CHAPTER 2

MONITORING QUALITY EDUCATION: A REVIEW OF THE LITERATURE

In recent years, there has been a re-emphasis on the quality of education, where quality education entails certain aims and objectives and the more education realises these aims and objectives, the better the quality of education. As argued in Chapter 1 monitoring systems are used to gauge the quality of education. This chapter provides the review of literature pertaining to monitoring. Specifically, value-added systems are explored as these provide information on the contribution that the school makes to the learners' learning. Furthermore, value-added systems may use either a curriculum-based assessment or a developed abilities assessment. Curriculum-based assessments are used to track learner achievement from one grade to the next, while developed abilities assessments provide a baseline measure from which future achievement can be predicted. Learner achievement is not the only variable that should be considered, however, as there are contextual factors that affect performance which also need to be considered. These factors can be divided into school-level factors, classroom-level factors and learner-level factors.

2.1 Introduction

> A better schooling system places significant emphasis on the measurement of learner performance, and on the need for improved management to ensure that education resources are translated into quality teaching and learning (National Department of Education, 2003b, p. 7).

The search for quality education within the context of the emerging global village has resulted in education systems across the world sharing many characteristics. Characteristics include an economic rationale for transforming education, an emphasis on standards, the need for valid and reliable indicators, performance as well as issues relating to accountability (Smith & Ngoma-Maema, 2003). Although the definition of quality is illusive, quality can be defined as

aims and objectives that have been achieved. In order to assess quality scientifically, certain mechanisms have to be used. The mechanisms used include systems that provide information on the extent to which identified aims and objectives have been attained. Monitoring systems are the mechanisms that are used and issues pertaining to monitoring will be discussed in this chapter. Monitoring is a key element in this research as stated in the first main research question addressing the appropriateness of MidYIS as a monitoring system for the South African context.

Monitoring systems in education are discussed in 2.2 of this chapter in which the term "monitoring" is elaborated upon. In addition, the characteristics of monitoring systems are examined, followed by examples of prominent monitoring systems developed in the Netherlands, Australia, and the United States of America. A comparison of the systems is discussed in 2.3 while value-added systems as a basis for monitoring are elaborated on in 2.4. The term "value-added" is discussed, including the origins of value-added systems in education and the different approaches to them, namely, the use of curriculum-based measures or developed ability measures. Furthermore, ability correlates with performance, this is discussed in 2.5 and is followed by a discussion of abilities against the backdrop of the curriculum. In 2.6, the role of abilities and the skills they represent are discussed in terms of the aims and objectives of curricula specifically in the demonstration of performance. Performance cannot be interpreted in a vacuum and contextual factors influencing performance need to be considered in order to provide an accurate assessment of performance as addressed by the second main research question. In 2.7, contextual factors affecting performance, factors that are school-related, classroom-related and learner-related, are discussed.

2.2 Monitoring systems in education

In Chapter 1, section 1.3, the concept of monitoring was introduced and, essentially, refers to the gathering of relevant information on learner performance at various stages in order to ascertain whether academic gains have been made. Building on this, monitoring can be thought of in terms of watching, keeping track of, or checking with a purpose (Merriam-Webster Dictionary, 2005). Monitoring of learner performance provides important information to politicians and the public alike and monitoring of education systems has become a major policy issue (Husén & Tuijnman, 1994). In addition, monitoring refers to the procedures for the collection of information about various aspects of the education system at national, regional, and local levels (Husén & Tuijnman, 1994), the main purpose of which is to monitor performance to support learning or reach a judgement on achievement. Other functions of

monitoring are to provide information on school functioning and to map changes in performance over time (Nuttall, 1994). Monitoring is a coherent approach in which both achievement and contextual information are included (Husén & Tuijnman, 1994).

Moreover, monitoring can be thought of in terms of professional monitoring systems (PMS), on the one hand, which are confidential and used by schools for self-evaluation purposes, and official accountability systems (OAS), on the other hand, which function on a national-level and involve publication of information (Tymms, 1999). Until recently, however, few countries have systematically collected information on education outcomes or made them available. Thus there is an absence of evidence of the quality of teaching and learning taking place (Greaney & Kellaghan, 1996).

Quality of education is increasingly being emphasised (UNESCO, 2005; OECD, 2005; Greaney & Kellaghan, 1996) and school success, in terms of quality, is increasingly being highlighted where success is seen as ensuring achievement. In order to ensure that learners are performing, tools are needed not only to ascertain whether academic improvements have occurred but also to identify learners who are at risk (Safer & Fleishman, 2005). Thus data has to be collected at different times (Greaney & Kellaghan, 1996). Moreover, research has shown that, when quality education is tracked by means of monitoring systems, learners seem to learn more and are more aware of their own performance (Greaney & Kellaghan, 1996; Lockheed, 1996; Sammons, 1999). Furthermore, decision-making about the learning process improves (Safer & Fleishman, 2005) as quality assessments provide not only a basis for learning but also diagnose areas that need attention (Scheerens & Hendriks, 2002). As stated by Fitz-Gibbon (1996, p. 69) “what students learn represents one of those major outcomes that we care about enough to measure, so assessment is an integral part of monitoring.”

What is clear from the discussion above is that monitoring systems used to ascertain quality education comprise of characteristics that could provide a framework for classifying and comparing systems. For example, it provides answers to questions about which tools are needed to collect information and about which tools are used for what purpose. Furthermore, monitoring systems have a purpose, namely, to ascertain whether goals are being reached, thus monitoring systems have an underlying rationale. In the section to follow, a framework for comparing monitoring systems is proposed (2.2.1). This is followed by a discussion on monitoring systems used in the Netherlands (2.2.2), Australia (2.2.3) and the United States of America (2.2.4).

2.2.1 Characteristics of monitoring systems

Monitoring systems have certain characteristics and, according to Fitz-Gibbon (1992), these include:

- Dealing with a manageable unit of education;
- Having an explicit rationale underpinning the system as well as a primary aim;
- Are negotiated among stakeholders;
- Have a positive affect on behavioural aspects;
- Do not interfere with the system that is being monitored.

In other words, a school or a school department is the unit that is being monitored according to a set of inputs, outcomes, and related processes that can be directly linked to that school or school department. The inputs, processes, and outcomes that are included in the monitoring system have to be specified and justification must be given as to why the set of indicators have been included. Furthermore, the monitoring system and the indicators included in the system have to be accepted by the stakeholders of the school or school department and should affect the learners equally. Finally, collecting data that is essential to the monitoring process should not take up excessive and unwarranted amounts of time distracting stakeholders from their daily duties.

One of the major problems in designing any monitoring system, according to Fitz-Gibbon (2002), is the selection of indicators to be included. Thus the purpose of the system has to be kept in mind. An indicator, in this context, refers to a statistic that conveys information regarding the change, status or performance of the education system (Bottani & Tuijnman, 1994). Moreover, an indicator is quantifiable in nature, representing a snapshot of the situation at one point in time. Indicators are measured against stipulated criteria and describe conditions that can be improved upon, using information that is collected regularly to indicate change (Greaney & Kellaghan, 1996). For selecting indicators, Fitz-Gibbon (2002) suggests that one considers, as a starting point, the range of possible kinds of indicators (attitudes towards school work, leadership style, classroom management), within a conceptual framework, so that the process of monitoring and flow of information can be established.

The characteristics described by Fitz-Gibbon (1992) provide a useful framework when comparing monitoring systems. In her framework, she not only places emphasis on the purpose of the monitoring system but also on operational aspects such as what data are collected, how data are collected, and how the information benefits the stakeholders. All four aspects mentioned are consistent with the definition of monitoring as discussed in the

introductory paragraphs of 2.2. In the sections to follow, examples from the Netherlands (2.2.2), Australia (2.2.3) and the United States of America (2.2.4) are presented. Only one example, per country, is discussed. The examples discussed have been specifically chosen, as they have similar characteristics, such as the rationale behind using the monitoring system; but, differ greatly in the approach followed and in the implementation of the system. The discussion is concluded with a comparison of the systems, based on the characteristics identified by Fitz-Gibbon (1992).

2.2.2 The ZEBO-project in the Netherlands

In the Netherlands, schools are responsible for the quality of education provided and for pursuing a policy that ensures improvement of education. Good quality education is seen as a basic right and the government has to create favourable conditions for fostering quality education. Furthermore, quality education is seen as not just investing in individuals but also as an investment in society as a whole (Plomp, 2004). Under the *Quality Law*, which came into effect in 1998, schools are encouraged to carry out self-evaluations, but are not provided detailed formats or directions as to how the self-evaluation should be carried out. In addition, responsibilities for quality evaluation and the curricular domain, specifically, are becoming increasingly centralised. Furthermore, the *Quality Law* stipulates that schools are accountable for the quality of education they provide and, as a result, schools are required to develop three policy documents aimed at making their approach to quality transparent. The first document is a school plan, which outlines the school's approach to quality education. The second is a school prospectus containing the school's objectives, educational activities, and results achieved. The third document is an arrangement of information that offers interested parties additional information on various possibilities of involvement and the participation of parents, learners and staff in the decision-making process regarding school activities (Scheerens & Hendriks, 2002).

In order to assist schools with the task of evaluating themselves, many approaches and tools have been developed. However, many school self-evaluation approaches were characterised by a lack of regard for the reliability and validity of instruments and were therefore questionable (Scheerens & Hendriks, 2002). Three organisations, namely the Foundation of Educational Research, the Foundation for Curriculum Development and the Institute for Educational Measurement, collaborated in the development of self-evaluation instruments for primary schools, which were scientific in nature and based on sound research approaches. Thus the ZEBO-project (Self-Evaluation in Primary Schools) was developed (Hendriks, Doolaard & Bosker, 2001, 2002). In the ZEBO-project, different approaches to school self-

evaluation and monitoring are integrated, each with theoretical and disciplinary underpinnings (Scheerens & Hendriks, 2002).

The ZEBO-project is comprises three distinct components that are integrated into one system, as mentioned previously. The first component is a pupil monitoring system that is based on psychometric theory and includes issues of adaptive instruction (ZEBO-PM). The second component of the project assesses the educational content covered, or "opportunities to learn", within the framework of curriculum planning and curriculum evaluation (ZEBO-CC). Finally, the project measures school process indicators within the framework of school effectiveness and school improvement research (ZEBO-PI). Thus the ZEBO-project makes use of various instruments, namely standardised tests and background questionnaires (Hendriks et al., 2001, 2002) which are grounded in an inputs, processes and outcomes framework (see Table 2.1).

Table 2.1 provides an outline of the aspects that are included in the ZEBO-project and, as can be seen, contextual factors as well as achievement are taken into consideration. The achievement information is used to ascertain the contribution the school is making to the learning process or the value the school is adding, while the contextual information is used to identify factors that should be considered when interpreting the gains or lack of gains made by learners.

Various interpretive frameworks could be used by schools to evaluate the quality of education that they provide, based on the information received as part of the ZEBO-project. The frameworks include comparing themselves with nationally established norms or by comparing themselves with other schools and interpreting the results by means of reflection with no reference to external benchmarks or points of reference. The aim of using a monitoring system such as the ZEBO-project is that schools will be able to track performance over time and set targets to be attained (Scheerens & Hendriks, 2002) as well as develop self improvement plans and strategies (Hendriks et al., 2001, 2002).

Table 2.1 ***Components and indicators of the ZEBO-project***

Variables included	Sub-categories	Source of information
Input indicators	Initial achievement in mathematics and language. Background characteristics such as socio-economic status, school career data, pupil characteristics such as age. Financial and material inputs.	School management information systems. Questionnaires.
Process indicators	Content covered such as books used, components taught and opportunities to learn. Conditions which enhance school effectiveness such as achievement orientation and high expectations, educational leadership, cohesion amongst staff, school and classroom climate, instruction methods and monitoring tools used.	Curriculum evaluation. School diagnostic instruments/questionnaires.
Outcome measures	Achievement that is adjusted in terms of initial achievement.	Learner monitoring system based on achievement tests for mathematics and language.

(Source: Scheerens & Hendriks, 2002; Plomp, 2004)

2.2.3 The Victorian Certificate of Education (VCE) data project in Australia

In Australia, as is the case in many other countries, including England, there has been a drive by policy makers to make use of performance indicators. In this context, performance indicators are used based on mean examination scores, which are aggregated at the school-level and published in league-table type rankings of schools' results. The result of the

publication of league-table rankings, however, impacts negatively on the education system as it includes criticism of schools and educators by the media, a 'test dominated' curriculum and parents choosing to enrol their children in certain schools and not others based on the league-table results (Rowe, 1999). Furthermore, league-tables very often include crude estimations while aspects of the school are lost in the statistics, so that vastly different schools are compared with one another rather than similar schools. In addition, the estimation of variation, designed to inform school improvement strategies, is ignored by the league-tables (Rowe, 1999). In reaction to this, a project was launched to stimulate within-school improvements in teaching, learning, and performance of learners by means of providing performance feedback from the Year 12 Victoria Certificate of Education (VCE) assessment programme.

This project is known as the VCE data project and aims to assist schools to monitor effectiveness of teaching and learning in 53 subjects over time. The focus of the project is to provide schools with performance data that facilitates the process of monitoring effectiveness of teaching and learning programmes. The idea behind the project is that performance feedback is a necessary precursor for the identification of strengths and weaknesses in teaching and learning programmes. However, having access to the information does not necessarily mean that the information will be used. Thus careful and responsible management of performance information is called for in an environment where all the stakeholders are committed to strategic and continual improvement (Rowe, Turner & Lane, 2002).

In Australia, information on the abilities and academic achievements of Year 12 learners is collected as part of the Victorian Certificate of Education (VCE) assessment programme. The primary aim of the assessment programme is certification; however, the results could be used for monitoring the effectiveness of schooling, planning, and support in addition to facilitating learners' entry into tertiary education and the work force. The VCE data project was implemented in 1992. It included a mix of examinations and structured school-based tasks. As part of the assessment programme, learners in Year 12 were required to take the General Achievement Test, or GAT, halfway through the year. The results were used as a quality control device to identify which school-based tasks were either over- or under-scored, based on predicated results from the GAT (Rowe et al., 2002). The rationale for this was that additional information was needed about the competence or ability of learners as opposed to making use of standardised tests only (Rowe et al., 1999). In addition, as is argued by Rowe (1999), the majority of standardised tests assessed skills in terms of general academic abilities or traits and not learning outcomes as a result of instruction per se.

The GAT is a measure of general abilities focusing on three domains. The first domain is written communication while the second domain comprises mathematics, science, and technology. The third domain includes arts, social science, and the humanities. In addition, learners are given a subject score. By using the subject score and abilities score it becomes possible to estimate the effect of the school on learner achievement. Thus the role of the VCE data project is to supplement the annual statistical information received as part of the VCE assessment programme with information that facilitates the investigation of questions related to effectiveness of teaching and learning (Rowe et al., 2002).

Feedback is seen as the fundamental core of the VCE data project and a key mechanism with which schools are able to claim ownership of their learners' performance data. Feedback in the VCE data project is provided by means of computer software designed specifically for the project. Schools are provided with data for each learner and subject and this is presented graphically. A manual, or user guide, is supplied with the software providing information on how to interpret the graphs generated by the software. In addition, further support is provided by means of a telephone help-desk, via email and consultations (Rowe et al., 2002).

2.2.4 The ABC+ model in the United States of America

Education reform in the United States of America has tended to focus exclusively on learner performance and accountability with little attention being paid to process information. The ABC+ (Attitudinal/Behavioural/Cognitive Indicators plus Context) monitoring and feedback model was developed with the aim of providing process data to schools and districts at the classroom, grade and school-level (see Table 2.2 for details). The interpretation of the data and application of the data are context specific. The ABC+ model takes cognisance of this and assists in the development of school improvement plans that are driven by best practices in school effectiveness and staff development research (Teddlie, Koshan & Taylor, 2002).

A key consideration of the proposed model was that the instruments and procedures used should make sense to practitioners. Practitioners should be able to trust the information if they are expected to use the information. Furthermore, the research should be efficient in scope and function but also be affordable. Finally, the data collection should be replicable over time and across schools so that performance can be measured against itself and be comparable to other schools. Additional characteristics of the ABC+ model are that it provides schools with school effectiveness indicators that can be used to track performance over time and that it makes use of mixed methods for collecting process information on site.

Also, the ABC+ model makes use of a variety of reporting formats that can be used to illustrate improvement progress to a variety of stakeholders (Teddlie et al., 2002).

Data are generated on the parent, learner, classroom/educator and school/principal-level, making use of various data collection instruments (see Table 2.2) for the different types of process information required. The rationale behind the inclusion of attitudes, behaviour, cognitive indicators, and context variables is the belief that attitude change precedes behavioural change that precedes cognitive change and that school context affects the course of the change process (Teddlie et al., 2002). In addition, school effectiveness research has been criticised for using performance as the prime criterion for effectiveness and ignoring alternative indicators of effectiveness which are also necessary (Koshan, Tashakorri & Teddlie, 1996).

The ABC+ model was developed as a professional monitoring system, which means that data are generated for direct use by schools for improvement purposes. Stakeholders, in this case school staff members, decide which data elements should be monitored and who should collect the data - the school staff themselves, or external evaluators (Teddlie et al., 2002).

Table 2.2 ***Data elements of the ABC+ model***

Level	Attitudinal indicators	Behavioural indicators	Cognitive performance indicators	Context variables
School-level	Interview.	Self report log of activities.	Questionnaire assessing awareness of school change.	Governance structures. Community Grade phase of schooling.
Classroom-level	Focus group interview.	Classroom observations using defined protocols.	Questionnaire assessing awareness of best teaching practices.	Selection and retention of educators.
Learner-level	Attitudinal; questionnaire.	Shadowing/observation of a learner for a day.	Norm referenced tests. Criterion referenced tests. Value-added scores.	Socio-economic status.
Parent-level	Interview.	Inventory of parental activities.	Questionnaire assessing awareness of direct parental involvement.	Cultural components of the community.

(Source: Teddlie, Koshan & Taylor, 2002)

2.3 Comparison of selected monitoring systems

In the sections above, various monitoring systems have been discussed in order to provide the reader with an overview of the different type of monitoring systems available. In the beginning of the section on monitoring systems, Fitz-Gibbon (1992) states that monitoring systems have various characteristics, namely:

- A measurable unit/level of analysis;
- A rationale for the monitoring system;
- Stakeholder participation is included;
- There is an effect on behaviour;
- The implementation process should not interfere with the functioning of the system being monitored.

Table 2.3 provides a summary of the three monitoring systems discussed in terms of the framework provided by Fitz-Gibbon (1992). From the comparison, it can be seen that in all three systems:

- The school and classroom-levels have been identified as the unit of analysis;
- The rationale underlying the system focuses on school effectiveness and the monitoring of aspects within the school;
- Stakeholders are important to identify aspects which should be monitored so that improvement plans may be based on those aspects;
- Data collection takes place during school hours and thus has to be negotiated so that there is minimal disruption;
- The degree of stakeholder input as well as the impact of implementation varied from one approach to another.

Table 2.3 ***Characteristics of the monitoring systems using the Fitz-Gibbon (1992) framework***

System characteristics	The ZEBO-project	The VCE data project	The ABC+ model
Unit of analysis	School, classroom, and learner-level.	School, classroom, and learner-level.	School, classroom, learner, and parent-level.
Rationale underpinning the project	Developing sound self-evaluation tools based on research and theory.	Assist schools to monitor the effectiveness of their teaching and learning.	To provide process information which schools can use for improvement plans.
Primary aim of the project	Primarily for monitoring by schools.	Forms part of government initiatives for certification purposes; however, an important aspect is the facilitation of monitoring effectiveness.	Primarily for monitoring.
Stakeholder input	Schools evaluate themselves. Components evaluated to ascertain efficiency, effectiveness, and use of information.	Schools interpret the data based on training received. School management teams primarily responsible; however, it is a participative process in which the stakeholders work together.	Stakeholders decide which elements should be monitored and who will collect the data. Participative in nature.
Effect on behavioural aspects	Information used to draw up self - improvement plans in line with legislation.	Information used to develop strategies for improvement including personnel management strategies.	Information used to develop school improvement strategies and plans.
Implementation of the project	School-based with minimum interference with school activities.	Minimum interference with school activities as this forms part of the VCE assessment programme.	The model is time-consuming and labour intensive; however, data collected is not collected by outcomes-driven indicator systems.

A monitoring system in the South African context has to serve the same purposes as the three examples discussed and, as such, the lessons for South Africa that can be taken from these examples are:

- The unit of analysis should be the district, school and classroom-level;
- There should be a clear rationale which underpins the monitoring system;
- Stakeholder participation is vital if the system is to be a success;
- Indicators included in the system should be chosen with care;
- The information gathered and analysed should be followed up with positive action such as improvement plans;
- There should be a minimal effect on school activities.

It is, however, pertinent to consider that, although the classroom and the school-level are primarily focused on, other areas of the system cannot be ignored. Thus one has to consider the inclusion of the parents or community as well as higher levels of the education system such as district, provincial or national-levels. Furthermore, the rationale has to be clear as to whether the goal is to develop tools for self-evaluation to monitor effectiveness or to make use of already developed tools in order to develop self-improvement plans. Finally, the level of participation of the school has to be identified. Does the school collect the information themselves, send the information for capturing and transformation and then analyse the data or does the school liaise with research consultants who collect the data, analyse the data and provide detailed feedback reports?

For South Africa, in the light of policy initiatives, it would be important to include other levels of the system as well to ensure that no vital elements are neglected. For example, without the inclusion of the district office, schools may not be able to obtain the official support they need to carry out improvement plans, especially in light of the uncertainty as to what is expected in terms of self-evaluation. It may be beneficial to make use of instruments that are already developed but can be adapted to the South African context. This approach may take the least time in terms of development and has the potential of yielding effective results. Finally, with the demands placed on schools, it is not likely that they would have the time to collect and analyse the information themselves, but rather that they would make use of researchers who would be able to collect the necessary data as well as supply the information that is needed, tailored to the school's needs.

Important lessons can be learnt from literature when developing a monitoring system. Involvement in self-evaluation, monitoring, and feedback is a learning experience in itself (Hendriks et al., 2002). It is of the utmost importance to provide accurate, informative, and

appropriately adjusted information, which presents the performance data in a responsible manner (Rowe et al., 2002). In addition, the school principals are of crucial importance, as the driving force for monitoring and self-evaluation usually originates by them (Hendriks et al., 2002). It is imperative that schools are provided with an opportunity to take ownership of learner performance data (Rowe et al., 2002). To this end, staff should be included in the design of the data collection (Teddlie et al., 2002). Schools tend to compare the performance information received with their own experiences, if the results match their expectations they are satisfied but at the same time, disappointed because of the lack of new insight. Schools may often make use of the self-evaluation and monitoring as an accountability check for parents and school boards (Hendriks et al., 2002), while Gray (2002) indicates that schools, as well as educators, are more likely to respond when they perceive the data to be something worthwhile at both school and subject-level.

Hendriks et al. (2002) suggest that, when developing a monitoring system, instruments need to be flexible in order to meet the needs of the school. The type of performance information has to be tailored to schools' needs, especially in terms of presentation, including norm-referenced tables as part of the feedback and support structures to assist schools in the interpretation of information. In terms of analysis, one should take the hierarchical structure of learner performance data into account before the information is given to the school (Rowe et al, 2002). Over and above these points, it is important to make a distinction between the basic monitoring function of such a system on the one hand and additional instruments for diagnostic purposes and further analysis on the other (Hendriks et al., 2002). The culture and context of schools must be taken into account: if a school has built up defences in terms of performance related information, the information could simply be rejected (Gray, 2002). In order to remedy this situation, educators and researchers should try to establish an atmosphere of support for school-level improvement at both state and district-levels. In addition, researchers should undertake comparative longitudinal studies in order to evaluate the effect of the information (Teddlie et al., 2002).

Research (Gray, 2002; Hendriks et al., 2002; Rowe et al, 2002; Teddlie et al., 2002) suggests that the potential benefits of implementing adequate monitoring systems are great. A word of caution though, the aim of the monitoring system must entail more than merely improving upon test scores, as this narrow concentration on test scores could lead to a narrowing of the curriculum, inadequate learning and the possibility of lowering educational standards instead of raising them (Torrance, 2003). Furthermore, the misuse of monitoring systems is immense (Husén & Tuijnman, 1994). However, when monitoring systems are created and implemented with knowledge of the likely effects and the characteristics of these

effects are continuously being tracked and documented, as well as evaluated, then one is one-step closer to a system that is truly beneficial (Coe, 2002). In the words of Rowe et al. (2002, p. 182-183):

> …learning and achievement outcomes are not likely to be brought about by academic polemic, nor by "top-down-driven" administrative fiats of bureaucracies…Rather, with access to, ownership of, and control over their own data and their supporting products, sustained improvement can be achieved by schools via leadership support and teacher professional development practices that maximize the quality of teaching, learning and achievement.

2.4 Value-added monitoring systems

In Chapter 1 (1.3.3), the reader was introduced to value-added as a mechanism used for monitoring. In this section, value-added monitoring systems are elaborated on. The question of whether schools make a difference in terms of learning has long been answered (Sammons, 2006). This section elaborates on the question being posed not of whether schools make a difference but rather how much they affect learning (Zurawsky, 2004). Value-added systems are useful in ascertaining the quality of education as value-added measures address questions about the way in which a school and learners are performing and also stimulate discussion on how to organise teaching and learning activities (Saunders, 2001).

The term "value-added" originated in economics where it was used to describe the difference between the price of the finished product and the cost of the raw materials that were needed to produce the product (Pickering & Bowers, 1990). However, value-added and value-added data on performance have become major features in the educational landscape and part of the story of school effectiveness (Saunders & Rudd, 1999). As part of the educational landscape, the measurement of value-added is central to the development of a good indicator system that is based on empirical underpinnings and is open to scrutiny as well as to refinement. Such a system should include elements such as prior attainment, the longitudinal nature of progress, the very nature of the school (multileveled), the knowledge that the factors involved in hindering or boosting progress are multivariate in nature and that there is a differential effectiveness for different groups of learners (Saunders, 1999; Zurawsky, 2004).

Value-added can be interpreted in a variety of ways. It could refer to measures of progress made by learners in one school as compared to similar learners in other schools (Strand, 1998) or refer to the gains made by individual learners (Bianchi, 2003). Value-added could

also be expressed in the calculation of the contribution schools make to learners' progress (Saunders & Rudd, 1999) or even the difference between learners' knowledge and skills at entry level and knowledge and skills at graduation (Pickering & Bowers, 1990).

Value-added analyses have the potential to be informative to all stakeholders whether districts, schools or parents (Strand, 1998). In order for them to be informative, however, it is necessary to consider the following (Saunders & Rudd, 1999, p. 3):

i. Outcome measures which reflect the various levels of pupil performance
ii. Measures of prior attainment
iii. Background information
iv. Calculations should be based on data collected at individual learner-level
v. Use advanced statistical techniques

Various methods have been developed over the years to produce information about the relative effectiveness of schools on the one hand and providing diagnostic assistance for managers and educators alike on the other. Furthermore, schools are in need of strategies or systems that can be used, not only to identify what learners know and do not know, but also to provide information that establishes a basis against which future achievement can be compared (Kyriakides, 2002). Until now, the focus of the work on value-added measures has been on the methodological accuracy and the conceptualisation of statistical models to be used in an appropriate manner in order to collect the right kind of data in the right form (Saunders, 2000). This emphasis has led to different value-added approaches. In the section to follow, two different approaches, from the United Kingdom (2.4.1) and the United States of America (2.4.2), will be discussed as they represent the two ways in which value-added monitoring systems could be approached. The section concludes with reflections on value-added monitoring systems (2.4.3).

2.4.1 Value-added monitoring systems in the United Kingdom

In the United Kingdom, schools use assessments, including aptitude assessments, to calculate the value-added. Value-added assessment is commonly undertaken by secondary schools when a new cohort of learners joins the school in Year 7, which is the beginning of secondary education, although systems are available for primary schools. The rationale behind implementing a value-added system is that the national curriculum tests undertaken at the end of primary school, very often are not suitable for calculating value-added. As a result, many schools opt for abilities type assessments which give an indication of general attainment that is used to calculate the value a school has added, based on the General

Certificate for Secondary Education (GCSE) results at the age of 16 (National Foundation for Educational Research, 2004). In addition, it is pertinent to mention that value-added measures are seen as increasingly important due to the pressure placed on schools to perform as a result of the publication of league-tables (Fitz-Gibbon, 1996).

Value-added systems in the United Kingdom make use of a baseline against which later performance is compared, and progress made by the learner can be ascertained based on the difference between the initial measure and later performance. The progress made by learners can be attributed to the school and, hence, can be thought of as the value the school has added. Thus the method entails comparing the baseline measure and the output measure in order to ascertain the difference (National Foundation for Educational Research, 2004).

The National Foundation for Educational Research (NFER) in the United Kingdom has been a major contributor to the development of value-added research, in terms of empirical investigations of variables that are associated with learner performance, and has also contributed to the practical application of value-added analyses. The NFER developed a "service," which was called the Quantitative Analysis for Self Evaluation or QUASE (Saunders & Rudd, 1999). The aim of QUASE is to provide detailed, confidential information on learner performance based data from a developed abilities assessment to schools and to Local Education Authorities (LEA). The analyses undertaken as part of the QUASE system are derived from sophisticated statistical modelling techniques and assist schools to evaluate how well they are faring, based on the school's background and learners' prior attainments (Schagen, 1996).

Attitude questionnaires are used in addition to the abilities test. By taking background characteristics into account, the performance results are placed in context and enable the NFER to undertake multilevel analysis of data about individual learners, year groups and the school as a whole (Arkin, 1997). QUASE feedback consists of tables as well as graphic representations. Included in the feedback is information about learners' performance, for instance whether they have performed significantly above, below or no different in the GCSE result in comparison with the predicted result based on the baseline measure. Bar charts, in addition to scatter plots, provide information per subject as well as against and scatter plots provide three kinds of information – about subjects, prior performance, and national percentile scores. Thus schools can compare performance against national standards and can identify learners who may need additional assistance as well as learners who performed relatively well (Schagen, 2004). Moreover, attendance and differential effectiveness for girls

and boys are also included (Saunders & Rudd, 1999). What is particularly interesting about the approach followed by the NFER is that seminars and in-service training courses are offered in order to assist in interpreting and using the data (Saunders, 2000).

As mentioned in Chapter 1, the CEM centre has also developed a number of value-added systems at various stages of the United Kingdom school system, most notably Primary Indicators at Primary Schools (PIPS), Middle Years Information System (MidYIS), Year 11 Information System (YELLIS) and A-level Information System or Alis (CEM, 2002a). The current research focuses on MidYIS, which is described in Chapter 4. However, the first project developed by the CEM centre will be briefly discussed as this project forms the template from which the other projects were developed.

The Advanced Level Information System (Alis) was designed to provide performance indicators for learners after GCSE. Alis was developed in 1983 and, as with the other systems discussed in this section, makes use of a value-added approach. It uses a baseline measure, representing learner ability before the learner starts with what is called post-16 courses, i.e. courses taken after the age of 16. A two-pronged approach is followed in the Alis Project. If learners have a GCSE score, the average is used as the baseline measure. If learners do not have a GCSE score the CEM centre makes use of the Test of Developed Ability or TAD (CEM, 2006e). In addition to making use of a baseline measure to provide value-added feedback for Advanced Subsidiary-Level (which is the first year of advanced studies) as well as A-Level (which is the second year of advanced studies), Alis also provides attitudinal information based on questionnaires which learners complete (CEM, 2006f). The questionnaire takes approximately 15 minutes to complete and includes items pertaining to home background, prior achievement, attitudes towards subjects, attitudes towards institutions and likelihood of staying in education, career choices and preferences in work (CEM, 2006g).

2.4.2 Value-added monitoring systems in the United of States

Essentially, the approach to value-added in the United States is based on the idea that educators are to be evaluated on the difference between incoming levels of achievement and outgoing levels of achievement. Initially, value-added systems were meant to level the playing field (Ballou, 2005), where educators could not be held accountable for factors that they could not control. However, the theory and the practice are often very different. In the United States, for instance, value-added has become synonymous with accountability (Ballou, 2005).

Sanders (then at the University of Tennessee) developed a value-added assessment model of accountability in the United States of America in the early 1980's (Sanders & Horn, 1998). The system developed by Sanders and his colleagues focuses on the gains, which are made by individual learners as well as the schools and districts, from one year to the next. The primary purpose of the system was to provide information for summative evaluation of schools' or educators' effectiveness in leading learners to academic gains over a period of time (Sanders & Horn, 1998).

The basic propositions of this system were to try to measure the influence the districts, schools and educators have on learner performance. The system developed by Sanders and his colleagues was later incorporated into the *Tennessee Educational Improvement Act* and became known as the Tennessee Value-Added Assessment System (TVAAS), which assesses learners in mathematics, science, reading, language and social studies from Grade 3 to Grade 8 (Sanders, 1998). The assessments, which are administered annually, are vertically linked from one year to the next and effectiveness is based on learner progress (Ballou, 2005). The rationale underpinning the TVAAS was to provide learner and educator performance scores that were free from the biases normally associated with standardised testing, as TVAAS scores reflect growth regardless of initial level of performance (Sanders, Wright, Ross & Wang, 2000). The value-added measure of the TVAAS was derived from comparing the expected scores (obtained from past results such as the previous year) with the actual score achieved in the current year of study (Bianchi, 2003) and made use of scales which correlated highly with curricular objectives (Sanders, 1998). According to Sanders and Horn (2003), the TVAAS is a statistical process that measures the influence of the school system, where schools and educators are used as indicators of learning taking place. Specifically, the growth in learning is aggregated on a yearly basis as reflected in the assessment scores of the five academic subjects tested (Kupermintz, 2003). The TVAAS model uses unbiased estimates of the influence of educators, schools and school systems on learning (Sanders & Horn, 2003).

2.4.3 Concluding remarks regarding value-added monitoring systems

There are benefits attached to value-added assessments. In the words of Steen (in Olson, 2002, p. 1), value-added approaches "provide more accurate estimates of changes in test scores than we currently get with a lot of the systems being used. It [value added assessments] also … does a better job of communicating what we really want to know, which is the extent to which individual students are gaining or losing". Other benefits are

- Value-added measures provide a way of monitoring effectiveness in terms of increases in achievement over previous performance, as each learner is compared to his or her own record (Kupermintz, 2003; Legres, 2000; Olson; 2002)
- Value-added data could assist in academic advising, developing learners, and improving teaching (Kyriakides, 2002; Pickering & Bowers, 1990; Olson; 2002; Zurawsky, 2004).
- Value-added assessment provides schools with objective feedback regarding progress made by the educator, school, and/or district, as it focuses on learners' rate of advancement. It thus provides a basis for measuring future performance (Kyriakides, 2002; School Directors Handbook, 2003).

Value-added assessment systems are not without criticism (Drury & Doran, 2003; School Directors Handbook, 2003):

- They are not always easily understood. Most of them are based on advanced statistical techniques which may well be above the grasp of educators;
- They can be misused in the name of accountability;
- Value-added assessments adjust for learner background characteristics which are specifically associated with academic growth and which could lower performance expectations of disadvantaged learners and schools;
- Critics also state that value-added assessments based on the curriculum will lead to teaching to the test and that standardised tests do not measure all the aspects of learning.

Furthermore, value-added analyses are only as good as the assessments used and data gathered (Zurawsky, 2004) and are costly to set up and manage. One should be mindful that these systems are based on normative and retrospective models, which do not say anything about desirable levels of performance. These systems deal in correlations, not causes, and, as a result, are limiting for evaluation purposes. Moreover, value-added systems could be used in different contexts: either in an accountability context or in a development and improvement context. In terms of accountability, value-added analyses can only be used as a screening device: they should not be used for making definitive assessments. In an improvement context, require staff training and support in order to maximise the analyses. As beneficial as value-added analyses can be, these analyses do not provide quick fixes to the problems facing schools and should be used with caution (Saunders, 2002). However, value-added assessments support the notion that all learners can learn and provide a means of determining at which pace they learn.

The ultimate use of value-added assessment information is that it is elicited with the aim of improving teaching and learning. This cannot be accomplished, however, without giving adequate feedback that is a key component in many value-added systems. Feedback, according to Black and Wiliam (1998), should be about particular qualities of learners, learners' work, and the extent to which the learner can improve. For value-added feedback to be effective, both positive and negative aspects need to be highlighted (Duke, 2002) so that the recipients of the feedback would be motivated to fulfil educational purposes (Siebörger & Macintosh, 2004). The issue of value-added feedback nevertheless needs to be approached with caution. Evidence suggests that feedback can often be almost as harmful as beneficial (Coe, 2002). When designing and implementing a feedback system, one should be mindful of the fact that it might not automatically lead to an improvement in the situation though it might, under the right conditions, have a substantial effect on the improvement of task performance (Coe, 2002).

No assessment system will completely explain or evaluate all aspects of learning, but the data, which is obtained from value-added assessments, can be a helpful tool for stakeholders to use in their efforts to improve upon learning (School Directors Handbook, 2003). A growing body of knowledge about research on value-added methods is being developed, with specific emphasis on new approaches and techniques that are both credible and useful for schools (Doran & Fleischman, 2005). Two of these approaches have been discussed in this section: making use of assessments that are aligned with the curriculum and making use of an abilities type assessment in order to gather baseline data from which future achievement can be predicted. In the section to follow, the use of abilities assessments to predict academic performance is discussed, with a view to providing a theoretical base for the use of ability assessments.

2.5 Ability as a predictor of academic success

Ability could be defined as being competent in a certain area, acquiring proficiency in a certain skill, or even having a natural aptitude in an area (Merriam-Webster, 2005). Ability can also be viewed as cognitive (information processing) traits or characteristics used when solving problems. Intelligence is seen as general reasoning ability and accounts for performance in a wide variety of contexts (Anastasi & Urbina, 1997; Kline, 2000) as it involves the ability to plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience (Gottfredson, 1997a). Intelligence or abilities assessment, however, is very often riddled with certain misconceptions, such as the idea that intelligence scores cannot change and those scores, once obtained, will remain for life

(Gottfredson, 1997a). Historical misinterpretation, in addition to the misuse of intelligence test scores, has added to the debate of making use of such tests (Haladyna, 2002). In South Africa for instance, the results of this type of assessment were used to discriminate against racial groups and thus to reinforce the *apartheid* philosophy. In reaction to this, the Department of Education, as part of the newly elected Government, in 1994 discontinued support for school wide use of intelligence tests.

Modern explanations of intelligence and the abilities that constitute intelligence, range from the capacity for learning (Haladyna, 2002) to the differences in the rate in which learning takes place and the time taken to learn (Carroll, 1997). Explanations also include the ability to profit from being exposed to materials and situations (Rowe, 1997) and the differences in the capacity to process complex information (Gottfredson, 1997b). These explanations provide a snapshot of how differences in abilities could produce differences in the quality of learning taking place. Furthermore, intelligence and ability are not factors that merely influence performance in school but also have a lifelong impact (Gottfredson, 1997c).

The knowledge and skills that are considered to be the hallmarks of intelligence or ability are very often taught (Spearritt, 1996; Rowe, 1997), thus schooling increases ability scores (Colom, Abad, García & Jaun-Espinosa, 2002). Furthermore, Perlman and Kaufman (1990) state that intelligence and the assessment thereof was developed out of a pragmatic need to predict academic success. Up to 25% of variance can be accounted for in school results, as many items included in the assessments represent content that is grounded in the school curricula. Researchers have been interested in the role of ability in determining academic success, not just for the sake of undertaking research but also with the aim of identifying adequate intervention strategies (Kline, 1993).

Cognitive abilities and motivation are mentioned, as determinants of academic performance and the relationship between cognitive abilities and achievement are well documented (Gagné & St Père, 2001). For example, Walhberg (1984) in a survey of 3000 empirical studies on school learning, found an average correlation of .71 between achievement and ability. In addition, Gagné and St Père (2001) found a multiple correlation of .55 to .60 between ability and achievement. Kline (1993) reports a multiple correlation for ability and achievement in language of 0.6 and, in mathematics, of 0.64. Kline (2000) states that on a primary school-level, a correlation of .60 between achievement and ability has been established. In addition, Jenson (in Kline, 2000), confirming claims made by Vernon in the 1960's, found that intelligence is the single best predictor of achievement at any level, whether at primary school, secondary school or university. The studies mentioned here

reinforce the statement that cognitive ability is a good predicator of academic achievement (Facon, 2004; Haladyna, 2002; Howie, 2002; Kendall, Verster & von Mollendorf, 1988; Kline, 1993; Rowe, 1997; Rushton, Skuy & Fridjhon, 2003; Snow, 1998; Spearritt, 1996). There are many reasons for this, one of them being that the knowledge and skills that are assessed by achievement tests are also assessed by abilities tests (Rowe, 1997). Another reason is that the correlation between ability and academic success can be explained by the conceptualisation of intelligence as the ability to reason (Kline, 2000).

Wood (1987) is of the opinion that discussions on abilities and attainment testing exclude the educational context and educational achievement, as achievement is often seen as being interchangeable with ability. In the section to follow, knowledge, skills, and abilities are discussed against the backdrop of the educational context and, more specifically, in the context of the curriculum.

2.6 The relevance of skills and abilities against the backdrop of curriculum

The preceding section illustrates the relationship between ability and academic performance. Two processes seem to be of importance when the development of abilities is considered, namely, the exposure process or the opportunity to learn and the ability to take advantage of the learning moment in order to acquire knowledge and skills (Rowe, 1997). Here knowledge can be thought of in terms of facts, concepts and principles, as well as procedures. A fact can be viewed as a declarative truth, a concept requires a definition and has certain characteristics, a principle is a “lawful” relationship, and a procedure is a purposeful activity (Haladyna, 2002). Thus knowledge involves the knowing or understanding of facts, while a skill is complementary to knowledge. It involves doing, which is the application of knowledge. Knowing, however, is seen as more than the accumulation of factual information and procedures. It is also seen as having the ability to integrate knowledge, skills, and procedures in different ways, depending on the context, in order to solve problems (le Grange, 2004; National Research Council, 2001). During the learning process, knowledge and skills are acquired, which are then organised and changed into functional systems, which in turn are used in thought and further learning (Snow, 1998).

How learning takes place depends on the curriculum that is followed, where curriculum can be thought of as what is to be learned. It may consist of aims (Posner & Rudnitsky, 1997) or be a formal academic programme. A curriculum is a structured programme that provides opportunities to learn (Graham-Jolly, 2003) or a plan for learning (Van den Akker, 2003). Various levels of curriculum exist. On a systems-level, curriculum development is normally

generic in nature while site-specific approaches take place on the school, classroom, and learner-level. The curriculum as implemented differs from both its intended and its attained aspects (Travers & Westbury, 1989). The intended, implemented, and attained curriculum may be described in the following manner (Travers & Westbury, 1989; Van der Akker, 2003):

- The intended curriculum contains the rationale underlying the curriculum, what should be taught in schools and learned by learners, and what is found in curriculum policy documents;
- The implemented curriculum is the curriculum as interpreted by educators for the purposes of teaching, i.e. the actual teaching- learning activities taking place;
- The attained curriculum is the curriculum as experienced by learners and which results in learning outcomes.

In terms of an outcomes-based education (OBE) system, such as the system in South Africa, learning is facilitated by outcomes that can be thought of as the aims, goals, or standards of the learning process. An outcome is the end product of a learning process, it is the knowledge or insight that learners should acquire as well as skills that learners should have mastered and be able to demonstrate (Killen, 2000, 2002; Olivier, 1998; Posner & Rudnitsky, 1997). The outcomes, aims, or learning targets reflect what is important in education and consist of (Kotzé, 2002):

1) Knowledge that emphasises the need to learn and to be familiar with information. Knowledge also refers to the sum of what is known or the body of truth (Merriam-Webster, 2005).
2) Reasoning, which pertains to the understanding of knowledge and refers to the ability to think and draw conclusions (Merriam-Webster, 2005).
3) Skills, which are the application of knowledge in a practical manner. To have a skill entails using one's knowledge effectively in order to execute a task (Merriam-Webster, 2005; Posner & Rudnitsky, 1997).
4) Products, which refer to the ability to think critically about what is commonly accepted as knowledge (Merriam-Webster, 2005).

An OBE curriculum emphasises learner experience, active learning, and the development of learner abilities and skills (Gultig, 2003; Kraak, 1998). However, learning ideas without acquiring corresponding competences mean that learners may not necessarily be able to use the ideas (Posner & Rudnitsky, 1997). Therefore a competence-based approach to education is followed, in which knowledge and skills are taught with the intention that the knowledge and skills learned can be applied (Van der Wagen & Ridley, 2001). Knowledge and skills not

only have to be integrated but also have to be demonstrated against defined standards or criteria within a specific context. Competence is a skill or cluster of skills that can be applied within a context, integrating understanding of performance and the underlying knowledge base (Bellis, 1999). Thus within an OBE curriculum, the transferability of skills (cognitive skills) and knowledge is emphasised (Van der Wagen & Ridley, 2001). Also emphasised is the capacity to apply knowledge and skills in an integrated manner (Kraak, 1998). Skills include basic skills such as reading, writing and arithmetic as well as thinking skills such as creativity, problem-solving and reasoning (Pullin, 1994).

What is clear is that learners should be equipped via the curriculum with skills that will enable them to evaluate choices and to identify and solve problems based on logical reasoning. Thinking processes play a major role in learning activities and should form part of the curriculum as learners who are not adequately equipped or who have a limited command of basic skills are likely to fall behind in school, especially in mathematics, reading and writing, where thinking skills play a major role in success (Hamers & Csapó, 1999). Marsh (1992) concurs, stating that the mastery of basic skills and abilities, such as problem-solving skills and the ability to use and evaluate knowledge, as well as the mastery of fundamental processes is imperative, as learners who are not proficient in basic skills will be restricted in their ability to function in society.

In the section above, elements of the curriculum have been briefly discussed with a focus on skills, abilities, and competence. There are still instances, however, where rote-learning is focused on, at times to the exclusion of conceptual learning; the emphasis is placed on the recall and recognition of facts instead of the demonstration of knowledge and skills (Falk, 2000). The achievement of outcomes and the development of knowledge remain the core business of a functional curriculum; however, achievement should be understood within the context in which it occurs (Wood, 1987). In the section to follow, factors affecting achievement are elaborated upon in order to provide the context which Wood (1987) is referring to.

2.7 Factors influencing performance

In this section of the chapter, factors influencing performance will be elaborated on, drawing on school effectiveness research, as school effectiveness research attempts to identify factors that influence learner outcomes. In addition to school effectiveness, there is literature on school improvement where the focus is primarily on the processes and conditions leading to improved learner outcomes. School improvement literature is included but only with regard

to the factors under discussion and, as a field of research in its own right, is not elaborated on. The reason for this is that school improvement literature primarily focuses the sustained efforts of stakeholders to change conditions within schools (Marsh, 1992).

School effectiveness developed in reaction to the statement that schools do not make any difference and that background factors were the dominant influences in learner performance (Gray, Hopkins, Reynolds, Wilcox, Farrell & Jesson, 1999). The term “school effectiveness” describes educational research that is concerned with exploring the differences within and between schools. The aim of school effectiveness research is to obtain information about the relationships between variables (Goldstein, 1997) in order to describe the characteristics associated with successful learner outcomes (March, 1992). This relationship, however, is not causal in nature but should be thought of it terms of tendencies (Sammons, 2006). School effectiveness can be said to be the degree to which schools achieve their goals and, in the educational context, is often associated with the quality of education (Scheerens, 1999).

School effectiveness studies generally involve the random sampling of schools and learners or classes of learners as well as the identification and the collection of information related to learner outcomes. Background information is used to map patterns in order to outline school processes that could be linked to good practice (Mortimore & Sammons, 1994) and, as a result, has the potential of providing substance to school improvement. To this end, two approaches could be used, especially in developing countries (Scheerens, 2001a). Firstly, a more pro-active approach, in which focus is placed on planned change in malleable conditions of the school context as well as the school organisation and the instructional processes at the classroom-level that have shown to have an effect on learner performance. Secondly, a retroactive approach in which variables and indicators are selected for monitoring and evaluation purposes with the aim to use the indicators as guides for improvement at a later stage (Scheerens, 2001a).

A fundamental design for school effectiveness research is the association of hypothetical effectiveness-enhancing conditions or factors and various measures of output, i.e. learner performance. Here, a basic model taken from systems theory is utilised. The school is seen as a black box inside which certain processes take place that impact on the output. The aim is to reveal the impact of relevant input characteristics on the output and to bring to light the process or throughput factors, as well as the impact of contextual conditions (Scheerens, 2000). School effectiveness research is best guided by a model in which one has an input-process-output- context categorisation of variables that is multi-level in nature and oriented

towards a value-added approach (Scheerens, 2001a) in which learner background characteristics are controlled (Sammons, 1999; Scheerens, 1990).

The most distinguishing feature of effective school research is that it attempts to study characteristics related to the organisation, form, and content of schools. The results from early studies lead to the design of the "Five-Factor Model of School Effectiveness" (Creemers, 1994; Scheerens & Bosker, 1997; Scheerens, 2000). The factors are strong educational leadership, acquiring basic skills, an orderly and secure environment, and high expectations of learner performance and frequent assessment of learner progress (Creemers, 1994; Scheerens, 2000). However, these five factors are not the only factors that influence achievement.

Characteristics of the school, educator, and learner could have an effect on performance. A relationship between school characteristics and performance has been found. Specific characteristics that have been mentioned in literature are location (Adewuyi, 2002; Howie, 2002; Teddlie, 1994) and the school's resources, including the physical, human, and material resources at the school's disposal (Greenwald, Hedges & Laine, 1996; Hill, 2001; Mortimore, 1998; Muijs, Harris & Chapman, 2004; Sammons, 1999; Scheerens, 1990; Scheerens, 2001b; Willms & Somers, 2001). Educator characteristics that have an effect on achievement are gender, age, qualifications, and competence. (Bliss, 1991; Grobler, Grobler & Esterhuyse, 2001; Howie, 2002). Other factors influencing performance are learner background characteristics, such as home environment, socio economic status (Adewuyi, 2002; Bliss, 1999; Howie, 2002; Sammons, 1999; Scheerens, 1990; Teddlie, 1994a) and the number of books in the home, the occupation of parents and their level of education (Howie, 2002).

Additional factors influencing school-level performance are achievement orientation and high expectations at both school and classroom-level where there is a clear focus on the mastering of basic subjects. (Bliss, 1991; Grey et al., 1999; Heck, 2000; Hill, 2001; Howie, 2002; Marsh, 1992; Newmann, 1991; Sammons, Thomas, Mortimore, Walker, Cairns & Bausor, 1998; Scheerens & Bosker, 1997; Scheerens, 1990; 1992; 2001a; Teddlie, 1994a; 1994b; 1994c; Wills & Somers, 2001). The focus is not only on achievement but also on communicating the expectations to stakeholders and to provide intellectual challenges for learners. (Mortimore, 1998; Sammons, 1999). A school's degree of achievement orientation can be ascertained from its expressed policies (Scheerens, 1990).

Educational leadership has also been cited as a factor that influences performance. Here, general leadership skills and the characteristics of the school principal as an information provider, co-ordinator, meta-controller of classroom processes and as an instigating participatory decision-maker are included (Adewuyi, 2002; Bliss, 1991; Gray et al., 1999; Heck, 2000; Howie, 2002; Marsh, 1992; Mortimore, 1998; Muijs et al., 2004; Newmann, 1991; Sammoms et al., 1998; Scheerens & Bosker, 1997; Scheerens, 1990, 1992; Teddlie, 1994a, 1994b). Of importance is professional leadership in which leadership is firm, purposeful, and participative in nature (Sammons, 1999). This can be seen in the amount of time the principal spends on educational matters and the amount of time spent on instructional issues (Scheerens, 1990).

School-based staff development also has a bearing on achievement (Howie, 2002; Muijs et al., 2004; Sammons, 1999; Teddlie, 1994b). Whether or not professional development support schemes are present, can be deduced from a school's policies. It is also important that professional development is linked to the school and embedded in the workplace (Muijs et al., 2004).

School climate is another factor correlating with learner performance. School climate is characterised by an orderly atmosphere in which there are rules and regulations, punishment as well as reward, where absenteeism and dropout is monitored and the behaviour and conduct of learners are taken into account. Internal relationships are also highlighted here, in terms of priorities, perceptions, and relationships between the various parties in the school, appraisal of roles and tasks and the facilities and buildings (Adewuyi, 2002; Heck, 2000; Marsh, 1992; Muijs et al.; 2004; Sammons, 1999; Scheerens & Bosker, 1997; Scheerens, 1990, 1992; Teddlie, 1994a).

Likewise, classroom-level performance is influenced by the classroom climate. Classroom climate is characterised by relationships within the classroom - between learners and between educator and learners - whether order and discipline are maintained, attitudes towards work done within the classroom and the satisfaction with the classroom environment (Marsh, 1992; Scheerens & Bosker, 1997; Scheerens, 2001b; Teddlie, 1994c; Willm & Somers, 2001).

Consensus and cohesion among staff are also viewed as important correlates of performance, which is illustrated by the type and frequency of meetings and consultations, content sharing and extent of co-operation as well as educator satisfaction levels with regard to co-operation. In addition, the importance attributed to co-operation and the various

indicators of successful co-operation is of importance (Marsh, 1992; Scheerens & Bosker, 1997; Scheerens, 1990, 1992). Shared vision and goals signalling unity of purpose and consistency of practice stimulate an environment of collegiality and collaboration (Newmann, 1991; Sammoms et al., 1998; Sammons, 1999). It is of significance that, a mission statement should be in place, that staff are actively involved in planning and decision-making and that there is a measure of organisational cohesion (Grey, et al., 1999; Mortimore, 1998).

Apart from educator coherence, curriculum quality and opportunities to learn are considered to be important factors affecting learner performance. Here opportunities to learn refer to the extent to which what is taught is tested (Scheerens, 1992). Learners who have been exposed to material included in assessments tend to fare better (Scheerens, 1990). The way the curricular priorities and objectives are set out, the choice and application of methods and textbooks, opportunities for learning and the satisfaction with the curriculum are relevant when addressing factors that influence performance (Adewuyi, 2002; Hill, 2001; Marsh, 1992; Newmann, 1991; Scheerens & Bosker, 1997; Scheerens, 1990; Scheerens, 1992; Teddlie, 1994c).

Effective learning time, often referred to in the literature as time-on-task or time allocated to learning activities, is also of importance when considering factors associated with performance. Monitoring of absenteeism, classroom management, and homework are also important determinants (Bliss, 1991; Hill, 2001; Howie, 2002; Marsh, 1992; Newmann, 1991; Sammoms et al, 1998; Scheerens & Bosker, 1997; Scheerens, 1992; Teddlie, 1994a, 1994c). Also of significance are specific aspects of learning time, such as duration of classes, school day, week or year, i.e. the actual time spent on task-related work (Scheerens, 1990). The specific aspects of learning time do not include homework, although research indicates that homework does correlate with achievement (Cotton, 2001; Nkhoma, 2002) as this is an extension of learning time (Cotton, 2001). Homework that is assigned regularly is positively related to learner attitudes towards school, subject, and homework itself (Cotton, 2001). Furthermore, approaches to teaching such as independent learning (Scheerens & Bosker, 1997), not grouping learners by ability (Scheerens, 2001a; Willms & Somers, 2001) and co-operative learning (Teddlie, 1994c) are considered important.

The structure of instruction in addition to effective learning time is important. Under structure is understood the preparation of lessons, structure of lessons, direct instruction, monitoring and maximisation of learning time (Hill, 2001; Marsh, 1992; Scheerens & Bosker, 1997; Scheerens & Creemers, 1999; Scheerens, 2001a). Teaching should be purposeful and efficiently organised. The purpose should be clear with lessons being structured so that they

are flexible and adaptable (Sammons, 1999; Scheerens, 1990, 1992). The monitoring of class work is also important and entails the educator moving around the classroom, being aware of how well or how poorly learners are faring with assignments and working with learners one-to-one if need be (Cotton, 2001), thus indicating differentiation in terms of general orientation and special attention given to learners at risk (Marsh, 1992; Scheerens & Bosker, 1997).

Monitoring of learner progress, making use of monitoring systems, school process evaluation, and the use of the evaluation results and satisfaction with evaluation activities all have an effect on learner performance (Heck, 2000; Marsh, 1992; Mortimore, 1998; Scheerens & Bosker, 1997; Scheerens & Creemers, 1999; Scheerens, 1992; Scheerens, 2001a; Teddlie, 1994a). Monitoring here refers to the tracking of learner performance, by including the frequency of assessments as well as making use of computer programs to track learner progress at all grades are key (Cotton, 2001; Sammons, 1999; Scheerens, 1990).

Reinforcement in the form of rewards and incentives as well as feedback, is related to learner performance (Mortimore, 1999; Scheerens & Bosker, 1997; Scheerens, 2001a), especially positive reinforcement in which there is clear and fair discipline as well as feedback (Sammons, 1999; Raffan & Ruthen, 2003). Feedback provides the opportunity to let learners know how they are faring, helps in the correction of errors, and fills gaps in their knowledge base (Cotton, 2001). Motivation is widely used in many studies and is linked to reinforcement (Scheerens, 1990). Motivation is an internal process, originating from a variety of sources, such as needs or cognition. It impacts on such behaviour patterns as the desire to achieve academically or the desire to learn, striving for excellence and personal incentives (Raffan & Ruthven, 2003; Waugh, 2001). Motivation can be viewed as the degree to which learners are willing to commit to achieve a goal and is either extrinsic or intrinsic. Extrinsic motivation is motivation that comes from outside the learner, such as a tangible reward, while intrinsic motivation comes from within the learner because s/he wants to set the goal for personal satisfaction (Haladyna, 2002).

Additional learner-level factors include learner rights and responsibilities in which issues of learner self-esteem, self-concept and learner aspirations have an impact on achievement (Grobler, Grobler & Esterhuyse, 2001; Howie, 2002; Mortimore, 1998; Sammons, 1999). Learner rights and responsibilities refer to the extent to which learners are involved in school related activities whereby learners acquire a sense of ownership in the school and their own learning (Mortimore, 1998).

Finally, parental involvement in school affairs such as participation in the development of school policies – regarded as an important form of contact with parents - and general school satisfaction with parental involvement have been found to be correlates of performance (Heck, 2000; Hill, 2001; Mortimore, 1998; Muijs et al., 2004; Newmann, 1991; Sammoms et al., 1998; Scheerens & Bosker, 1997; Scheerens, 1992; Scheerens, 2001a; Willms & Somers, 2001). The home-school partnership, in which parental involvement occurs in the learning process, (Sammons, 1999; Scheerens, 2001b), in which strategies are used to involve parents or significant others (Grey et al, 1999) and in which parents motivate their children to learn, to do their homework and to use their time efficiently (Van der Werf, Creemers & Guldmond, 2001) is therefore important.

Scheerens and Bosker (1997) state that effectiveness-enhancing conditions appear to be measured by assigning priority to factors and components in terms of attitudes, beliefs and goals as well as the factual state of affairs. All of this is relevant in the appraisal of the degree to which the various factors and components are achieved. Even though the various factors mentioned by authors in the preceding paragraphs are based on literature from the international arena, there is reason to believe that a correlation with developing countries can be established, seeing that in the developing world similar factors are highlighted as being important.

However, Scheerens and Bosker (1997) warn that most factors are broad when the components associated with them are considered. This makes it difficult to identify which set of elements is crucial in enhancing effectiveness. The divergence and broadness of the factors also make identifying single definitions of each factor difficult, as these could be operationalised differently across studies (Fertig, 2000). Much of the literature, which forms the body of knowledge, takes the form of a review of reviews or meta-evaluations with only a small number of studies providing evidence, which critics view as a serious drawback.

Furthermore, the context of developed versus developing world needs to be taken into consideration. In the developing world, school effectiveness research is characterised by differences between schools, variations in stability and the consistency of school inputs (Fertig, 2000) as well as cultural contingencies and the challenges of studying classroom processes where a mixed method approach is preferable (Fertig, 2000; Scheerens, 2001a, 2001b).

Fuller and Clark (1994) emphasise that school effectiveness research in the developing countries context has to follow a dual process: researchers and policy makers who wish to

identify inputs into the system in order to raise learner achievement have to consider cultural conditions and “culturalists” will have to link classroom processes to effects or as accepted in school effectiveness research trends (Sammons, 2006). Research indicates that material and human resource input factors have stronger effects in developing countries than in developed countries (Scheerens, 2001a) which, in developed countries, there are no consistent inferences which can be drawn with regard to family inputs (Hanushek, 1997).

While school effectiveness models are not as volatile as critics would have it, they are still not as firmly established as some enthusiasts proclaim (Wyatt, 1996). Studies of school effectiveness in developing countries should make use of the advanced statistical analysis available, i.e. multilevel analysis, an element that has been missing in school effectiveness research generated in developing countries. Studies should also make use of baseline measures of outcomes if school effects are to be inferred (Riddell, 1997).

2.8 Conclusion

The use of school performance data has great potential to contribute to improvement efforts; but, at the same time, if handled ineptly, the research could prove to be irrelevant or create a situation, which would have been better if it were avoided altogether (Wyatt, 1996). Nevertheless, it could be said that learning is determined by the quality of education, provided by schools, that includes all that learners do in the classroom. Teaching and learning should be an interactive process. For this to take place, schools need to know not only how their learners are progressing but also what learner difficulties are being experienced so that the needs of the learners can be met (Black & Wiliam, 1998). Adequate monitoring systems could be of use in this regard.

In this chapter, different types of monitoring systems have been discussed namely the ZEBO project in the Netherlands, the VCE data project in Australia, and the ABC+ model in the United States. The need for projects such as these arose out of policy initiatives undertaken by local and national government. The aim of these projects was to develop tools which schools could use for self-evaluation purposes so that adequate interventions could be put in place if need be.

Value-added monitoring systems were also discussed in this chapter. The way in which value-added measures are used to produce the necessary information is of vital importance in order to find measures that would best suit the South African context. Different approaches can be learnt from in order to develop a system that is focused on the improvement of

learners and quality of education by raising expectations regardless of background characteristics. Two approaches have been discussed, namely a curriculum-based approach and a developed abilities approach. Both approaches yield important information. The curriculum-based approach makes use of assessments that are grounded in the curriculum and are administered on a yearly basis so that progress from one grade to another can be ascertained. This type of system also lends itself to educator accountability, where educators are held responsible for the lack of progress made by learners. This approach has been criticised, however, as it could result in "teaching to the test" and, thus, other important skills are not developed adequately. A developed abilities assessment, on the other hand, provides baseline information on skills which the learners have already developed (cross-curricula skills) are then used to predict future performance.

The relationship between abilities and performance was touched upon as well, with overwhelming evidence that once adequate ways to measure prior achievement in terms of abilities have been developed, these could be used to predict future performance. However, the skills tested in a developed abilities assessment are skills that are taught and thus the role of skills and abilities was discussed against the backdrop of the curriculum.

Various contextual factors seem to be highlighted by a number of authors, when considering how performance information should be interpreted. Specifically, factors on a school-level include resources available to the school, high academic expectations, leadership, and school climate. Factors on a classroom-level have also been identified, such as educator expectations, curriculum quality, quality of instruction, monitoring of learner progress, reinforcement and feedback, and cohesion. On a learner-level, factors such as motivation, learner responsibilities, and self-conceptualisation have been identified, as well as the role of parents and the community. These factors have implications for this PhD research, as they will need to be adequately defined and operationalised in order to explore them within a developing world context. They can serve as a useful point of departure, to learn from studies that have taken place elsewhere.

Lessons can be taken from the literature reviewed and be woven into the fabric of the current research. If quality education is to be investigated, some form of monitoring is needed. The type of monitoring system used depends on the aim, purpose, or rationale of the system. For this research, the aim is to develop a system, which schools and educators could use to monitor learner performance and as a self-evaluation tool for improvement purposes. This rationale assists in addressing questions of which indicators to include, how data would be collected and what type of instruments would be most effective. From literature, one finds

that either a curriculum-based or a developed ability type assessment could be used. In the context of South Africa, a situation arises where secondary schools need information on the basic skills learners have when entering secondary school. These skills can then be built upon, problematic areas can be identified, and strategies can be developed to focus on identified areas. The idea here is that content can always be taught; however, if learners do not have the basic skills necessary, they will have problems accessing and mastering the content taught and a situation may arise where learners fall further and further behind. The lack of performance in international content-based or curriculum-based assessments as well as national content-based or curriculum-based assessments is a case in point. South Africa has not performed well in international comparative assessments like the TIMSS studies in 2003, 1999, and 1995 (Howie 1997, 2001, HSRC, 2006) as well as the SACMEQ study (Moloi & Strauss, 2005) where learners performed well below the international averages and below those of many countries. Likewise the learners performed well below expectation in the *Systemic Evaluation* in Grades 3 and 6. The disappointing results could be due to learners being ill prepared in terms of the content areas in addition to being unable to achieve the expected assessment standards (National Department of Education, 2005b).

It is evident in the literature that there is a link between ability and academic performance, in essence, both measure similar aspects (as discussed in 2.5 of this chapter). Thus predictions about academic performance can be made, based on the results of the developed abilities assessment. In value-added systems such as the systems employed at the CEM centre this rationale is used so that, based on the results of the developed abilities assessment, predictions can be made about academic subjects. The value the school has added is worked out by comparing the predicted result with the actual result achieved in national examinations and the difference is then referred to as the value added.

Literature sensitises one to the reality that achievement does not take place in a vacuum. There are various factors that need to be considered in order to place achievement in context. The factors, which influence achievement, may vary from context to context. However, literature suggests that certain factors are more prominent than others are. Thus if an effective monitoring system is to be developed for the South African context, factors affecting achievement have to be considered as well. These factors are not just on one level. The school system forms a hierarchy. Within schools, there are educators and classrooms, within classrooms there are learners. Because of the constant interaction among levels, it is only logical to assume that factors from one level have an effect on other levels. Literature verifies this assumption (Scheerens, 1990; Scheerens & Bosker, 1997). Thus factors from the school, classroom, and learner-level, have to be included for exploration.

The literature reviewed for this research would indicate that, for the South African context, a developed abilities assessment is preferable to a curriculum-based assessment because schools will have information about the basic skills that learners are equipped with. Furthermore, a baseline that makes use of a developed ability assessment provides measures from which growth can be ascertained and from this the contribution the school makes to the learning process can be determined. Thus in a context where schools are becoming more and more accountable for learner performance, a system, such as the one employed at the CEM centre, using abilities assessments, is beneficial. Schools would be able to demonstrate the contribution they have made to learners' learning, relative to the level at which the learner started.

Additionally, literature indicates that contextual factors should be included when exploring learner achievement as these factors do influence achievement. In South Africa, as a developing world context, the factors that would influence achievement have to be determined. A more compelling reason perhaps for the inclusion of contextual factors may be that for South Africa, as a result of the *apartheid* era and disparities in schooling, the contextual factors have to be taken into account.