This chapter outlines current developments in relation to dynamic assessment (DA), an interactive assessment procedure that uses deliberate and planned mediational teaching and assesses the impact of that teaching on subsequent performance. The objective of the chapter is to critically review the major criticisms of the traditional ‘static’ testing approach, discuss the theoretical basis of the DA approach and its relevance within the South African context, and present an overview of current empirical research on DA.

There has been an increased demand worldwide for nondiscriminatory assessment procedures (Haywood & Tzuriel, 1992; Hessels & Hessels-Schlatter, 2002; Nell, 2000; Seabi & Amod, 2009; Skuy, Gewer, Osirin, Khunou, Fridjhon & Rushton, 2002; Tzuriel & Kaufman, 1999). The major criticism regarding the use of standardised intelligence tests is that they primarily reflect Eurocentric, middle-class values and attitudes (Nell, 2000). It is argued that they do not accommodate diversity in relation to culture, language, values, experiential background and cognitive styles. Given the political, socio-economic and educational conditions that have prevailed in South Africa under the apartheid regime and as an effect of its legacy, the application of traditional assessment procedures may be unfair to certain groups of people. Alternative, more equitable forms of assessment such as the DA approach have been proposed by several theorists and researchers for use within the multilingual and multicultural South African context (Amod, 2003; De Beer, 2005; Fairon, 2007; Floquet, 2008; Gewer, 1998; Lipson, 1992; Murphy & Maree, 2006; Seabi & Amod, 2009; Skuy et al., 2002).

A further criticism directed at the use of traditional intelligence tests/psychometric evaluations is that the scores are derived from a ‘static’ testing situation which provides minimal information regarding the individual’s learning potential or potential to respond to intervention. ‘Static’ testing refers to the administration of tests in a standardised manner as stipulated in test manuals. Intervention which could include feedback, training and teaching is refrained from in the traditional static testing approach (Hessels-Schlatter & Hessels, 2009). The limitation of this approach is that the knowledge and skills needed to fulfil the requirements of tests have not necessarily been taught to the child, and this will undoubtedly limit his or her ability to perform well on these tests. In essence, the emphasis in DA is on intra-individual change rather than
inter-individual difference. A number of theorists also argue that traditional/static testing provides a limited link between assessment and educational instruction, thus limiting the guidance given to teachers on the extent and type of intervention needed to promote learning (Ashman & Conway, 1993; Campione, 1989; Elliot, 2000; Haywood & Lidz, 2007).

In response to the disenchantment with traditional approaches, alternative forms of assessment have been proposed, such as the DA approach espoused by Feuerstein and his colleagues (Feuerstein, Feuerstein, Falik & Rand, 2002). This approach, which regards cognition as a modifiable construct, offers a fair way of assessing children within the South African context. It also offers the potential to integrate assessment findings with classroom intervention. This is related to current education policy, with its emphasis on the role of the teacher in the assessment process and on bridging assessment and instruction.

Interactive/dynamic assessment

Interactive assessment is a term used to encompass the variety of approaches to assessment that have in common a more active relationship between assessor and testee than is found in normative, standardised assessment (Haywood & Tzuriel, 1992). The assessor engages in ‘deliberate and planned mediational teaching’ and assesses ‘the effects of that teaching on subsequent performance’ (Haywood & Tzuriel, 2002, p.40). Campione (1989) has distinguished dynamic assessment from traditional assessment according to the following dimensions: focus – the way in which potential for change can be assessed; interaction – the nature of the interaction between assessor and testee; and target – the nature of the assessed task.

In relation to focus, Sternberg and Grigorenko (2001) describe two methods for assessing potential for change – namely, the ‘sandwich’ and ‘cake’ formats. The ‘sandwich’ format comprises an initial pre-test, a teaching phase and a post-test phase to assess the improvement achieved. On the other hand, the ‘cake’ format presents prompts and assistance during an initial assessment phase, gauging ‘online’ the individual’s need for assistance. Although the ‘sandwich’ format may make use of standardised tests during the pre- and post-tests, the ‘cake’ format may use a non-standardised procedure. Lidz (1991, p.4) emphasises that DA must be viewed as an approach that is distinct from traditional static assessment, as it focuses on ‘learning processes’ in contrast to ‘already learned products’. This goal of assessment is relevant to the South African situation, where diversity exists in individuals’ educational backgrounds, and is a moderating factor in relation to test performance. In DA, the interaction between the assessor and the testee is altered so that the assessor can act as a mediator to facilitate learning, rather than assessing objectively without influencing the procedure. The collaborative interaction between assessor and testee has as its goal the assessment of potential, rather than current performance.

Numerous models of DA which differ in format and content are described in the literature. Most DA procedures have been developed for use on an in-depth, one-to-one basis with individual testees. However, attempts have been
made to use them as a screening approach within group contexts (Floquet, 2008; Lidz, 2002; Lidz & Greenberg, 1997; Lidz, Jepsen & Miller, 1997; Seabi & Amod, 2009; Tzuriel & Feuerstein, 1992). The two subdivisions within the DA paradigm include global and domain-specific approaches. As an example of the former approach, the Learning Potential Assessment Device (LPAD) (Feuerstein et al., 2002) concentrates on general cognitive skills and processes, providing a qualitative and holistic picture of the child's ability to learn through a variety of tasks. On the other hand, Campione and Brown (1987), for example, use DA within the context of domain-specific skills. Their assessments relate to particular academic content areas such as reading. A further example of a domain-specific approach is that of Lidz's (1991) curriculum-based approach. Her approach uses actual curriculum content as the assessment task. An instrument designed by Lidz and Jepsen (1999) is the Application of the Cognitive Functions Scale, which is appropriate for preschool children. The content of this scale is strongly related to typical preschool curriculum demands.

The theoretical background of the dynamic assessment approach

DA is rooted in a socio-cultural and bio-ecocultural model of a socially constructed reality which emphasises environmental change, although the role of heredity is recognised (Murphy & Maree, 2009). Intelligence is defined within the DA approach as being a modifiable construct. This assumption is based on the belief that human beings have the potential for meaningful, permanent and pervasive change (Feuerstein, Rand & Rynders, 1988). The historical and theoretical foundation of the DA movement rests largely on the work of Lev Vygotsky (1978) and his concept of the ‘zone of proximal development’ (ZPD), and of Reuven Feuerstein (Feuerstein, Rand, Hoffman & Miller, 1980) and his theories of structural cognitive modifiability and mediated learning experience (MLE).

Vygotsky and the zone of proximal development

Vygotsky was one of the earliest critics of psychometric approaches to assessment. He suggested that learning and interaction were more valid bases for determining a child's cognitive functioning (Guthke & Wingenfeld, 1992). He emphasised the importance of cultural factors and, more specifically, the role of adult–child interactions in the development of the child's values, information and understanding. One of the most profound contributions by Vygotsky is his concept of the ZPD. This refers to the ‘distance between a child's actual developmental level as determined by independent problem solving and the higher level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers’ (Vygotsky, 1978, p.86). Vygotsky viewed the ZPD as a tool that psychologists and educators could use to understand children's mental and educational functioning. His writings have had a substantial impact on the theory and practice of cognitive psychology and its application to education (Ashman & Conway, 1997).
Feuerstein’s model of dynamic assessment

Structural cognitive modifiability

Feuerstein’s dynamic approach to assessment is based on his theory of structural cognitive modifiability (Feuerstein et al., 2002) and is the most influential of the DA models (Lidz, 2002). This theory is based on the assumption that human beings are dynamic and changing, and that they have the unique capacity to modify their cognitive functions and adapt to changing demands in life situations (Haywood & Tzuriel, 1992). While Feuerstein’s theory of structural cognitive modifiability evolved out of his studies of children, it is understood to be applicable to individuals of different ages and cultural groups.

The theoretical roots of Feuerstein’s approach to assessment, as well as his Instrumental Enrichment (IE) programme (Feuerstein et al., 1980), are in Piagetian structuralism. IE is the thinking skills programme derived from the theory of structural cognitive modifiability. While Piaget focused on the process of acquiring knowledge through stages of cognitive development, Feuerstein extended this view of the learning process. For Feuerstein, it is the MLE between a ‘primary caregiver’ and the child which accounts for the outcomes of the learning process (Feuerstein et al., 2002). Kozulin (1994) notes that, while Vygotsky proposed that adults and more competent peers introduce symbolic tools to the child in the course of learning, he did not fully elaborate on the role of the human mediator in his theoretical framework. This theoretical goal is addressed by Feuerstein’s construct of MLE (Kozulin, 1994).

One of the most controversial issues in the field of psychology has been how intelligence is defined and what factors affect it. A fundamental question that remains at the centre of the debate is whether intelligence is static or modifiable. Feuerstein conceives of intelligence not as a fixed and unitary characteristic, but in terms of cognitive structures and processes that can be developed through learning. Feuerstein’s concept of modifiability suggests that assessment should investigate and address a child’s potential to change and to develop his or her cognitive skills. Several researchers support Feuerstein’s assertion that there are many obstacles that can mask an individual’s ability, and that when these obstacles are removed greater ability than was suspected may be revealed (Haywood & Lidz, 2007; Skuy et al., 2002; Tzuriel & Kaufman, 1999).

Mediated learning experience

A central concept related to Feuerstein’s notion of structural cognitive modifiability is that the development of cognitive structures and processes is dependent upon the individual’s opportunity to benefit from MLE. Feuerstein, Rand and Hoffman (1979, p.71) define MLE as ‘the interactional processes between the developing human organism and an experienced, intentional adult who, by interposing himself between the child and external sources of stimulation, “mediates” the world to the child’. This process of MLE is distinct from direct learning, in the sense that the environmental stimuli are mediated taking into consideration the child’s capacities and needs. Feuerstein’s concept of MLE explains how culture is transmitted and how autonomous functioning
is promoted. Intergenerational transmission of culture provides the individual with the tools for further development, while the MLE received and the degree of modifiability that the individual becomes capable of ensure the optimal use of these tools (Skuy, 1996).

According to Feuerstein (1980), lack of adequate MLE (proximal condition) is considered to be the causal factor for inadequate cognitive development, while conditions such as poverty, neurological impairment and emotional disturbance in the child or parents, as well as low education of parents, are viewed as distal aetiological conditions. This implies that, although these conditions are commonly found in people with inadequate cognitive development, they are not necessarily the direct cause of cognitive deficiency but are, rather, the correlates of cognitive deficiencies (Feuerstein, 1980).

In part, these distal conditions reflect the reality of South Africa, especially before 1994, because parents from poor socio-economic backgrounds, who were mainly from black communities, often had to work far away from home. The absence of parents, as well as extremely limited physical and social environments, made it difficult, if not impossible, for the optimal transmission of culture or development of learning. Mentis (1997) argues that apartheid created an environment hostile to the transmission of MLE, and this absence deprived the individual of the prerequisites for higher mental processes, despite a potentially normal inherent capacity.

Feuerstein (1980) makes a distinction between cultural deprivation and cultural difference. He considers the way culture and learning are mediated to an individual to be a proximal condition. When the transmission of culture from one generation to the next is lacking – for instance, in situations of war or famine – cognitive performance tends to be hindered and Feuerstein refers to this as cultural deprivation. On the other hand, cultural difference is viewed as a lack of familiarity with another culture. Although the child may come from a different culture, he or she may adapt easily and cope well in an unfamiliar environment, provided that the essential elements of the child’s own culture have been sufficiently mediated.

In order for effective mediation to take place, certain parameters of interaction have to be present. These parameters, which guide the mediator, are presented in Table 9.1. Research demonstrates that not all teaching and parenting interactions constitute mediation, although these interactions can be considered as being mediational if they encompass certain of the MLE parameters (Falik, 1999). All of the parameters presented in Table 9.1 are applicable to a variety of behavioural interactions, and are important for the successful creation of conditions of learning and the development of skills. (See Skuy (1996) for a detailed discussion on cross-cultural implications of Feuerstein’s construct of MLE.)

In sum, according to Feuerstein, MLE plays a vital role in moderating aetiological factors such as socio-economic status. Individuals with similar difficulties show markedly different learning and performance abilities, depending on the type and amount of MLE they receive. Founded on this premise, MLE-based intervention has been used in assessment as well as in learning support programmes.
Table 9.1 Feuerstein’s criteria for mediated learning experience

<table>
<thead>
<tr>
<th>Parameters of interaction</th>
<th>Definition</th>
</tr>
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<tbody>
<tr>
<td>Intentionality and reciprocity</td>
<td>Refers to the conscious and consistent attempts of the mediator to influence behaviour and maintain his/her involvement (Lidz, 1991).</td>
</tr>
<tr>
<td>Meaning</td>
<td>The relevance and importance of an activity are conveyed.</td>
</tr>
<tr>
<td>Transcendence</td>
<td>This entails going beyond the immediate interaction, and connecting to and widening the transfer of goals to future areas and expectations (Seokhoon, 2001).</td>
</tr>
<tr>
<td>Regulation and control of behaviour</td>
<td>Refers to self-monitoring, where the behaviour is related to what was planned or intended.</td>
</tr>
<tr>
<td>Feelings of competence</td>
<td>Instilling in the mediatee a positive sense of ability to succeed.</td>
</tr>
<tr>
<td>Sharing behaviour</td>
<td>Emphasises the value of the mediator and mediatee cooperating and interacting supportively and empathically with each other.</td>
</tr>
<tr>
<td>Individuation and psychological difference</td>
<td>The mediatee is accepted and made aware of his/her uniqueness.</td>
</tr>
<tr>
<td>Goal planning</td>
<td>Explicit involvement of the mediatee, and the structuring of processes related to goal-setting and planning to achieve these goals (Skuy, 1996).</td>
</tr>
<tr>
<td>Challenge</td>
<td>Instilling optimistic belief in the mediatee to approach an unknown situation with curiosity, enthusiasm and determination.</td>
</tr>
<tr>
<td>Human being as a changing entity</td>
<td>Instilling a belief in the mediatee of the possibility for self-change with expectations for potential growth (Falik, 1999).</td>
</tr>
<tr>
<td>Search for optimistic alternatives</td>
<td>Facilitation of an awareness of potential for change and of available opportunities to do so.</td>
</tr>
<tr>
<td>Feeling of belonging</td>
<td>Although people are unique and independent, they are also interdependent on each other.</td>
</tr>
</tbody>
</table>

The principles and procedure of dynamic assessment

The conceptualisation of intelligence in terms of cognitive structures and processes, which can be changed through MLE, led to the development of the dynamic approach to assessment. In this approach, the cognitive processes engaged in by testees during problem-solving and their use of particular thinking strategies in relation to particular cognitive tasks is assessed.

The basic principle of DA is that the performance level of the testee in the assessment situation can be modified by introducing materials and instructions into the assessment procedure which can aid performance. The nature and extent of the mediation will provide an indication of the learning potential of the testee, and also provide guidance for further educational intervention.
As the goal of the assessment process is to analyse cognitive modifiability rather than to identify the testee’s stable characteristics, the test situation is reshaped from a rigidly standardised procedure to a flexible interaction between the tester, the testee and the task (Lidz, 1991). Using the learning potential paradigm, a test-teach-retest technique is applied. After obtaining some information on initial baseline functioning, the testee is provided with training experiences relevant to the problem-solving task, and the resulting performance on similar tasks is assessed on the basis of the learner’s ability to profit from the strategies offered. Teaching and learning are thus incorporated into the assessment process. During the DA process, the tester as mediator not only makes the stimuli meaningful but also attempts to instil in the testee the importance of being able to apply and transfer the learning to other areas of life. As the DA approach rejects the notion of ability as a fixed entity, it attempts to identify the learner’s best performance, recognising that with further intervention this performance could be further modified, despite certain intervening cognitive, motivational, situational or cultural factors.

Feuerstein et al. (2002) have devised a cognitive functions list which provides a basis for identifying the testee’s strengths and weaknesses in the DA process, and for appropriately addressing the latter through the provision of MLE. They conceptualise these cognitive functions as falling into three phases of cognitive processing: the input (data gathering), elaboration (data processing) and output (data expression) phases. The area of deficiency may be in one or more of these three mental phases.

In addition to criteria for MLE, Feuerstein (1980) provides techniques for mediation, which are briefly defined. Process questioning involves questions that focus on the process of learning or performing the skill, but not on the final product. During process questioning, the mediator asks ‘how’ questions. Bridging involves the creation of opportunities to link new learning to previous knowledge and to similar situations. Modelling involves step-by-step demonstration of learning and problem-solving. During modelling, the mediator first demonstrates to the testee and afterwards the testee imitates him or her. By using the technique of challenging or justification, the testee learns to evaluate his or her outcome. During this process, the mediator challenges both correct and incorrect responses, thus building upon and extending the testee’s existing knowledge. Teaching about rules involves the making of rules for particular situations. Having made a rule for solving a problem, the goal is to assist the testee to apply this knowledge to similar problems that he or she may encounter in the future.

The Learning Potential Assessment Device
The LPAD developed by Feuerstein and his colleagues (Feuerstein, Haywood, Rand, Hoffman & Jensen, 1986) is based on their theory of structural cognitive modifiability and its construct of MLE. The LPAD consists of assessment tasks which are administered dynamically, and the assessment process itself provides specific direction for intervention. Accredited training is necessary to use the LPAD instrument.
The LPAD comprises a battery of verbal and nonverbal tasks which seek to tap a variety of operations including categorisation, numerical reasoning, memory and analogical reasoning. Each test comprises an original task and a variation of the task for purposes of mediation. The tasks are novel in nature, so that the child has not had previous experience of them (Lidz, 1991). The assessment tasks nevertheless reflect similar cognitive demands to school tasks (Feuerstein et al., 2002).

The Instrumental Enrichment programme
The IE programme was developed by Feuerstein (1980) to provide a vehicle for the transmission of optimal MLE. This thinking skills programme consists of a series of paper-and-pencil exercises that are presented to the individual. The primary goal of IE is to facilitate meaningful structural change in an individual’s cognitive functioning, through the process of MLE, as well as to develop his or her ability to think both autonomously and creatively (Feuerstein & Jensen, 1980). Feuerstein and Jensen describe a number of subgoals of IE, such as the increase in intrinsic motivation, the development of insight and awareness, changing self-perception and the acceptance of greater control over the learning situation.

Dynamic testing versus dynamic assessment
Sternberg and Grigorenko (2001) argue that all testing is dynamic testing because there is a learning component to most tests. Tzuriel (2001) refutes this argument by pointing out the major differences between standardised testing and DA in terms of goals, orientation, the context of testing, the interpretation of results and the nature of tasks. He points out that static tests do not contain implicit learning components, and he presents empirical evidence to support this view.

Haywood (2001) also refutes Sternberg and Grigorenko’s claim that all testing is dynamic testing. He points out their misconception of the nature of the intervention in DA, and argues that whereas Sternberg and Grigorenko define dynamic testing in narrow psychometric terms, testing is not synonymous with assessment, which draws upon data from a broad range of sources (including tests). While it is probable that some learning will take place during most testing procedures, the salient difference between static and dynamic approaches is not the learning, but the teaching that is done according to a mediational style (Haywood, 2001). According to Haywood, through the DA process the examiner explores:

- the obstacles that impact on the examinee’s performance;
- the kind and amount of teaching and mediation needed to address these obstacles; and
- the expected extent of generalisation of learned cognitive and meta-cognitive concepts and strategies.
Application of dynamic assessment and the MLE construct

Considerable international research supports the effectiveness of DA in improving the cognitive functioning of students (Feuerstein et al., 2002; Haywood, 1995; Lidz, 2002; Tzuriel & Kaufman, 1999). In South Africa, there has been an increase in research in this area since the 1980s. A few empirical studies conducted in South Africa are reviewed here.

Several studies have documented the effectiveness of MLE in improving cognitive functioning and academic performance of students in the South African context (Mehl, 1991; Russell, Amod & Rosenthal, 2008; Schur, Skuy, Zietsman & Fridjhon, 2002; Seabi, 2012; Seabi & Amod, 2009; Seabi & Cockcroft, 2006; Skuy et al., 2002; Skuy & Schmukler, 1987). These have been conducted on samples ranging from preschool children and remedial school learners through to university students.

Russell et al. (2008) investigated the effects of parent–child MLE interaction on the cognitive development of 14 preschool children who engaged with their caregivers (11 mothers, 2 fathers, 1 grandmother) in free-play (a form of play similar to play at home) and structured tasks (which included 15-piece puzzles and wooden apparatus with 5 sticks of different lengths). The purpose was to explore and to compare the impact of parents’ MLE during structured tasks and informal play interactions. Three sessions for each parent–child dyad took place, comprising a parent interview, playtime and two sessions of individual assessment. The MLE Scale (Lidz, 1991) was used to measure parents’ MLE interactions, while cognitive functioning was measured by the Kaufman Assessment Battery for Children (K-ABC). Significant correlations were found between mediation of Transcendence, Joint Regard, Praise and Encouragement, Competence, and mediation of Meaning with cognitive modifiability. The parents’ MLE during play interactions yielded greater significant impact than their MLE interactions during structured tasks. These findings suggest that playful parent–child interactions may create a powerful medium for cognitive development. Specifically, the results suggest that sharing experiences, information, affect, attention and relating a feeling of competence are necessary in interactions with young children in order to effect cognitive development.

Recently, Seabi and Amod (2009) compared the effects of one-to-one mediation with group mediation on a sample of Grade 5 learners in a remedial school. It was proposed that participants within the Individual Mediation group (N = 10), who were given individualised intervention, would perform significantly better than those within the Group Mediation group (N = 10). Mediation instruments (namely, Set Variations B-8 to B-12 from Feuerstein’s LPAD) served as a vehicle for mediating cognitive deficiencies. The intervention was geared towards correcting thinking patterns that impair learning, and developing accurate perception, insight and understanding of the participant’s thought processes. Specifically, participants were encouraged to develop effective thinking strategies, refrain from impulsivity, be precise and systematic in data gathering, clearly identify and define problems, devise a plan of action, avoid
Dynamic assessment in South Africa

trial-and-error responses, look for logical evidence and reflect before responding. Results revealed a significant improvement from pre-test scores only within the Individual Mediation group. Despite this, no statistically significant difference was found between the performance of the Individual Mediation and the Group Mediation samples. It was therefore concluded that provision of MLE enhances cognitive functions irrespective of the type of mediation, whether individual or group.

In a follow-up study with a different sample of remedial learners, Seabi (2012) argued that the Seabi and Amod (2009) study may have underestimated the effects of mediation, since the two groups that were exposed to MLE were compared to one another in the absence of a control group. Therefore, Seabi (2012) investigated the effects of MLE intervention (that is, one-to-one mediation similar to the type provided in Seabi and Amod’s study) by comparing the performance of a control group and an experimental group on the Raven’s Coloured Progressive Matrices (RCPM), a nonverbal measure of intelligence. The sample comprised 67 participants (males = 35; females = 32; mean age = 11.8) from Grades 4 to 7. Participants were given the RCPM on two occasions, and inbetween, a non-randomly constituted experimental group was exposed to MLE intervention. The experimental group comprised Grade 4 and 5 learners, whilst the control group consisted of Grade 6 and 7 learners. The control group demonstrated superior performance over the experimental group in the pre-test RCPM scores, as an effect of grade level. However, the experimental group improved their performance significantly from pre- to post-test, presumably as an effect of the mediation, and the discrepancy in RCPM scores between the groups was narrowed at post-test. Analysis of between-group post-test differences revealed non-significant results. This suggests that provision of MLE is valuable for learners with special educational needs, and that these learners may have greater potential ability than is estimated by traditional intelligence tests.

At high school level, Schur et al. (2002) investigated the effectiveness of teaching an experimental astronomy curriculum (EAC) to a group of low-functioning learners based on a combination of MLE and a constructivist approach. This study included an experimental and a control group, each of which comprised 16 Grade 9 learners. Although learners within these groups received lessons focused on the concept of the earth for three hours per week, the experimental group did so within the framework of the EAC, while the control group was exposed to the conventional approach within the earth studies curriculum. The results revealed that the experimental group (receiving the curriculum through a combination of MLE and constructivism) improved their cognitive functions (as measured by Test of Understanding Science) and learnt astronomy (Nussbaum’s test) to a significantly greater degree than a comparable control group. This suggests that the combination of MLE and constructivism can be used to produce domain-specific curricula, and that it is possible to use science teaching as a means of enhancing students’ cognitive skills.

Several other studies (Mehl, 1991; Seabi & Cockcroft, 2006; Skuy et al., 2002; Skuy & Shmukler, 1987) were carried out at a university level. Mehl conducted a study with physics students to determine whether they displayed any
cognitive deficiencies such as blurred and sweeping perception and impulsive exploration of a learning situation, documented by Feuerstein (1980). MLE was used as a vehicle for mediating the cognitive deficiencies identified. The sample comprised an experimental group that received a programme of MLE applied to the teaching of different aspects of physics, and a control group that received regular instruction. No statistically significant differences were found in the performance of the experimental and control groups in the two sections of the course – namely, optics and thermodynamics. However, a significant difference was found in the mechanics section of the course, in favour of the MLE group.

Skuy and Shmukler (1987) investigated the effectiveness of DA approaches among groups of socio-politically and educationally disadvantaged South African adolescents. The sample, comprising 60 Indian and 60 coloured adolescents from the top and bottom of their respective academic spectra, were assigned to experimental and control groups. Two sets of instruments were used – namely, several tasks (including Set Variations I and II, Complex Figure Drawing and Comparisons) from the LPAD and a set of independent measures of cognitive functioning (including the Raven’s Standard Progressive Matrices (RSPM), Equivalent Complex Figure and the Similarities subset of the Wechsler Intelligence Scale for Children – Revised). Although pre-test–post-test measurements were conducted for the control and experimental groups, only the latter group was exposed to MLE intervention. The LPAD involved approximately six hours of interaction between the mediator and mediatee. The Set Variations I and II were presented in a group setting, since group interaction in these tasks is regarded as facilitative of mediation (Tzuriel, 2001). Following the intervention, improvements were found on the LPAD tasks. Although mediation was not generally effective in yielding change on the conventional measures of cognitive functioning, there was a mediation effect in interaction with academic performance and race. These results suggest the potential value of mediation with socio-politically disadvantaged groups in South Africa.

In another study, Skuy et al. (2002) investigated the effects of MLE on improving the cognitive functioning of psychology students. A sample of 98 students (70 black and 28 white) volunteered to participate in this study, and 55 were randomly assigned to the experimental group, while 43 were allocated to the control group. RSPM served as a pre- and post-test measurement of intellectual ability. Mediation was only provided to the experimental group, which was divided into two subgroups for purposes of the intervention. A two-way Analysis of Covariance (ANCOVA) was conducted with the two groups (black experimental, black control, white experimental, white control) as variables. Although analysis of the pre-test scores yielded significant differences due to the effect of race, the post-test results yielded significant difference as an effect of the mediation and non-significant results as an effect of race. The results of this study support the importance of mediation in improving the cognitive functioning of students.

A similar study was conducted with 111 first-year engineering students (Seabi & Cockcroft, 2006). The purpose was to compare the effectiveness of MLE, tutor support and peer collaborative learning on academic courses and intellectual
tests. Of the 111 students, 45 constituted the experimental MLE group, which was compared to two groups of 36 and 30 students each, and which constituted the tutor and peer groups respectively. The participants were exposed to pre- and post-test measurements of intellectual ability – namely, the Raven’s Advanced Progressive Matrices (RAPM) and the LPAD Organiser subtest, and academic courses (which included chemistry, mathematics, physics, an introductory course in engineering, mechanics, core courses and the overall course). While the mediator for the MLE group was guided by the MLE parameters of intentionally, consciously and actively eliciting cognitive functions, by initiating discussions and responding to the participants within the mediation group, the tutor served as a bystander to assist those students who experienced difficulties in solving engineering problems within the tutor group. In contrast, participants within the peer group were only able to consult one another for assistance. The intervention was conducted for 90 minutes over a five-week period.

Although significant improvements were found at post-test on the RAPM in all three groups, only the mediation group demonstrated significant improvement on the Organiser subtest of the LPAD. Of the seven academic variables assessed, six yielded significant post-test improvement within the mediation group, while two of these variables demonstrated significant improvement within the tutor group. No significant improvement was shown on any academic variables within the peer group. Consequently, it was concluded that exposure to adequate and appropriate MLE is effective in improving the academic achievement of students, thus supporting the existing research in this domain.

The reviewed studies suggest that students could benefit from interacting with a mediator, thereby enabling them to reach a level of cognitive functioning that they could not access without assistance from a knowledgeable adult. Given the years of educational and socio-political deprivation that black students have been exposed to, considerable mediation may be needed to overcome the cognitive deficits that they may display. The LPAD and the construct of MLE appear to provide valuable tools which can be applied in relation to psycho-educational assessment, intervention and research.

Criticisms of the dynamic assessment approach

DA, with its particular emphasis on learning potential, is a groundbreaking approach to assessment. Given its mediation of cognitive operations, this approach avoids the trap of taking acquired knowledge as the primary indicator of ability to accomplish future learning. However, DA is not widely applied, for several reasons. It is not yet taught in most of the institutions of higher learning; it is not cost-effective, given that it takes more time to administer than static tests; it requires more skill and experience than other forms of assessment, as well as suitable training; and the recipients of psychologists’ reports typically do not expect a DA report and do not yet know how to interpret the data or the recommendations (Elliot, 2003; Karpov & Tzuriel, 2009; Tzuriel, 2001). While the theory and principles of DA have the potential to be widely applied
to assessment practice in South Africa, use of the LPAD is very limited as the accredited training that is needed to implement this procedure is not easily accessible.

Some researchers (Grigorenko & Sternberg, 1998; Haywood & Tzuriel, 2002) criticise DA procedures as being highly clinical in nature and lacking in validity and reliability. For instance, Boeyens (1989a, cited in Du Plessis, 2008, p.35) maintains that the ‘measurement of gain of post-mediation scores over pre-test scores is confounded by the fact that the reliability of a gain score is reduced by the error of measurement in the pre-test and post-test scores. The reliability of the difference score will thus always exhibit a lower reliability than that demonstrated by the pre-test and post-test scores.’ Therefore, even when able to attest to acceptable levels of reliability for pre-test and post-test scores, it is not necessarily possible to attest to the reliability of the difference score (Murphy, 2002).

The issue of transfer of learning beyond the assessment situation (for example, to school subjects such as mathematics or reading) has also been cited as a concern (Karpov & Tzuriel, 2009). Furthermore, an evaluation of DA has been difficult, as various models have been postulated with each stipulating their own definitions, theoretical frameworks and requirements (Jitendra & Kameenui, 1993; Murphy & Maree, 2009).

Given both measurement and practical concerns relating to DA, computerised adaptive testing has been suggested as a possible solution. In South Africa, De Beer (2005) has conducted empirical studies on the Learning Potential Computerised Adaptive Test, a dynamic computer-based test, and a detailed review of this assessment procedure is provided in chapter 10 of this volume.

Conclusion

The current educational curriculum in South Africa, which was further revised for implementation starting in 2011, reflects the influence of concepts such as cognitive modifiability, the ZPD, process- rather than product-based education and assessment, and the enhancement of problem-solving and thinking skills. These are the principles and goals that need to be mirrored in psychological assessments conducted in South Africa, in response to the search for culturally fair tools. Local research suggests that DA, with its goal of enhancing learning potential, can make a notable contribution as an addition to the repertory of tests that are currently in use. Intensive and ongoing research needs to be conducted to develop viable ways of applying DA on a wider scale, and to ensure that the procedures used within this approach are valid and reliable, and adapted to meet local needs.

References


Section One: Cognitive Tests


