top it says SET A and you have column A here on your scoring form. This is A 1. You see what it is (point to the large patterned block). The upper part is a pattern with a bit missing. Each of these bits below (point to blocks 1 - 6 in turn) is the right shape to fit the space, but they do not complete the pattern.

Number 1: (point to the bit and then to the pattern) is definitely the wrong pattern. Numbers 2 and 3 are also wrong - they fit the space but they are not the right pattern.

What about number 6? It is the right pattern (show that the pattern is the same as the pattern above) BUT it does not go all over.

Put your finger on the one that is quite right."

6.3 Check that the students have done this and say - "yes, number 4 is the right one. So the answer to A 1 is 4. Write 4 here against number 1 in column A on your scoring form. Do not turn over yet." Wait for everyone to mark the example.

6.4 Give brief instructions on the principle of how the rows and columns for pattern sequencing are organized. Elicit as many responses from the students as you can before you give them the answers.

6.5 Then say "on every page in your book there is a pattern with a bit missing. You have to decide each time which of the bits below is the right one to complete the pattern above. When you have found the right bit, write the number of it down on your scoring form against the number of the main pattern. They are simple at the beginning and get harder as you go on. There are no trick questions.

If you pay attention to the way you do the easy ones, you will find the later ones less difficult.

Try each in turn from the beginning right to the end of the book. Work at your own pace. Do not miss any out. Do not turn back. See how many you can get right. You have as much time as you like. Turn over and do the next one."

6.6 When enough time (about 2 minutes) has passed for everyone to write down the answer to A 2, say "the right one is number 5. See that you have written 5 against number 2 in column A on your form. Go on like that by yourselves until you get to the end of the book."

4.3 Then say "Here are a list of statements about yourself. All you have to do is read them carefully and decide if they describe you or not. If a statement describes you show this by filling in an "A" on your answer sheet. If a statement does not describe you mark a "B" in the space on your answer sheet.

4.4 Then say "Look at the questions on page 2. For example question No. 51 gives you a choice between two statements a or b.

(a) is: Likes to work alone and

(b) is: Prefers to work in a group.

Say choose the letter of the statement which describes you. If it is the first statement of the pair show this by filling in "A" on your answer sheet. If it is the second statement of each pair show this by filling in a "B" in the space on your answer sheet."

4.5 Say "You can continue in the same way with the second half of the questionnaire called the Khatena Morse Multitalent Perception Inventory."

4.6 Say "See that a list of statements has been given to you. All you have to do is read them carefully and decide if they describe you or not. If a statement describes, you show this by filling in an "A" in the space on your answer sheet. If a statement does not describe you mark a "B" on your answer sheet."

4.7 Say " If you don't understand a particular question put up your hand to get help from me".

4.8. Walk around and assist students when they need help.

5. THE SIMILARITIES TEST

Approximate time needed: 45 minutes

5.1 Hand out the Similarities question sheet.

5.2 Say: "Here is an example of a question which asks what is similar or the same about two things. For example, in what way are a wheel and a ball alike? How are they the same?" Elicit responses from the group and then give the correct answer: "They are both round and they both roll"

5.3 Say: "Please write down the answer - you can just write 'both round' or 'both roll'".

5.4 Tell the students "you have 30 minutes to complete the other questions", and to begin. After 15 and 25 minutes tell the students they have 15 and 5 minutes left respectively.

5.5. Give no other help other than to say "don't give differences, only the similarities". Please note that **NO WORDS ARE TO BE EXPLAINED**

2. THE DRAW-A-PERSON TEST

Approximate time needed: 10 - 15 minutes

- 2.1 The students need a pencil and eraser for this test.
- 2.2 Hand out blank sheets of A4 paper so that the shorter or narrow edge is closest to the student.
- 2.3 Say: "Write your name on the top left hand side of the page".
- 2.4 When the students have all done that, say "Draw a picture of a person in pencil. It must be the whole person, not just the head or a stick figure".
- 2.5 Draw an example of a stick figure and explain that this is wrong.
- 2.7 Say "As you draw you can rub out and redraw parts that you want to change, Begin"
- 2.8 When the students have finished their drawings say "Give the person you have drawn a name and an age. Write this in the bottom right hand corner."
- 2.9 Allow about 2 minutes for the students to do this.

3. THE LOCUS OF CONTROL QUESTIONNAIRE

(Approximate time: 15 - 20 minutes)

- 3.1 Hand out the questionnaire called the Nowicki-Strickland Locus of Control scale for children.
- 3.2 Say to the students "Write your name on the top of the first page".
- 3.3 Then say "Read the questions and write only a yes or a no as your answer. Write this next to the end of each sentence in the little block".
- 3.4 Say "If anyone does not understand a word or the exact meaning of a sentence, you may put up your hand to get help. Begin".

4. THE KHATENA- TORRANCE SELF-PERCEPTION QUESTIONNAIRE

Approximate time needed: 30 - 45 minutes

- 4.1 Hand out the Khatena-Torrance Creative Perception Inventory and answer sheets.
- 4.2 Say "Write your name on the top of the page".

APPENDICES

APPENDIX A

INSTRUCTIONS FOR TEACHERS

Included in this package are the following:

1. A biographical questionnaire
2. The Draw-A-Person Test
3. The Nowicki-Strickland Locus of Control questionnaire
4. The Khatena Torrance Self-perception questionnaire

The three intelligence tests are:

5. The Similarities test and
6. The Ravens test
7. The Biggs test

and the creativity tests are:

8. Unusual Uses test
9. The Torrance Creative Thinking test.

and the two evaluation tests are

- a. of the student by the teacher and
 - b. by the students themselves
10. The cognitive rating scales questionnaires,
(Form 1 for the teacher; Form 2 for the student).

1. BIOGRAPHICAL QUESTIONNAIRE

Approximate time needed: 20 - 30 minutes

- 1.1 First hand out the biographical questionnaires.
- 1.2 Explain that the students need to fill in all the questions honestly and that this information will be kept private.
- 1.3 Allow time for the students to read the questions and ask any questions about the questionnaire that may have confused them.
- 1.4 When the students have scanned the questions tell them to begin.
- 1.5 Assist students individually if this is necessary.

APPENDICES

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Question 2(B)

What did you have to do in Question 2(A)?

.....
.....

Question 2(C)

Explain step by step how you worked out how to do question 2(A).

.....
.....
.....
.....
.....
.....

Question 2(D)

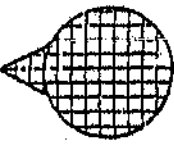
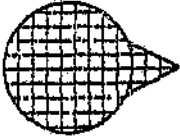


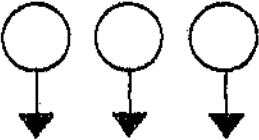




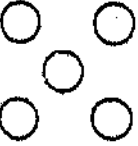
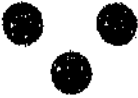

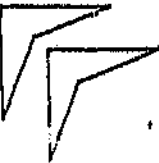

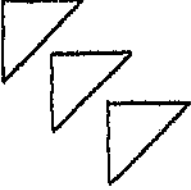
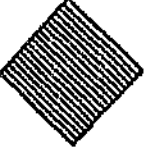
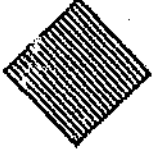

Explain any difficulties you had.

.....
.....
.....

QUESTION 2(A)

Circle the word or words that describe what is common between the sample picture on the left and each of the pictures in the same row.

Sample Picture

	 <p>direction size color form</p>	 <p>direction size color form</p>
	 <p>number color form</p>	 <p>number color form</p>
	 <p>number direction color form</p>	 <p>number direction color form</p>
	 <p>number color size form</p>	 <p>number color size form</p>
	 <p>direction number color size form</p>	 <p>direction number color size form</p>
	 <p>direction number size color form</p>	 <p>direction number size color form</p>

Question 1(B)

What did you have to do in Question 1(A)?

.....
.....

Question 1(C)

Explain step by step how you worked out how to do question 1(A).

.....
.....
.....
.....
.....
.....

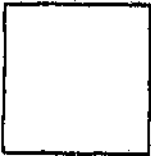
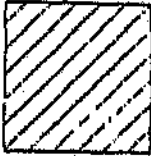


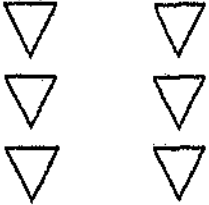
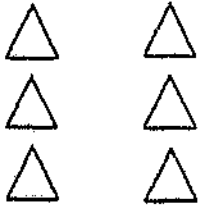
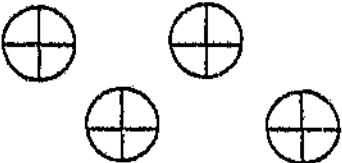
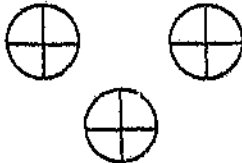


Question 1(D)

Explain any difficulties you had.

.....
.....
.....
.....

Indicate what is common to each pair of pictures and the differences between them.

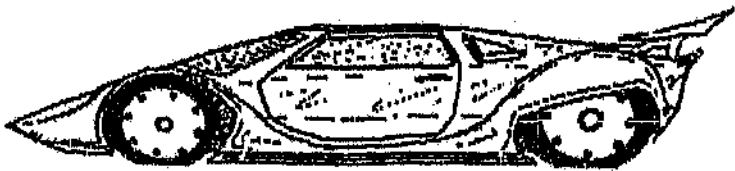
Question 1(A)

	
Common: _____	
Different: _____	Different: _____
	
Common: _____	
Different: _____	Different: _____
	
Common: _____	
Different: _____	Different: _____
	
Common: _____	
Different: _____	Different: _____
	
Common: _____	
Different: _____	Different: _____

1 E.....

2 E.....

THINKING SKILLS (4)



GEORGI BRAUDE
DIV. SPECIAL EDUCATION
WITS

APPENDICES D & E NEVER INCLUDED IN THE PAGINATION, ONLY A, B, C, F, G, H, I

Road
Letter of alphabet
Gate
Wall / bricks
Washing machine
Stove
T.V.
Hi-Fi
Bin (e.g. wastebin)
Pipe / tube
Door
Window
Clock / Watch
Book
Phone or electric lines
Postbox
Bottle
Switch
Circuit board
Shirt
Trousers
Calculator
Tree
Leaf
Flower
Pot
Bulb
Box
Bus / car / truck
Chair
Table
Wardrobe / cupboard

Seed or pip
Animal (eg. pig, camel, tortoise, sheep)
Face or head
Body of person
Eye or pupil
Glasses (eyes)
Brain
Flower
Egg
Hat (e.g. beret)

Picture Completion

Common Responses :

Glasses (e.g. sunglasses)
Bird
Tree
Bus / car / truck
Hand or face
Person
Fruit (e.g. orange, apple, banana)
Flower
Water
Hill / mountain
Leaf
Vase / flower pot
Watering can
Teapot / kettle
Book
Fish
Crown
Hat / cap
House / hut
Hand / arm
Cup / glass / beaker
Letter of the alphabet
Heart
Umbrella
Gun
Dumbbell (weight)
Kettle
Snake
String / cable / whip
Wheel or tyre
Steps or stairs
Snail
Chair
Soundwaves

Lines

Common Responses :

Pencil
Person
Hut / ship / house
Tin / can
Mug / cup

14. Fantasy Figures :

Clown, monster, witch, etc. - scores 1.
Character figures - scores 3.
Ordinary figures - scores 5.

15. Size of Drawing :

Between 6 and 22 cm - scores 5

22.1 - 24 cm - scores 4

4.5 - 5.9 cm - scores 4

24.1 - 26 cm - scores 3

3.0 - 4.4 cm - scores 3

26.1 - 28 cm - scores 2

1.5 - 2.9 cm - scores 2

28 + cm - scores 1

0 - 1.4 cm - scores 1

16. Profile View

Full Frontal - scores 5

Partial Frontal (i.e. only body or head drawn in frontal view) - scores 3.

Head and body drawn in profile view - scores 1

17. Placement on the Page

(The number in each block represents the score).

1	2	2	2	1
2	3	4	3	2
2	4	5	4	2
2	3	4	3	2
1	2	2	2	2

C_B
TORRANCE CREATIVE THINKING

Picture Construction

Common Responses :

Insect (e.g. tick, spider, cockroach, butterfly)
Bird (e.g. pigeon, ostrich, hen)
Fruit (e.g. peach, orange)
Potato
Rock or hill

APPENDIX C_A

- SCORING :** **THE DRAW-A-PERSON SELF-CONCEPT SCALE
DEvised AND VALIDATED BY BODWIN AND BRUCK
(1960)**
1. Shading Light, dim, subtle and uncertain lines which furtively accent particular parts of the figure. Patterned or stylised shading.
 2. Reinforcement Shading of the boundaries of clothing or the figure. Heavy dark lines or parts of the drawing emphasised through retracing over the same area.
 3. Erasures Any attempt to alter or perfect all or part of the drawing through erasure.
 4. Details in Figure Unessential features or details added to the figure or background.
 5. Sketchy lines Parts of the body, particularly the outline defined by light, broken, blurred, vague, fuzzy lines.
 6. Transparency Body of the figure completely transparent or inadequately clothed so that body parts ordinarily covered are shown.
 7. Asymmetry Imbalanced and lopsided arrangement of the body parts in respect to size, shape or position on the opposite sides of the center.
 8. Distortion Any unnaturalness or irregularity in form. Any non-human aspects to figure drawn, often displayed by size disproportion.
 9. Incompleteness Figure not drawn complete, lacking in significant body parts or clothing.
 10. Mixed Age Disparity in the physiological maturation of various body parts, such as breasts emphasised in an otherwise childish body.
 11. Opposite Sex Identification Figure drawn is of the opposite sex of the subject, or if the same sex, opposite sex characteristics are displayed.
 12. Primitiveness Overall figure is crudely and roughly drawn. Specific points are confusion of full and profile view of the head, mouth emphasis, trunk incomplete, omission of the neck, and disorganised body representation.
 13. Immaturity Drawing is marked by elaborate treatment of the mid-line such as Adam's apple, tie, buttons, buckle, and fly on trousers. There is emphasis on the mouth and/or breasts.

FINANCIAL INVOLVEMENT

Do you have to work to earn money while you are studying?

.....

TIME DEMANDS

What sports do you play?

.....

What are your hobbies or interests out of school?

.....

What responsibilities or duties do you have at home e.g
cooking, cleaning, shopping, washing and ironing, looking
after younger brothers or sisters etc?

.....

How long does it take you each day to do these things?

.....

What time do you get up to catch the taxi to school?

.....

If you repeated a standard or form, which one(s) did you repeat?

.....

How many times did you repeat that or those standards?

.....

Have you ever received an award for some achievement of yours?

What things have you done which make you proud of yourself?

.....

.....

.....

POSSIBLE INTERRUPTIONS IN SCHOOL CAREER

Did the school you went to ever have a boycott or close down?

.....

Has there ever been a serious event which caused you to stop going to school for a while. e.g Were you sick or did someone in your family die?

.....

If you had to leave school for a while, what happened?

.....

.....

How long did you stay away from school?

DESCRIPTION OF MLE ACTIVITY						DESCRIPTION OF ACTIVITY WHICH IS INSUFFICIENT OR IN CONTRADICTION TO MLE
	NO OPPORTUNITY	MISSED OPPORTUNITY	USUALLY IMPLEMENTED	SOMETIMES IMPLEMENTED	NEGATION	
TRANSCENDENCE						
1 The teacher explains a concept or principle beyond the scope of the present subject matter	/					1 The teacher fails to bridge concepts to related subject matter
2 The teacher explains the relationship of the subject of the lesson to previous or future subjects				/		2 The teacher presents each subject as an isolated and unrelated set of information and ideas
3 The teacher explains how the underlying process in solving a problem can be applied to another situation				X		3 The teacher fails to show how one problem solving approach can be applied to a variety of situations
4 The teacher promotes the use of work habits which are useful beyond present needs			/			4 The teacher fails to show how particular work habits may be used in a different context
5 Other:						5 Other:
COMPETENCE						
1 The teacher selects and presents material appropriate to the students level of development			/			1 The teacher fails to take into account students level of development when selecting and presenting material
2 The teacher phrases questions according to students level of competence						2 The teacher's questions are not pitched at an appropriate level
3 The teacher encourages students to be aware of their progress relative to their own standards						3 Students progress is only measured according to the class average
4 The teacher breaks down a complex task into its simpler parts to reduce anxiety			/			4 The teacher fails to reduce anxiety by showing how a complex task can be simplified
5 The teacher praises successful steps towards completion of a task						5 The teacher only praises successful completion of a task
6 The teacher rewards participation in an activity		/				6 The teacher does not reward participation
7 Other:						7 Other:

DESCRIPTION OF MLE ACTIVITY	NO OPPORTUNITY	MISSED OPPORTUNITY	USUALLY IMPLEMENTED	SOMETIMES IMPLEMENTED	NEGATION	DESCRIPTION OF ACTIVITY WHICH IS INSUFFICIENT OR IN CONTRADICTION TO MLE
INTENTIONALITY AND RECIPROCITY						
1 Teacher arouses student interest and motivation			X			1 Teacher fails to engage students
2 Students ask questions relevant to the subject matter	✓					2 Students do not participate in relevant discussion
3 Teacher gives appropriate feedback on students verbal contribution			✓			3 Teacher is insensitive to students verbal contribution
4 Teacher gives appropriate feedback on students written contribution	✓					4 Teacher fails to give meaningful comment on students written contribution
5 Teacher is willing to re-explain when work is not understood		✓				5 Teacher does not take cognizance of the need for re-explanation
6 Teacher comes prepared for the lesson and creates a sense of anticipation by changing classroom atmosphere			✓			6 Teacher did not prepare adequately for the lesson and fails to create enthusiasm
7 Other:						7 Other:
MEANING						
1 The teacher explains the importance or value of a subject						1 The teacher fails to provide the purpose or relevance of activities or subjects
2 The teacher explains the reason for focusing on a subject						2 The teacher focuses on a subject without giving explicit reasons for doing so
3 The teacher transforms material by changing frequency and/or intensity of presentation						3 The teacher fails to vary presentation in order to convey to students the importance or value of a subject
4 The teacher gives positive or negative feedback in explanation to a students responses				✓		4 The teacher responds indifferently to student responses
5 The teacher asks more 'how' and 'why' questions - process questions				✓		5 The teacher asks more 'who' and 'what' questions - content questions
6 Other:						6 Other:

23. I am able to talk or write my answers in a way that everyone understands what I have said.

ALWAYS MOSTLY SOMETIMES RARELY NEVER
-----|-----|-----|-----|-----|-----|

24. I am able to give the answer to a question in a way which is correct and can explain exactly what is meant.

ALWAYS MOSTLY SOMETIMES RARELY NEVER
-----|-----|-----|-----|-----|

25. I can think about a problem in my head and do not have to often look back at the example given to help me.

ALWAYS MOSTLY SOMETIMES RARELY NEVER
-----|-----|-----|-----|-----|

26. My answers and the way I act are planned and under my control.

ALWAYS MOSTLY SOMETIMES RARELY NEVER
-----|-----|-----|-----|-----|

14. I look for explanations for problems and can see the logical reasons for saying why this is the correct understanding of a situation.
- ALWAYS MOSTLY SOMETIMES RARELY NEVER
 -----|-----|-----|-----|-----|
15. I can solve problems in my head and don't need to use something around me like counting on my fingers to help me.
- ALWAYS MOSTLY SOMETIMES RARELY NEVER
 -----|-----|-----|-----|-----|
16. When I am given a new problem I can suggest ways of solving the problem and can test out my suggestions.
- ALWAYS MOSTLY SOMETIMES RARELY NEVER
 -----|-----|-----|-----|-----|
17. I can create a plan and then follow it when I solve problems.
- ALWAYS MOSTLY SOMETIMES RARELY NEVER
 -----|-----|-----|-----|-----|
18. When I solve a problem I can say exactly how I did it.
- ALWAYS MOSTLY SOMETIMES RARELY NEVER
 -----|-----|-----|-----|-----|
19. I have a good understanding of how things affect each other in the world. e.g cause and effect relationships.
- ALWAYS MOSTLY SOMETIMES RARELY NEVER
 -----|-----|-----|-----|-----|
20. My spoken or written answers are clear and easy to understand.
- ALWAYS MOSTLY SOMETIMES RARELY NEVER
 -----|-----|-----|-----|-----|
21. I show an interest in trying to solve new problems.
- ALWAYS MOSTLY SOMETIMES RARELY NEVER
 -----|-----|-----|-----|-----|
22. I think ahead and plan how I will do something before I give an answer.
- ALWAYS MOSTLY SOMETIMES RARELY NEVER
 -----|-----|-----|-----|-----|

6. The amount of water moved from a tall to a fat glass may look less but I know it is still the same amount of water.

7. I understand that 5×3 is the same as 3×5 .

ALWAYS MOSTLY SOMETIMES RARELY NEVER
-----|-----|-----|-----|-----|

7. When I start a task, I check that my information telling me what to do is correct.

ALWAYS MOSTLY SOMETIMES RARELY NEVER
-----|-----|-----|-----|-----|

8. When I have to do a problem, I think about other information that I can use to solve the problem. e.g. in doing a graph both x and y axes need to be considered; in working out the area, the length and breadth must be considered.

ALWAYS MOSTLY SOMETIMES RARELY NEVER
-----|-----|-----|-----|-----|

9. I usually am able to first see what the problem or question is and then I can put this into words.

ALWAYS MOSTLY SOMETIMES RARELY NEVER
-----|-----|-----|-----|-----|

10. I can choose which is the correct information needed to solve a problem and then use this information.

ALWAYS MOSTLY SOMETIMES RARELY NEVER
-----|-----|-----|-----|-----|

11. I can compare what is the same and what is different in different problems.

ALWAYS MOSTLY SOMETIMES RARELY NEVER
-----|-----|-----|-----|-----|

12. I can take new information and add this to what I already know to help me to solve a problem. (e.g. I can build on my experiences or what I have learned in the past).

ALWAYS MOSTLY SOMETIMES RARELY NEVER
-----|-----|-----|-----|-----|

13. I try to organize new information and see what the main point is.

ALWAYS MOSTLY SOMETIMES RARELY NEVER
-----|-----|-----|-----|-----|

COGNITIVE FUNCTION SCALE FORM 1

THE WAY I THINK

STUDENT'S NAME:

The sentences below describe the ways in which people think. Choose the word that describes the way you think in different situations.

For example you may only SOMETIMES think to ask for more information when you are told to do something which you don't clearly understand. Circle the word that best describes you in each situation. Please do not leave any questions out.

1. When I have to work out something which is difficult for me, I get as much information as I can.

ALWAYS MOSTLY SOMETIMES RARELY NEVER
 -----|-----|-----|-----|-----|-----

2. I understand something which is new to me by sorting it out slowly and carefully.

ALWAYS MOSTLY SOMETIMES RARELY NEVER
 -----|-----|-----|-----|-----|-----

3. I can understand what is said to me well enough.

ALWAYS MOSTLY SOMETIMES RARELY NEVER
 -----|-----|-----|-----|-----|-----

4. I know my left from my right, the top from the bottom, and I know where I am in the physical space about me. e.g. I know what is next to me and what the meaning of "around the corner" is.

ALWAYS MOSTLY SOMETIMES RARELY NEVER
 -----|-----|-----|-----|-----|-----

5. I understand the concept of time and understand what is meant by the word now, in one hour's time, I o'clock, yesterday, tomorrow, next week, last year etc.

ALWAYS MOSTLY SOMETIMES RARELY NEVER
 -----|-----|-----|-----|-----|-----

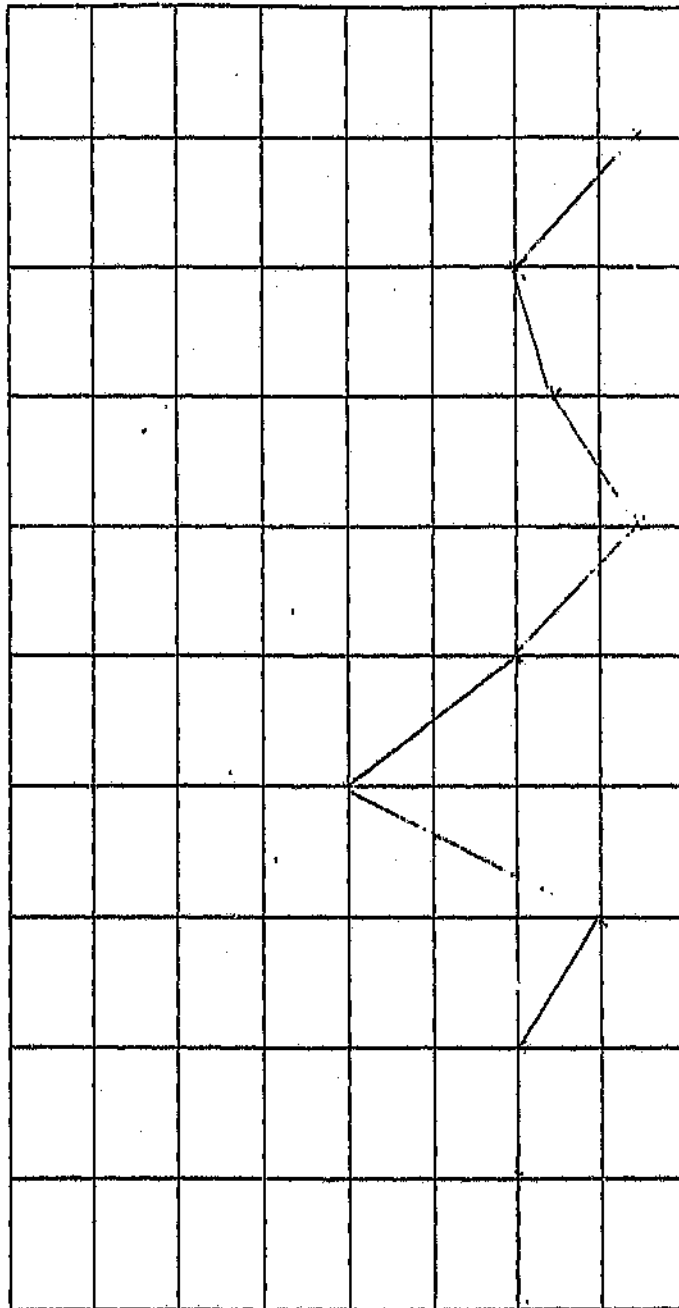
6. I understand that the size, shape or amount of an object may stay the same even if the object is moved into a different space.

Profile of Teacher's Attitude to MLE In the Classroom.

LOW MLE ←————→ HIGH MLE

20 30 40 50 60 70 80 90 100

Intentionality and Reciprocity	95
Meaning	80
Transcendence	85
Competence	75
Self-regulation and Control of Behaviour	80
Sharing	10
Individuation	90
Goal Planning	80
Novelty and Challenge	88
Self-change	84



Question 4(C)

Compare an electrical and a mechanical workshop.

Question 4(A)

Give at least 3 examples of where comparison is used in other subjects at school.

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.....

Question 4(B)

Give at least 3 examples of where you use comparison at school.

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.....

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Question 3(B)

What did you have to do in Question 3(A)?

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Question 3(C)

Explain step by step how you worked out how to do question 3(A).

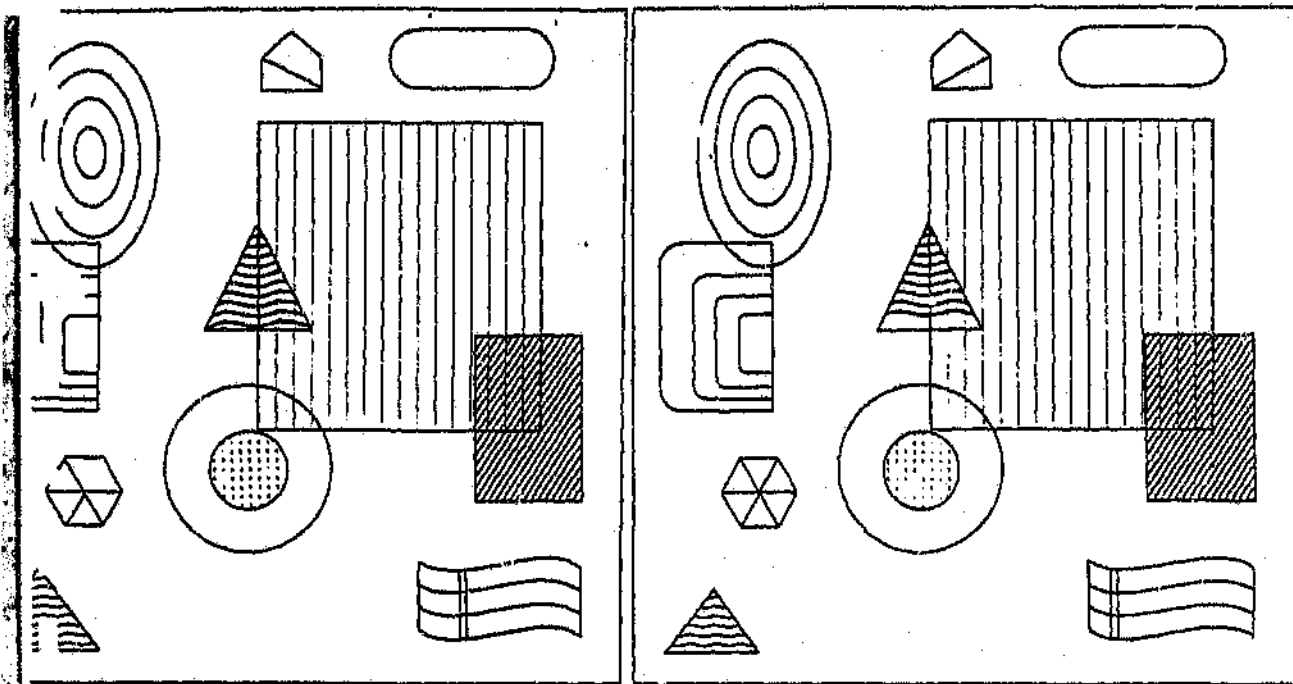
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Question 3(D)

Explain any difficulties you had.

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.....

Question 3(A) [22]



There are five differences between the two pictures. Mark each difference you find with an X.

DESCRIPTION OF MLE ACTIVITY						DESCRIPTION OF ACTIVITY WHICH IS INSUFFICIENT OR IN CONTRADICTION TO MLE
	NO OPPORTUNITY	MISSSED OPPORTUNITY	USUALLY IMPLEMENTED	SOMETIMES IMPLEMENTED	NEGATION	
INDIVIDUATION						
1 The teacher accepts divergent approaches in solving a problem		X				1 The teacher communicates that there is only one correct way to solve a problem
2 The teacher encourages independent and original thinking, and gives opportunity for innovative work	X					2 The teacher promotes conformity and discourages individual creativity
3 The teacher lets students choose part of their classroom activities and encourages diversity in use of free time	X					3 The teacher is not receptive to students' suggestions and promotes uniformity of activities
4 The teacher enhances positive aspects of cultural pluralism	X					4 The teacher exhibits cultural bias and does not integrate different world views
5 The teacher supports the right of a student to be different	X					5 The teacher fails to promote acceptance of individual differences
6 The teacher refrains from asking for total identification with her values and beliefs				X		6 The teacher insists on total identification with her values and beliefs
7 Other:						7 Other
GOAL PLANNING						
1 The teacher fosters the need and ability of students to realistic goals for themselves			X			1 The teacher's inappropriate expectations result in the students setting unrealistic goals for themselves
2 The teacher encourages perseverance and patience in the pursuit of goals				X		2 The teacher allows the student to give up on a task as soon as it becomes too difficult
3 The teacher explains to students the strategy underlying goal planning		X				3 The teacher fails to demonstrate the process of setting and achieving goals
4 The teacher develops in the student the need and ability to review and modify goals according to changing needs and circumstances	X					4 The teacher fails to develop in the student the need and ability to review and modify goals according to changing needs and circumstances
5 The teacher models goal-directed behaviour: setting clear goals for each lesson and for learning in general			X			5 The teacher has no clear objectives, and fails to provide a structure for reaching her objectives
6 The teacher instills an autonomous attitude in the students for their future		X				6 The teacher is prescriptive and makes decisions for the student's future
7 Other:						7 Other:

DESCRIPTION OF MLE ACTIVITY						DESCRIPTION OF ACTIVITY WHICH IS INSUFFICIENT OR IN CONTRADICTION TO MLE
	NO OPPORTUNITY	MISSED OPPORTUNITY	USUALLY IMPLEMENTED	SOMETIMES IMPLEMENTED	NEGATION	
SELF-REGULATION AND CONTROL OF BEHAVIOUR						
1 The teacher instills in students behaviour conducive to learning -- good classroom management			X			1 The teacher fails to instill in students behaviour conducive to learning - bad classroom management
2 The teacher restrains the inappropriate impulsiveness of students			X			2 The teacher fails to check inappropriate behaviour in a classroom
3 The teacher encourages self-discipline in students			X			3 The teacher fails to encourage self-discipline in students
4 The teacher models respect, commitment and perseverance in classroom activities			X			4 The teacher fails to demonstrate sustained interest and commitment in classroom activities
5 Other:						5 Other:
SHARING BEHAVIOUR						
1 The teacher applies effective group teaching methods			X			1 The teacher fails to apply effective group teaching methods
2 The teacher encourages students to share their work experiences with each other				X		2 The teacher discourages students from working co-operatively
3 The teacher shares her approach to solving tasks with students				X		3 The teacher fails to verbalize (talk through) her strategy in solving a problem
4 The teacher encourages students to help each other and facilitates peer tutoring	X					4 The teacher always insists on individual work
5 The teacher encourages students to listen to each other	X					5 The teacher fails to encourage active listening when other students are responding
6 The teacher encourages students to empathise with the feelings of others	X					6 The teacher fails to promote in students tolerance and understanding of another's point of view
7 The teacher selects subject matter which emphasises the importance of cooperation	X					7 The teacher encourages competition to the detriment of co-operation
8 Other:						8 Other:

DESCRIPTION OF MLE ACTIVITY						DESCRIPTION OF ACTIVITY WHICH IS INSUFFICIENT OR IN CONTRADICTION TO MLE
	NO OPPORTUNITY	MISSSED OPPORTUNITY	USUALLY IMPLEMENTED	SOMETIMES IMPLEMENTED	NEGATION	
TRANSCENDENCE						
1 The teacher explains a concept or principle beyond the scope of the present subject matter			X			1 The teacher fails to bridge concepts to related subject matter
2 The teacher explains the relationship of the subject of the lesson to previous or future subjects			X			2 The teacher presents each subject as an isolated and unrelated set of information and ideas
3 The teacher explains how the underlying process in solving a problem can be applied to another situation				X		3 The teacher fails to show how one problem solving approach can be applied to a variety of situations
4 The teacher promotes the use of work habits which are useful beyond present needs	X					4 The teacher fails to show how particular work habits may be used in a different context
5 Other:						5 Other:
COMPETENCE						
1 The teacher selects and presents material appropriate to the students level of development			X			1 The teacher fails to take into account students level of development when selecting and presenting material
2 The teacher phrases questions according to students level of competence			X			2 The teacher's questions are not pitched at an appropriate level
3 The teacher encourages students to be aware of their progress relative to their own standards				X		3 Students progress is only measured according to the class average
4 The teacher breaks down a complex task into its simpler parts to reduce anxiety			X			4 The teacher fails to reduce anxiety by showing how a complex task can be simplified
5 The teacher praises successful steps towards completion of a task		X				5 The teacher only praises successful completion of a task
6 The teacher rewards participation in an activity				X		6 The teacher does not reward participation
7 Other:						7 Other:

DESCRIPTION OF MLE ACTIVITY						DESCRIPTION OF ACTIVITY WHICH IS INSUFFICIENT OR IN CONTRADICTION TO MLE
	NO OPPORTUNITY	MISSSED OPPORTUNITY	USUALLY IMPLEMENTED	SOMETIMES IMPLEMENTED	NEGATION	
INTENTIONALITY AND RECIPROCITY						
1 Teacher arouses student interest and motivation			X			1 Teacher fails to engage students
2 Students ask questions relevant to the subject matter					X	2 Students do not participate in relevant discussion
3 Teacher gives appropriate feedback on students verbal contribution			X			3 Teacher is insensitive to students verbal contribution
4 Teacher gives appropriate feedback on students written contribution	X					4 Teacher fails to give meaningful comment on students written contribution
5 Teacher is willing to re-explain when work is not understood			X			5 Teacher does not take cognizance of the need for re-explanation
6 Teacher comes prepared for the lesson and creates a sense of anticipation by changing classroom atmosphere			X			6 Teacher did not prepare adequately for the lesson and fails to create enthusiasm
7 Other:						7 Other:
MEANING						
1 The teacher explains the importance or value of a subject		X				1 The teacher fails to provide the purpose or relevance of activities or subjects
2 The teacher explains the reason for focusing on a subject					X	2 The teacher focuses on a subject without giving explicit reasons for doing so
3 The teacher transforms material by changing frequency and/ or intensity of presentation			X			3 The teacher fails to vary presentation in order to convey to students the importance or value of a subject
4 The teacher gives positive or negative feedback in explanation to a students responses				X		4 The teacher responds indifferently to student responses
5 The teacher asks more 'how' and 'why' questions - process questions			X			5 The teacher asks more 'who' and 'what' questions - content questions
6 Other:						6 Other:

DESCRIPTION OF MLE ACTIVITY	NO OPPORTUNITY	MISSED OPPORTUNITY	USUALLY IMPLEMENTED	SOMETIMES IMPLEMENTED	NEGATION	DESCRIPTION OF ACTIVITY WHICH IS INSUFFICIENT OR IN CONTRADICTION TO MLE
CHALLENGE						
1 The teacher encourages intellectual curiosity			X			1 The students are not encouraged to question or ask 'what if' questions
2 The teacher encourages originality and creativity			X			2 The teacher instils conformist behaviour and discourages divergent thinking
3 The teacher makes available to the students challenging, novel and complex situations			X			3 The teacher adheres to the "tried and tested approach" and presents conventional tasks to students
4 The teacher encourages students to create their own examples and to present them to the class			X			4 The teacher inhibits original approaches in engaging in an activity
5 The teacher helps the child anticipate the satisfaction of completing a task			X			5 The teacher fails to promote intrinsic motivation to complete a complex task
6 The teacher encourages students to persevere with difficult tasks			X			6 The teacher fails to instil perseverance in students when completing a complex task
7 Other:						7 Other:
SELF-CHANGE						
1 The teacher promotes self-evaluation of individual progress			X			1 The teacher fails to develop an awareness of self-evaluation and individual progress
2 The teacher discourages students from using external criteria for measuring progress			X			2 The teacher explicitly evaluates the child relative to class standards and encourages comparison of marks
3 The teacher de-emphasises labeling of students			X			3 The teacher's consistent use of labeling results in the child acting out these expectations
4 The teacher generates an awareness of change within oneself, and in relationships with others and the environment			X			4 The teacher fails to create an awareness of change within oneself, and in relationships with others and the environment
5 The teacher models self change by sharing her growth and learning experiences			X			5 The teacher fails to modify her attitudes or approaches to new situations
6 Other						6 Other

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	NO OPPORTUNITY	MISSED OPPORTUNITY	USUALLY IMPLEMENTED	SOMETIMES IMPLEMENTED	NEGATION	
INDIVIDUATION						
1 The teacher accepts divergent approaches in solving a problem			✓			1 The teacher communicates that there is only one correct way to solve a problem
2 The teacher encourages independent and original thinking, and gives opportunity for innovative work			✓			2 The teacher promotes conformity and discourages individual creativity
3 The teacher lets students choose part of their classroom activities and encourages diversity in use of free time			✓			3 The teacher is not receptive to students' suggestions and promotes uniformity of activities
4 The teacher enhances positive aspects of cultural pluralism			X			4 The teacher exhibits cultural bias and does not integrate different world views
5 The teacher supports the right of a student to be different			X			5 The teacher fails to promote acceptance of individual differences
6 The teacher refrains from asking for total identification with her values and beliefs			X			6 The teacher insists on total identification with her values and beliefs
7 Other:						7 Other
GOAL PLANNING						
1 The teacher fosters the need and ability of students to set realistic goals for themselves			✓			1 The teacher's inappropriate expectations result in the students setting unrealistic goals for themselves
2 The teacher encourages perseverance and patience in the pursuit of goals			✓			2 The teacher allows the student to give up on a task as soon as it becomes too difficult
3 The teacher explains to students the strategy underlying goal planning			✓			3 The teacher fails to demonstrate the process of setting and achieving goals
4 The teacher develops in the student the need and ability to review and modify goals according to changing needs and circumstances			✓			4 The teacher fails to develop in the student the need and ability to review and modify goals according to changing needs and circumstances
5 The teacher models goal-directed behaviour; setting clear goals for each lesson and for learning in general						5 The teacher has no clear objectives and fails to provide a structure for reaching her objectives
6 The teacher instills an autonomous attitude in the students for their future			✓			6 The teacher is prescriptive and makes decisions for the student's future
7 Other:						7 Other:

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1 The teacher instills in students behaviour conducive to learning -- good classroom management			X			1 The teacher fails to instill in students behaviour conducive to learning - bad classroom management
2 The teacher restrains the inappropriate impulsiveness of students			X			2 The teacher fails to check inappropriate behaviour in a classroom
3 The teacher encourages self-discipline in students			X			3 The teacher fails to encourage self-discipline in students
4 The teacher models respect, commitment and perseverance in classroom activities			X			4 The teacher fails to demonstrate sustained interest and commitment in classroom activities
5 Other:						5 Other:
SHARING BEHAVIOUR						
1 The teacher applies effective group teaching methods	X		X			1 The teacher fails to apply effective group teaching methods
2 The teacher encourages students to share their work experiences with each other			X			2 The teacher discourages students from working co-operatively
3 The teacher shares her approach to solving tasks with students			X			3 The teacher fails to verbalize (talk through) her strategy in solving a problem
4 The teacher encourages students to help each other and facilitates peer tutoring			X			4 The teacher always insists on individual work
5 The teacher encourages students to listen to each other	X					5 The teacher fails to encourage active listening when other students are responding
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7 Other:						7 Other:
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The teacher generates an awareness of change within oneself, and in relationships with others and the environment	X					4 The teacher fails to create an awareness of change within oneself, and in relationships with others and the environment
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7 Other:						7 Other
GOAL PLANNING						
1 The teacher fosters the need and ability of students to set realistic goals for themselves	X					1 The teacher's inappropriate expectations result in the students setting unrealistic goals for themselves
2 The teacher encourages perseverance and patience in the pursuit of goals	X					2 The teacher allows the student to give up on a task as soon as it becomes too difficult
3 The teacher explains to students the strategy underlying goal planning				X		3 The teacher fails to demonstrate the process of setting and achieving goals
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5 The teacher models goal-directed behaviour: setting clear goals for each lesson and for learning in general			X			5 The teacher has no clear objectives and fails to provide a structure for reaching her objectives
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5 Other:						5 Other:
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2 The teacher encourages students to share their work experiences with each other			X			2 The teacher discourages students from working co-operatively
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7 Other:						7 Other:
SELF-CHANGE						
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3 The teacher de-emphasises labeling of students	X					3 The teacher's consistent use of labeling results in the child acting out these expectations
4 The teacher generates an awareness of change within oneself, and in relationships with others and the environment	X					4 The teacher fails to create an awareness of change within oneself, and in relationships with others and the environment
5 The teacher models self change by sharing her growth and learning experience				X		5 The teacher fails to modify her attitudes or approaches to new situations
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5 The teacher supports the right of a student to be different			X			5 The teacher fails to promote acceptance of individual differences
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4 The teacher develops in the student the need and ability to review and modify goals according to changing needs and circumstances			X			4 The teacher fails to develop in the student the need and ability to review and modify goals according to changing needs and circumstances
5 The teacher models goal-directed behaviour; setting clear goals for each lesson and for learning in general			X			5 The teacher has no clear objectives and fails to provide a structure for reaching her objectives
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4 The teacher models respect, commitment and perseverance in classroom activities			X			4 The teacher fails to demonstrate sustained interest and commitment in classroom activities
5 Other:						5 Other:
SHARING BEHAVIOUR						
1 The teacher applies effective group teaching methods	X					1 The teacher fails to apply effective group teaching methods
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7 The teacher selects subject matter which emphasises the importance of cooperation	X					7 The teacher encourages competition to the detriment of co-operation
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	NO OPPORTUNITY	MISSED OPPORTUNITY	USUALLY IMPLEMENTED	SOMETIMES IMPLEMENTED	NEGATION	
TRANSCENDENCE						
1 The teacher explains a concept or principle beyond the scope of the present subject matter.			X			1 The teacher fails to bridge concepts to related subject matter
2 The teacher explains the relationship of the subject of the lesson to previous or future subjects				X		2 The teacher presents each subject as an isolated and unrelated set of information and ideas
3 The teacher explains how the underlying process in solving a problem can be applied to another situation			X			3 The teacher fails to show how one problem solving approach can be applied to a variety of situations
4 The teacher promotes the use of work habits which are useful beyond present needs			X			4 The teacher fails to show how particular work habits may be used in a different context
5 Other:						5 Other:
COMPETENCE						
1 The teacher selects and presents material appropriate to the students level of development			X			1 The teacher fails to take into account students level of development when selecting and presenting material
2 The teacher phrases questions - according to students level of competence				X		2 The teacher's questions are not pitched at an appropriate level
3 The teacher encourages students to be aware of their progress relative to their own standards			X			3 Students progress is only measured according to the class average
4 The teacher breaks down a complex task into its simpler parts to reduce anxiety			X			4 The teacher fails to reduce anxiety by showing how a complex task can be simplified
5 The teacher praises successful steps towards completion of a task	X					5 The teacher only praises successful completion of a task
6 The teacher rewards participation in an activity	X					6 The teacher does not reward participation
7 Other:						7 Other:

DESCRIPTION OF MLE ACTIVITY	NO OPPORTUNITY	MISSED OPPORTUNITY	USUALLY IMPLEMENTED	SOMETIMES IMPLEMENTED	NEGATION	DESCRIPTION OF ACTIVITY WHICH IS INSUFFICIENT OR IN CONTRADICTION TO MLE
INTENTIONALITY AND RECIPROCITY						
1 Teacher arouses student interest and motivation			X			1 Teacher fails to engage students
2 Students ask questions relevant to the subject matter	X					2 Students do not participate in relevant discussion
3 Teacher gives appropriate feedback on students verbal contribution			X			3 Teacher is insensitive to students verbal contribution
1 Teacher gives appropriate feedback on students written contribution	X					4 Teacher fails to give meaningful comment on students written contribution
5 Teacher is willing to re-explain when work is not understood			X			5 Teacher does not take cognizance of the need for re-explanation
6 Teacher comes prepared for the lesson and creates a sense of anticipation by changing classroom atmosphere			X			6 Teacher did not prepare adequately for the lesson and fails to create enthusiasm
7 Other:						7 Other:
MEANING						
1 The teacher explains the importance or value of a subject			X			1 The teacher fails to provide the purpose or relevance of activities or subjects
2 The teacher explains the reason for focusing on a subject			X			2 The teacher focuses on a subject without giving explicit reasons for doing so
3 The teacher transforms material by changing frequency and/ or intensity of presentation			X			3 The teacher fails to vary presentation in order to convey to students the importance or value of a subject
4 The teacher gives positive or negative feedback in explanation to a students responses			X			4 The teacher responds indifferently to student responses
5 The teacher asks more 'how' and 'why' questions - process questions			X			5 The teacher asks more 'who' and 'what' questions - content questions
6 Other:						6 Other:

DESCRIPTION OF MLE ACTIVITY						DESCRIPTION OF ACTIVITY WHICH IS INSUFFICIENT OR IN CONTRADICTION TO MLE
	NO OPPORTUNITY	MISSED OPPORTUNITY	USUALLY IMPLEMENTED	SOMETIMES IMPLEMENTED	NEGATION	
CHALLENGE						
1 The teacher encourages intellectual curiosity			X			1 The students are not encouraged to question or ask 'what if' questions
2 The teacher encourages originality and creativity				X		2 The teacher instils conformist behaviour and discourages divergent thinking
3 The teacher makes available to the students challenging, novel and complex situations			X			3 The teacher adheres to the "tried and tested approach" and presents conventional tasks to students
4 The teacher encourages students to create their own examples and to present them to the class			X			4 The teacher inhibits original approaches in engaging in an activity
5 The teacher helps the child anticipate the satisfaction of completing a task			X			5 The teacher fails to promote intrinsic motivation to complete a complex task
6 The teacher encourages students to persevere with difficult tasks			X			6 The teacher fails to instil perseverance in students when completing a complex task
7 Other:						7 Other:
SELF-CHANGE						
1 The teacher promotes self-evaluation of individual progress	X					1 The teacher fails to develop an awareness of self-evaluation and individual progress
2 The teacher discourages students from using external criteria for measuring progress	X					2 The teacher explicitly evaluates the child relative to class standards and encourages comparison of marks
3 The teacher de-emphasises labeling of students			X			3 The teacher's consistent use of labeling results in the child acting out these expectations
4 The teacher generates an awareness of change within oneself, and in relationships with others and the environment			X			4 The teacher fails to create an awareness of change within oneself, and in relationships with others and the environment
5 The teacher models self change by sharing her growth and learning experiences					X	5 The teacher fails to modify her attitudes or approaches to new situations
6 Other						6 Other

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