CHAPTER 5

RESEARCH DESIGN

5.1 Introduction

As mentioned in Chapter 1 of this study, the implementation of CASS in South Africa is fairly new and given the complex nature of its implementation and the fact that CASS was introduced at short notice (Fataar, 1999; Kendall, 1999) the Department of Education together with its quality assurance council (Umalusi) found that there is not an acceptable standard of CASS at operational level (DoE, 1999b; DoE, 2003c; DoE, 2002c). As an interim measure, drastic measures are taken by Umalusi to reduce the impact of CASS on the examination marks of Grade 12 learners. Investigations conducted by the Department of Education also reveal that the implementation of CASS in general is problematic (DoE, 2002c). However, the literature review dealt with in Chapter 4 shows that despite the alleged limitations experienced by educators in the implementation of CASS, it is acknowledged that, "the assessment shift has been coupled with many expressions of hope that improvement in classroom assessment will make a strong contribution to the improvement of learning" (Black & Wiliam, 1998).

Since research shows that improved assessment practices can result in improved learning (Black & Wiliam, 1998), it would be wise to reflect on those variables that impact on the improvement of assessment practices in the classroom. It is also necessary to reiterate the purpose of this study so that it delineates the focus of this research and provides a conceptual framework for the understanding of the problem.

As indicated in Chapter 1, the purpose of this study is to investigate the problems and challenges experienced by Grade 12 Biology, Mathematics, Physical Science educators in the effective implementation of CASS; to determine the kinds of support provided to educators to strengthen and to sustain the effective implementation of CASS; and to examine to what extent the Grade 12 CASS marks are fair, valid and reliable. The data obtained through this study may be used to improve assessment practices in the classroom.

The purpose of this chapter is to discuss the research design used to investigate the research questions and to argue that the methodology adopted was most appropriate to the nature of the research questions.

Section 5.2 of this chapter examines the conceptual framework used in this study and is followed by a discussion on the research questions in 5.3. The research approach is discussed in 5.4, and 5.5 deals with the research methods. The conclusion to this chapter is presented in 5.6.

5.2 Conceptual Framework

The problem statement discussed in Chapter 1 of this study has been operationalised into three main research questions that form the basis of the discussions in this section. The conceptual framework, which incorporates the findings of the literature review, is meant to further address the three main research questions.

The three main research questions are:

- what are the problems and challenges experienced by Grade 12 Biology, Mathematics and Physical Science educators in the effective implementation of CASS?
- what kinds of support are provided to educators to strengthen and to sustain the effective implementation of CASS?
- the extent to which the Grade 12 CASS marks are fair, valid and reliable.

As mentioned earlier in this chapter since the effective implementation of CASS is expected to improve teaching and learning which would ultimately improve learner performance, the research questions that have emerged from the problem statement are likely to produce data that could be used to improve the effective implementation of CASS in the classroom thereby improving learner performance.

To provide the scope for further discussions and to facilitate understanding of the problem statement, a conceptual framework based on the Input - Process - Output (IPO) model has been adopted in this study. A conceptual framework can be defined as a model that allows the researcher to explore the relationships among

variables in a logical and prescribed fashion (Anderson, 1990). According to the IPO model there is a causal link between inputs, processes and outputs (Yu, 1998). This means that the variables at the input level have a direct influence on the variables at the processes level, which in turn influences the variables at the output level. As argued in Chapter 4 of this study, "to achieve high quality assessment in education, the need for high quality teachers is fundamental" (Klenowski, 1999, p. 40).

In the context of this study, the variables that influences the quality of educators are their teaching qualifications, skills, experience and development in CASS, attitude and motivation towards CASS, educational and professional support from subject advisors and support from the school principal (See figure 5.1). These variables at the input level have a direct impact and influence on the quality of teaching and learning within the classroom (classroom level). The better the qualifications of the teacher, his skills and experience in CASS and the more positive his attitude and motivation towards CASS coupled with the unconditional support of subject advisors and school principals, the better would be the quality of teaching and learning. This would then impact on the quality of the output (output level).

The input processes and output model focuses on the educator, his role and responsibilities in her/his classroom and how she/he functions within the context of the school. The context of the school refers to the school environment, for example, the culture of teaching and learning prevalent at the school, the discipline at the school, the resources available at the school, the location of the school, the support from the school principal, etc. In general, the manner in which an educator is able to perform her/his functions is peculiar to the context of his school. However, the school forms part of the much broader education system that consists of district offices, provincial education departments and the national department of education.

As indicated in Chapter 2 of this study, the role of subject advisors (subject advisors are located at district offices) is crucial to the improvement of teaching and learning. For this reason, the support of subject advisors has been highlighted

at the input level. If subject advisors are unable to support educators through, for example, the provision of CASS policy/guidelines, resources, professional development and training, it is expected that educators will not be able to meet the many challenges of classroom teaching.

Since the school cannot function in isolation and is much dependent on the support of district offices, the educator must be seen to operationalise CASS within the context of her/his school and the context of the district office that is responsible for the provision of support to the educator. Figure 5.1 is a representation of the input, process and output model which illustrates the educator's interaction with the school and the district office. This is followed by a discussion on the model.

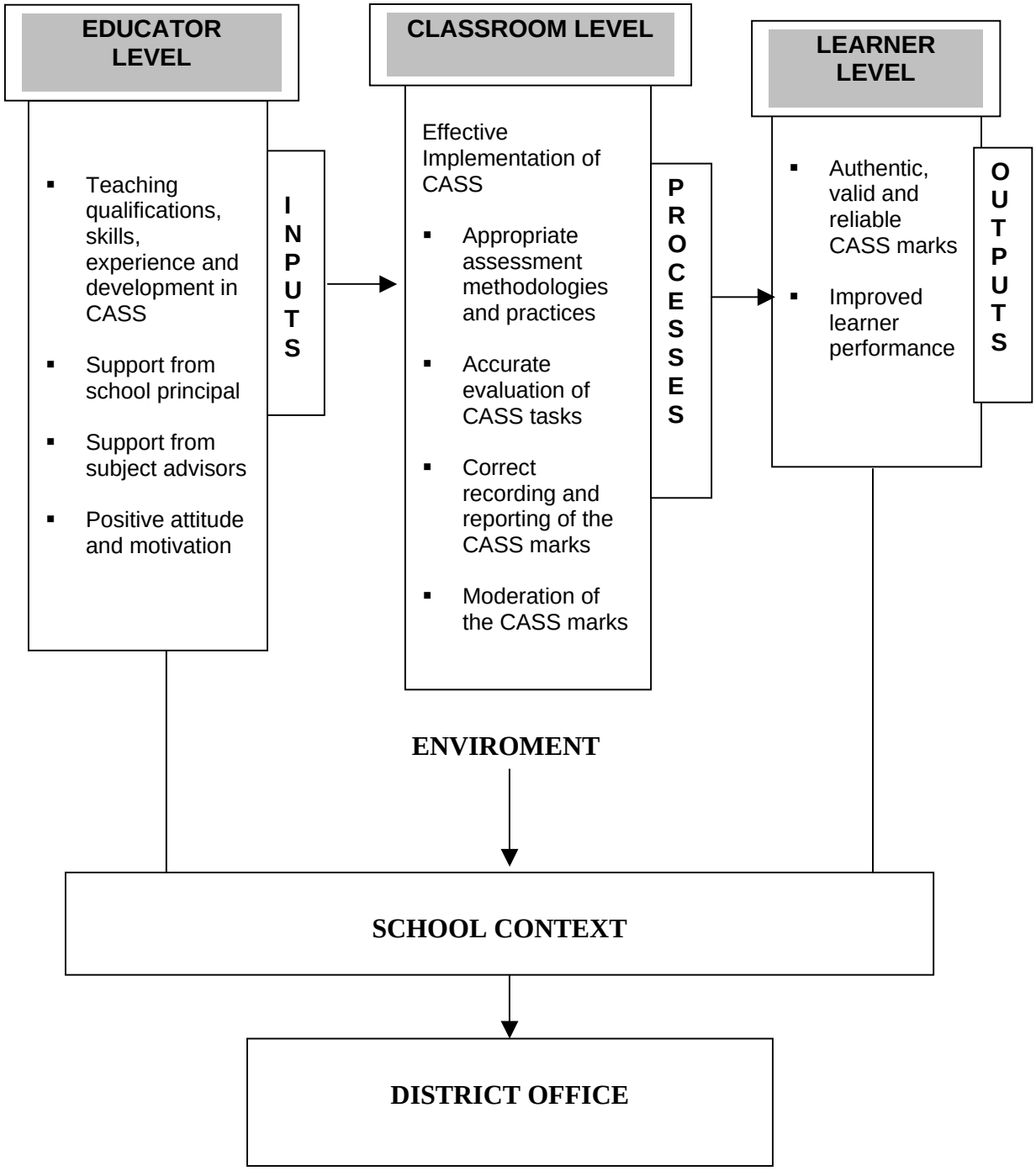

Figure 5.1 Input, Process and Output Model

Inputs

In relation to the research questions and with special focus on the educator within the school context, 'input' refers to the quality of educators that the school has been provided with to execute the schools primary function of effective teaching and learning. According to research conducted by the HSRC, "the perceived effectiveness of the educator proved to have influenced learner performance" (Kanjee et al., 2001, p.148). The better the quality of educators (teaching qualifications, skills, experience and development in CASS; support from subject advisors, support from school principal and more positive attitude and motivational levels), the better the quality of the interaction between teacher and learner in the classroom. This improved interaction between the teacher and learner then influences the quality of the outputs (authentic, valid and reliable CASS marks and improved learner performance) to be achieved at the end of the learning process.

The qualification of educators, their skills, teaching experience and development in the area of CASS are important variables at this level. Studies indicate that the qualification of educators have a significant effect on learner performance (Kanjee et al., 2001). However, apart from possessing a teaching qualification and being able to teach a subject, an educator must continually update her/his knowledge and skills in her/his subject. The experience she/he gains during the years of teaching is invaluable to her/his own development and to the development and progress of her/his learners.

Also of importance during this level is the quality of educator support provided by school principals and subject advisors in the form of classroom visits, provision of guidelines and policy documents, training programmes, workshops, professional development, skills training, physical resources and the provision of teacher and learner support materials. As indicated earlier in this section, the educator functions within the context of his school and the effectiveness of his teaching will depend to a large extent on the support he receives from her/his school principal.

Research indicates that school principals as leaders in a school have the ability to empower their educators by treating them with respect, showing support in terms

of staff development, support of teachers decisions, encouraging participatory policymaking and administration (Blasé, 1994). If the school environment is favourable and conducive to teaching and learning, this is likely to enhance the performance of educators.

The principal's interest and involvement in enhancing professional development and support within the school will influence the extent to which CASS is conducted in an appropriate manner. School principals will therefore need to understand the complex nature of CASS and provide assistance to educators to ensure that CASS is implemented in an effective manner.

However, in most instances the school principal's involvement is conditional since they are more involved in the general management and administration functions of the school than on providing professional development and support to their educators. Research shows that effective school management is linked to effective support of its educators (Kanjee et al., 2001). Without the unconditional support of the school principal especially in areas of new developments, it may become difficult for educators to meet the demands of new challenges with effectiveness. This may be the case where educators need additional physical resources, teacher and learner support materials, professional training and development, workshops, additional time with learners and administrative assistance.

Although it is recognised that the school principal plays an important role in the support of Grade 12 Biology, Physical Science and Mathematics educators, the collection of data from school principals was not necessary for the purpose of this study since the main focus of this study is on the educator and her/his subject advisor. Moreover, it was perceived that school principals are more concerned with the management and administrative functions of their schools than on the professional development and support of their educators. The collection of data from school principals would have also increased the scope of this study. It is acknowledged that this may have a limiting effect on the results of this study.

Within the context of the district office, subject advisors have an important role to play in ensuring that educators have the necessary support and the competence

to handle new challenges. Since schools are linked to district offices, there is much reliance on effective interaction between the school and the district, meaning between the teachers and their subject advisors. As indicated earlier in this chapter and as well as in chapter 2 of this study, the role of district offices (subject advisors are located at district offices) are crucial to the improvement of teaching and learning. Bisseker (2003) indicates that when districts don't work, teachers don't receive curriculum guidelines, textbooks and stationery. This he says is the greatest obstacle to improving educational opportunities.

Despite the many qualifications and years of teaching experience and the unconditional support of the school principal and the subject advisor, it may happen that educators are not interested in the effective implementation of CASS. This could be as a result of the negative attitude and low motivational levels of educators. Educators usually feel despondent and show resistance when they are confronted by challenges that they have not been prepared for. In this case the challenge of implementing CASS is expected to frustrate educators because of its complex nature and because they have not been adequately trained and prepared for it.

The literature review in Chapter 4 shows that experienced and skilled educators are prepared to quit the teaching profession because of their frustrations in implementing OBE. One of the main criticisms leveled against the introduction of CASS both nationally and internationally is that educators were not consulted before and during the policy making process. This has caused a lot of dissatisfaction amongst the teaching fraternity.

Research shows that if teachers are respected, trusted, praised and valued for the work that they do, this can have a powerful effect on the attitude and motivational levels of teachers (Blasé, 1994). The enhanced confidence that has been created through continued support and understanding from the school principal and subject advisors is essential to ensure that educators are able to implement CASS with confidence.

Since CASS is a fairly new concept in South Africa, it is essential that appropriate and continuous training and high quality support be provided by subject advisors and principals. However, in this study the focus will be on the support of subject advisors to their educators, which will serve to strengthen and to sustain the implementation of CASS. Considering the complex nature of CASS, its effective implementation is expected to be problematic unless educators are adequately trained and supported from the outset.

Processes

The term 'processes' refers to how the school seeks to achieve its goal of effective teaching and learning (DoE, 1999c). It refers to what the educators are teaching and how it is being taught, evaluated, recorded and moderated. The focus during the classroom level is on the effective implementation of the CASS policy, which simply means that educators must be able to operationalise the CASS policy in such a way that the desired subject outcomes or objectives are achieved at the end of the learning process. If educators do not have the right teaching qualifications, skills, experience, attitude, motivation and high quality support from subject advisors and school principals to implement CASS, this will have a negative impact on teaching and learning in the classroom.

Also of importance at the classroom level is the use of appropriate assessment methodologies and practices, which implies that educators need to use the correct types of assessment to suit the objectives or outcomes of the lesson. This can only be achieved if educators have a solid understanding of the subject content and types of assessments and how to implement them. Types of assessments include projects, assignments, tests, group work, practical, etc.

The ability to evaluate (make inferences) the CASS tasks are very much dependent on the educator's qualifications, experience and skills in the subject and the quality of training, skills development and support he receives from his subject advisor/s and school principal. The educator's level of competence will determine whether she/he is able to accurately interpret the assessment criteria used to evaluate the CASS task. Incorrect and inconsistent interpretation of the

assessment criteria will lead to an incorrect evaluation of the learner's work. The educator's value judgement must also be based on legitimate criteria, which will promote the validity and reliability of the CASS marks. Following the process of evaluation is the recording and reporting of the CASS marks. This requires that educators to be quite vigilant in the calculation and the transcribing of marks onto mark sheets. Lastly, it is essential that the CASS marks be moderated to ensure its validity and reliability. Moderation is a quality assurance measure used to ensure that the marks awarded to learners reflect their true capabilities. The literature reviewed shows that feedback is an essential element in the improvement of learner achievement. For this reason, if moderators are able to give feedback to educators on the standard and quality of the assessment, this information can be conveyed to the learners with the aim of improving the conduct of CASS, which will also influence learner performance.

The success of CASS implementation at the classroom level depends on the extent to which the inputs at the educator level have been complied with. Without the necessary qualifications, skills, expertise, positive attitude, motivation and high quality support from subject advisors and principals, an educator will not be able to implement CASS as effectively as she/he should.

Outputs

The term 'outputs' refers to the end result, goal or outcomes of what the educator and learner want to achieve at the end of the learning process. The output is usually an observable and /or measurable indicator. In this model, there are two main outputs, namely, authentic, valid and reliable CASS marks and improved learner performance. Both these indicators can clearly be observed and measured in the examination results of a school.

Improved learner performance is the variable, which measures the extent of success obtained through the implementation of a programme or policy (DoE, 1999c). The focus during this level is on the learner since the learner is dependent to a large extent on the professionalism and competence of the educator within the classroom. The learner's achievements will indicate whether the teaching and

learning has been effective or not. In this regard, one needs to question whether the learner has gained from for example, the high quality inputs (educator qualifications, skills and experience and support from subject advisors and principals) and the improved processes (improved classroom practices).

Studies in the UK (England) have shown that the obtaining of valid and reliable CASS marks leads to improved learner performance (Black & Wiliam, 1998). These outputs are however to a large extent dependent on whether the requirements during the input and process stage have been successfully met. The fairness, validity and reliability of the CASS marks are also discussed in the literature review presented in Chapter 4.

In sum, it can be argued that the quality of inputs at the educator level has a direct influence on the quality of interaction at the classroom level. This in turn influences the validity and reliability of the CASS marks and learner achievements at the output level. For this reason, it is critical that greater attention be given to those variables at the input level since the high quality inputs has a domino effect on the processes and the resulting outputs.

Flowing from the conceptual framework are the specific research questions that are aimed at seeking answers to the problem statement discussed in chapter 1 of this study.

5.3 Research Questions

The three main research questions that have been operationalised from the problem statement discussed in Chapter 1 and the conceptual framework discussed above are the following:

1. *What are the problems and challenges experienced by Grade 12 Mathematics, Biology and Physical Science educators in the effective implementation of CASS?*

This question seeks to provide insight on the problems and challenges facing educators in the effective implementation of CASS. Since problems and

challenges are expected to impact negatively on the implementation of CASS, it is essential that they are identified and appropriate measures taken to remedy them.

2. *What kinds of support are provided to educators to strengthen and to sustain the effective implementation of CASS?*

This question is divided into three aspects. The first aspect seeks to determine whether educators are familiar with the provincial/ or the national policy on CASS, the second aspect examines to what extent Grade 12 educators are trained to implement CASS effectively in Biology, Mathematics and Physical Science and the third aspect investigates how educators are supported to enable them to implement CASS effectively. A brief discussion on each aspect is given.

- *Are educators familiar with the provincial/or national policy on CASS?*

This question provides data on whether educators are in possession of a provincial/or national policy on the implementation of CASS and the extent to which they understand the policy so that they are able to implement it effectively in their subjects.

- *To what extent are Grade 12 educators trained to implement CASS effectively in Biology, Mathematics and Physical Science?*

This question provides data on the amount and frequency of training received by Grade 12 educators of Biology, Mathematics and Physical Science. The amount and the frequency of training provided by subject advisors will impact on the effectiveness of CASS implementation.

- *How are educators supported to enable them to implement CASS effectively?*

Apart from providing training to educators on the implementation of CASS, it is essential that educators be supported on an ongoing basis by their subject advisors and school principals. Educators must be supported in terms of classroom visits, teacher training, workshops, and professional development and

teacher and learner support materials. The need for continuous high quality support from subject advisors is paramount to the effective implementation of CASS.

3. To what extent are the Grade 12 CASS marks fair, valid and reliable?

This question seeks to determine to what extent the CASS marks provided by educators at the end of the Grade 12 - year are fair, valid and reliable.

Section 5.4 elaborates on the research design used in this study to seek answers to the research questions explained above.

5. 4 Research Design

This section presents the research approach adopted in this study to find answers to the three main research questions discussed in 5.3. Since the purpose of a research design is to provide the most valid and accurate answers possible to research questions (Wiersma, 1995), each research question will be deconstructed to highlight the variables to be investigated and the best possible way to seek information relevant to the research questions. The research questions are linked to the conceptual framework discussed in 5.2 of this chapter.

Research question 1

What are the problems and challenges experienced by Grade 12 Biology, Mathematics and Physical Science educators in the effective implementation of CASS?

The key words in the above question are “problems” and “challenges” experienced by “Grade 12 educators” in the implementation of CASS. To answer this question information is required about the possible barriers or the difficulties that Grade 12 educators experience or encounter in the practice of CASS in the classroom. These variables are seen as having a negative impact on the effective implementation of CASS, which is highlighted in the problem statement (Chapter 1).

Since this research question requires predominantly descriptive data on what Grade 12 educators perceive the barriers to be, the most suitable way to collect such data is through the use of surveys in the form of written questionnaires. The data gathered must describe what is happening at present (Anderson, 1990), so that there is a better understanding of the implementation of CASS. Further, questionnaires are also able to provide first hand (primary) information on the problem, which is not available by any other means. The use of written questionnaires also makes it possible to conduct the survey within a short period of time (mail survey), thereby saving on time and resources. Research shows that many studies in education and social sciences use surveys to collect information about attitudes, opinions and characteristics such as age and gender (Anderson, 1990). However, it must be acknowledged that the disadvantage of survey questionnaires is that it prompts respondents to provide answers that are socially desirable. This may have a limiting effect on this study.

In this question the key informant (respondent) is the educator who is involved in the implementation of CASS in the classroom. In the conceptual framework to this study, it was explained that the effective implementation of CASS depends on the educators teaching qualifications, skills and her/his development in the area of CASS. If an educator is not sufficiently qualified or competent in the implementation of CASS or if she/he does not receive adequate and continuous high quality support from subject advisors/or the school principal, it is expected that she/ he would experience problems in the practice of CASS in the classroom.

To provide for the triangulation and verification of the data received from the Grade 12 educators, it was also considered necessary to gather data from another source. An interesting option would have been to gather data from learners since they are in direct contact with their educators, however, since the collection of data from learners would have entailed direct contact with the learners so that the questionnaire could be explained, the option was ruled out due to time constraints. The next best option was the collection of data from subject advisors who are supposed to be in constant interaction with their educators and ought to be in a position to give first hand information on the implementation of CASS.

In this case the use of written questionnaires was also identified as the most suitable means to collect data due to the descriptive nature of this study. In addition, the main purpose of the data from the subject advisors was so that it could be compared and contrasted with the data from educators. As mentioned in the conceptual framework to this study, subject advisors have a vital role to play in the support of educators and as such it is expected that they would be in a good position to respond to the question on the problems and challenges (barriers) experienced by educators in the successful implementation of CASS.

To enhance the internal validity of the study further, a third data source was considered necessary since it had to verify the data collected from educators and subject advisors. Since there is a link between educators and their subject advisors, the third group was identified on the basis of their link with the district offices. This third group consisted of a group of CASS experts who are responsible for inter - alia, monitoring the implementation of CASS. Since written questionnaires were used to collect data from educators and subject advisors, the semi - structured interview was identified as a good way to collect data from a few experts because it gives first hand information.

The advantage of making use of semi - structured interviews is that it allows for the direct contact with the interviewees and the opportunity to use probing questions to obtain pertinent information on CASS. The direct face - to - face contact also facilitated the clarification of issues and responses on the spot. The semi-structured style enables the interviewer to However, to add value to the findings of this research study, the interviewees had to be carefully chosen from amongst a group of people that are able to speak with some kind of authority on CASS. For this reason officials that serve on the national CASS committee and who are involved in the monitoring and evaluation of CASS at district, provincial and national level and an official from Umalusi were identified as the most suitable participants for the interview because of their first hand knowledge on CASS.

The research design explained for research question 1 also applies to research question 2 and 3 since the nature of the research questions are most suitable for a descriptive study where the findings can be quantified using descriptive statistics.

Research question 2

2. *What kinds of support are provided to educators to strengthen and to sustain the effective implementation of CASS?*

This question examines three aspects, namely, are educators familiar with the provincial/or national policy on CASS; to what extent are Grade 12 educators trained to implement CASS effectively in Biology, Mathematics and Physical Science?, and, how are educators supported to enable them to implement CASS effectively?

The key variable in this research question is "support". The literature review in Chapter 4 shows that for any innovation to be successful, its implementation must be fully supported. In the conceptual framework discussed in 5.3, support from subject advisors and support from the school principal was highlighted at the input level. If educators are not provided with the necessary policy documents on CASS and if they do not understand the document, it would not be possible for educators to implement the policy. Further, if no training has been provided to educators the task of implementing CASS in the classroom will be made more difficult. The lack of support to implement CASS effectively can result in the CASS marks being invalid and unreliable.

To answer this research question, information on whether educators are in possession of the provincial/national policy on CASS is required. Further, educators need to indicate whether training has been offered to them and the frequency of such training. The extent of training determines whether educators are sufficiently prepared to implement CASS according to policy. It is also important that educators are provided with continuous high quality support such as in classroom visits, provision of resources, workshops, skills development, etc.

As in research question 1, this question also requires data to be collected from educators who are directly responsible for the implementation of CASS in the classroom. However, since subject advisors are responsible for supporting educators through the provision of policy documents and resources, training, skills

development programmes and workshops, it was appropriate to collect data from them as well. For this reason the same type of questions were included in the questionnaire of both the educators as well as the subject advisor. This facilitated the triangulation and verification of data.

Here too, the third data source, namely, the semi - structured individual interviews with a group of CASS experts was used to enhance the internal validity of the study. The motivation for the use of questionnaires and semi - structured interviews provided for research question 1 also applies to research question 2.

Research question 3

To what extent are the Grade 12 CASS marks fair, valid and reliable?

This question seeks to find out to what extent the Grade 12 CASS marks is true and consistent. Numerous questions come forth in this regard, such as, are the marks that are allocated to learners reflect the true abilities of the learners or are the marks simply faked by educators? Do the assessment tasks address the needs of learners? What measures are taken by examining bodies to ensure that the marks are valid? Have the marks been moderated? In the case of the reliability of the marks, are the marks consistent, have they been evaluated according to appropriate assessment criteria. Do educators have a common understanding of how to apply the assessment criteria so that marks are consistent? These are some of the answers that are sought after in this question.

As with previous research questions, this question also required as a first step a description of what is done to ensure that the CASS marks are fair, valid and reliable. In other words, educators and subject advisors had to indicate whether the CASS marks are fair and valid based on the CASS processes followed in arriving at the CASS marks. Subject advisors had to for example indicate what quality assurance measures were taken to ensure the validity and reliability of the CASS marks.

Consistent with the data collection approach adopted for question 1 and 2, this question was included in the written questionnaires of educators (people who are

responsible for CASS implementation and evaluation) and subject advisors (people who are responsible for supporting educators through the CASS implementation process). This question was repeated in the interview schedule so that a third perspective could be used to triangulate and verify the data received from educators and subject advisors.

The three different sources of data make it possible to triangulate information thereby enhancing the internal validity of this study.

Section 5.5 elaborates on the research methods adopted in this study.

5.5 Research Methods

This section expands on the research design used in this study, which incorporates a discussion on population and sampling in 5.5.1, instruments development in 5.5.2 and the data collection approach in 5.5.3. The procedures followed in the conduct of the research in presented in diagrammatic form in 5.5.4 and lastly 5.5.5 deals with the data analysis of this study.

5.5.1 Population and Sampling

This section deals with the selection of the sample of the target population for this study. As mentioned in the analysis of the research questions, the key informants (respondents) are the Grade 12 Biology, Mathematics and Physical Science educators who are directly involved in the implementation of CASS in the classroom. The target population would therefore be all Grade 12 Biology, Mathematics and Physical Science educators. However, to get good estimates, it is never necessary to include all teachers. A ‘good’ sample suffices. For practical reasons, a small sample of Grade 12 Biology, Mathematics and Physical Science educators was chosen to participate in this study.

Since questionnaire data often result in socially desirable answers, it was important to triangulate them. Subject advisors who are linked to the educators in terms of the support they are expected to provide were identified as the second

data source. This facilitated the triangulation and verification of data from the Grade 12 educators. Since convenience sampling was used as opposed to random sampling, this may be considered as a limitation to this study.

To further enhance the internal validity of the data, a third data source was identified. This involved the collection of data from a few CASS experts involved in the management/monitoring and evaluation of CASS from national, provincial and district level and from Umalusi. The third data source through a different method (namely, semi - structured individual interviews) was perceived to add credibility to the data. Hence, it is important to note that the data collected from educators were triangulated with the data from subject advisors, which was further triangulated with the data collected from the few CASS experts interviewed.

Sampling of subject advisors and educators

The Grade 12 subject advisors of Biology, Mathematics and Physical Science that participated in this study were sampled through their district offices and the educators were sampled through their schools.

Although the subject advisors in the sample are known to the educators and vice versa, the researcher is confident that the samples of subject advisors and educators have been sincere in their responses to the research questions. It is also expected that subject advisors and educators as professional people would respond in a manner that would not compromise their integrity. This assumption is based on the fact that subject advisors and educators in general are also concerned about the implementation of CASS and have shown considerable professional interest in this study. The subject advisors in the sample, who are well known to the researcher since they serve on the national panel of examiners, have been discussing their problems and the problems experienced by their educators in the implementation of CASS. As indicated in the rationale to this study in Chapter 1, there are genuine concerns amongst educationists and the public regarding the validity of the Grade 12 CASS marks and the credibility of the Grade 12 examinations as a whole. Discussions of this nature had in fact motivated the researcher to conduct research on this topic.

The subject advisors and educators were sampled from six out of nine provinces namely, Eastern Cape, Northern Cape, KwaZulu - Natal, Mpumalanga, Limpopo and Gauteng. Given the exploratory nature of the study, the choice of six provinces out of nine provinces is considered a fair sample size. Also, for practical reasons the survey could only be conducted in six provinces where the provincial infrastructure provided a platform for the smooth administration of the survey. The questionnaires were administered in fifteen (15) district offices and twenty - two (22) schools across the six provinces. The sample of subject advisors and educators that participated in this study is shown in Table 5.1.

Table 5.1 Sample of subject advisors and educators through district offices and schools across the six provinces

Province	No of Districts	No of Subject Advisors	No of Schools	No of educators
KwaZulu-Natal	2	2	4	13
Gauteng	2	2	4	11
Northern Cape	3	4	3	8
Eastern Cape	3	5	4	12
Limpopo	2	3	4	12
Mpumalanga	3	5	3	4
Total Sample	***15***	***21***	***22***	***60***

The 21 subject advisors that participated in this study were selected through convenience sampling (feasibility and access) since the subject advisors are known to the researcher. The sample of educators was also selected on the basis of convenience by the subject advisors through the schools that they are responsible for.

Although the non - random sampling method was used, attempts were made to select subject advisors and educators from different locations, namely, rural, township, urban (suburbs) and urban (centre of city) so that the various school

contexts would be represented in the study. It was also considered important to include responses from a spread of districts and schools, which is likely to produce data illustrating the different perspectives on CASS. See Table 5.2.

Table 5.2 Number of educators and subject advisors sampled according to their location across the six provinces

Respondent	Rural		Township		Urban		Mixed		Totals	
	No.	%	No.	%	No.	%	No.	%	No.	%
Educators	12	(20%)	12	(20%)	36	(60%)	0	(0%)	60	(100%)
Subject Advisors	8	(38%)	_		7	(33%)	6	(29%)	21	(100%)

Sampling of subject advisors through their district offices

Since subject advisors are located at district offices, they had to be sampled via their district offices. The questionnaires for the subject advisors were therefore sent to two - three districts/regional offices in each of the six provinces mentioned above together with a letter inviting the subject advisors to participate in the research. The subject advisors were assured that their responses would be highly confidential. See Appendix A. The subject advisors were chosen using the non-random sampling method.

Subject advisors in each of the three subjects, namely, Biology, Mathematics and Physical Science at each district office were expected to complete separate questions. If 15 districts participated in the study the number of responses from subject advisors would have been 45. However, in many district offices it was found that there was only one subject advisor for Mathematics and Science. In Limpopo, it was found that only one subject advisor was appointed for all three subjects. In this instance, the subject advisor completed only one questionnaire for all three subjects. In total, 21 questionnaires were completed by the subject advisors of Mathematics, Biology and Physical Science from the 15 districts.

Sampling of educators through their schools

The sampling of educators took place via their subject advisors and through the schools they serve. The questionnaires for the educators were sent to the subject advisors in the six provinces mentioned above together with a letter inviting the Biology, Mathematics and Physical Science educators to participate in the research. The purpose of the study was outlined in the letter and the participants were assured that all information supplied by them would be kept confidential. See Appendix B.

Subject advisors responsible for Biology, Mathematics and Physical Science handed the questionnaires to their Grade 12 educators within their districts. Since subject advisors had to work within their districts, they choose to involve educators located at schools that were convenient in terms of feasibility and access. In each of the schools identified by the subject advisors, one Grade 12 educator in each of the three subjects mentioned above was invited to participate in the research. In schools, where for example, there were two educators teaching Mathematics at Grade 12 level, two questionnaires were completed for that particular subject. However, in certain cases, not all responses were received from educators. A total of 60 responses were received from 22 schools.

Since, the samples chosen are not representative of the target population (Grade 12 educators and subject advisors of Biology, Mathematics and Physical Science), it is accepted that the results from this study cannot be generalised to the entire population of which the participants are a part. The small sample size and the convenient sampling strategy can be seen as having a limiting effect on the results of this study. However, the study must be seen as an exploratory one.

Sampling of Education Assessment Experts

To enhance the internal validity of the research results, a third source of data collection through the use of semi - structured interviews was considered necessary. This third data source provided for the triangulation and verification of the data collected from the Grade 12 educators and subject advisors of Biology,

Mathematics and Physical Science. The individual interviews also complements the small sample size used in the case of both educators (60) and subject advisors (21).

Another reason for including the individual interviews, as a third data source was to obtain data from a source that was also considered reliable and that would add credibility to the research results. To enhance the validity of the findings of this study, the interviewees had to be selected from amongst a group of people that are able to speak with some kind of authority on CASS. For this reason, 5 of 12 (42%) officials that serve on the national CASS committee and who are involved in the monitoring and evaluation of CASS at district, provincial and national level and an official from Umalusi were identified as the most suitable participants for the interview. In this regard, one can safely indicate that although only five officials were chosen, the focus was on the quality of inputs from these respondents rather than on the quantity of respondents. The selection of these officials was purposive.

The following criteria were used to select the sample of the participants for the interview:

- all five officials were selected on the basis of their knowledge, expertise and involvement in the area of CASS;
- the officials are currently representing their departments/organisation at the CASS workshops organised by the national Department of Education;
- the participants are involved in assessment at different levels, i.e., district level, provincial level, national level and at an external level (Umalusi).

The following individuals were interviewed:

- one subject advisor dealing with CASS assessment at the district level in the North West provincial Education Department;
- two Deputy Chief Education Specialists from the National Department of Education, who are involved in the monitoring and evaluation of under performing secondary schools in all provinces;

- the Director of Curriculum and Assessment in the Western Cape Department of Education who plays an important role in the management of CASS at provincial level; and

- the Director of Assessment in the FET band (Schools) from Umalusi who has the responsibility of ensuring the credibility of the Grade 12 CASS marks.

The main reason for the selection of these officials is that they are knowledgeable and currently very active in the improvement of CASS implementation across all provinces. They are also best suited to give first hand information about the operation of CASS at provincial and district level since they monitor and evaluate the implementation of CASS at schools on a regular basis.

Since the interviews allowed for the probing of responses from the interviewees, much information was collected in this way. The face - to - face interviews also created an opportunity for the clarification of issues and responses on the spot.

5.5.2 Instrument development

In this study, the need for three separate instruments to collect data was identified on the basis of the three different groups of respondents that could contribute immensely to this study. Although three different instruments were used to collect data, similar types of questions were repeated in the three different instruments so that the responses could be compared and contrasted. (See Appendix C,D and E).

In terms of the educators and subject advisors, the questionnaire was identified as the most suitable way to collect data since the study is of a descriptive nature and detail descriptive information can best be obtained through the use of written questionnaires. The third instrument was the interview schedule that was meant to collect data from the five experts selected to participate in this study.

The instruments developed for the survey administered to subject advisors and educators of Mathematics, Physical Science and Biology and the instrument for the semi - structured interviews are shown in Table 5.3.

Table 5.3 List of Instruments administered in this study

Population	Level	Instrument	Target
CASS Experts	Umalusi (External Quality Assurer)	Interview Schedule	Director of Assessment: FET Schools
	National Department of Education	Interview Schedule	DCES (2) National Forum for Learner Performance (NFLP)
	Provincial Department of Education	Interview Schedule	Director: Assessment
	District/Region	Interview Schedule	Subject Advisor: Assessment
Subject Advisors (Grade 12)	Districts/Regions 6 Provincial Education Departments	Questionnaire	Subject Advisors: Mathematics Biology Physical Science
Educators (Grade 12)	Schools 6 Provincial Education Departments	Questionnaire	Educators: Biology Mathematics Physical Science

Questionnaire for Educators

One questionnaire was developed for the Grade 12 educators of Mathematics, Biology and Physical Science. Educators were required to provide information on constructs such as their profiles (qualifications and experience as educators); whether they were familiar with the provincial/national CASS policy; the type of support and the frequency of training received from subject advisors in order that they may implement CASS efficiently and effectively as well as the problems and challenges that they are faced with in the implementation of CASS. Educators also had to indicate whether in their opinion the CASS marks obtained by their learners in their subject were fair and valid. The researcher is aware that this was a

complex question due to the limited knowledge of educators on what constitutes a fair and valid assessment. A more detailed discussion on this aspect is dealt with in chapter 6.

Many questions that were included in the questionnaire of the subject advisors were also included in the questionnaire of the educators. This made it possible to compare and contrast the data for triangulation purposes. Question types used were open - ended and closed questions and questions using Likert scales. See Appendix D.

Questionnaire for Subject Advisors

One questionnaire was developed for the Grade 12 subject advisors of Mathematics, Biology and Physical Science. The subject advisors were required to provide information on constructs such as their profiles (qualifications and experience as subject advisors); whether educators in their subject are familiar with the CASS policy; the type of support and the extent and frequency of training provided to educators in order that they may implement CASS efficiently and effectively as well as the problems and challenges facing educators in the implementation of CASS in the subject concerned. Subject advisors also had to indicate whether in their opinion the CASS marks obtained by the learners in their subject were fair and valid. As is the case with educators, subject advisors would have also experienced problems in providing an accurate response to this question due to the complex nature of the question. Chapter 6 reveals more about the fairness, validity and reliability of the CASS.

Since the information collected from the subject advisors had to be compared and contrasted with the data from the educators, the questionnaire used for the subject advisor had to include many questions that were also included in the questionnaire designed for the educators. Question types used were open-ended and closed questions and questions using Likert scales. See Appendix C.

Interview Schedule

The interview questions were designed to elicit information from various perspectives and at the various levels (national, provincial and district level) about the implementation of CASS at Grade 12 level. The interview focused on aspects such as the problems and challenges experienced by Grade 12 Biology, Mathematics and Physical Science educators in the effective implementation of CASS, the kinds of support provided to educators to strengthen and to sustain the effective implementation of CASS and to what extent the Grade 12 CASS marks are fair, valid and reliable. Open - ended and closed items were included in the interview schedule. However, there were more open - ended items than closed items, which allowed for a greater degree of communication and proved to be invaluable to this study. See Appendix E.

Piloting of Instruments

The three instruments, namely the questionnaire for the educators, subject advisors and the interview schedule were pilot tested to ensure that the wording, sequence of questions and the type of questions used in the instruments were related to the research questions and to this study as a whole. In terms of the questionnaires, the pilot test was conducted with a group of 8 subject advisors and a group of 10 educators of Biology, Mathematics and Physical Science. This process helped to re - phrase certain questions that were interpreted as ambiguous. The interview schedule was piloted with three officials within the Department of Education who serve on the national CASS committee. This process helped to clear ambiguous questions and to correct the flow of the questions.

Upon completion of the pilot test, the instruments were edited and finalised for the main study.

5.5.3 Data Collection

In the proposal to this study, it was planned that data would be collected from 10 district offices and 20 schools across five provinces. When the time arrived for the

questionnaires to be returned by the respondents to the researcher, not all questionnaires were completed and returned even though the respondents were provided with self-addressed envelopes.

Two measures were taken to ensure that sufficient responses are received in time for the analyses of the data. The one was to increase the sample size by including an additional province to the study and the other was to contact the respondents by telephone and remind them of the return by date. These measures did indeed pay dividends. Within a three - month period a total of 21 of 24 (87.5%) questionnaires were completed and returned by subject advisors and 60 of 72 (83.3%) questionnaires were completed and returned by educators from across the six provinces. The pleasing rate of response also shows the commitment of subject advisors and educators to this study. However, although the sample is not representative of the entire target population, it is nevertheless an acceptable sample size since this study can be characterised as an exploratory one where the findings from the study cannot be generalised to the entire target population.

Educators

A total of 72 educator questionnaires were sent to the district offices in the six provinces (6 x 12 questionnaires per province). The response rate was 60 of 72 (83.3%). Data on the implementation of CASS at Grade 12 levels was collected from a total of 20 Mathematics educators, 17 Biology educators and 23 Physical Science educators in the six provinces. One educator from Limpopo indicated that he was teaching all three subjects; hence he had completed one questionnaire for all three subjects. Another educator from Mpumalanga also completed one questionnaire instead of two separate questionnaires. A breakdown of data collection according to subject and provinces is provided in Table 5.4.

Table 5.4 Data collection of educators according to subject and province

Province	Mathematics	Biology	Physical Science	No. of responses per province
KwaZulu-Natal	5	3	5	13
Gauteng	4	2	5	11
Northern Cape	3	2	3	8
Eastern Cape	4	4	4	12
Limpopo	2	5	5	12
Mpumalanga	2	1	1	4
No of responses per subject per province	***20***	***17***	***23***	***60***

Subject Advisors

Table 5.5 provides a breakdown of the responses received from the subject advisors per province and per subject.

Table 5.5 Data collection of subject advisors according to subject and province

Province	Mathematics	Biology	Physical Science	No. of responses per province
KwaZulu-Natal	0	1	1	2
Gauteng	0	2	0	2
Northern Cape	1	1	2	4
Eastern Cape	2	1	2	5
Limpopo	1	1	1	3
Mpumalanga	3	0	2	5
No of responses received per subject	***7***	***6***	***8***	***21***

Assessment Experts

Individual semi - structured interviews were conducted with five experts on CASS that are involved in the management/monitoring and evaluation of CASS at Grade 12 level. The participants were consulted and appointments were made for the conducting of the interviews. The questionnaires were sent to the officials a few days prior to the interview so that the participants could become familiar with the questions. Each interview lasted approximately one hour. The responses were hand - written on the interview schedule and later captured on Microsoft word. To ensure the accuracy of the data, the information was referred back to the respondents for checking. The respondents were asked to ensure that their responses were captured accurately. The participants were thanked for their willingness to participate in the interview and for the sharing of information regarding the implementation of CASS from their respective positions.

5.5.4 Procedures followed in conducting the research

The following procedures were followed in conducting this research. See Figure 5.2.

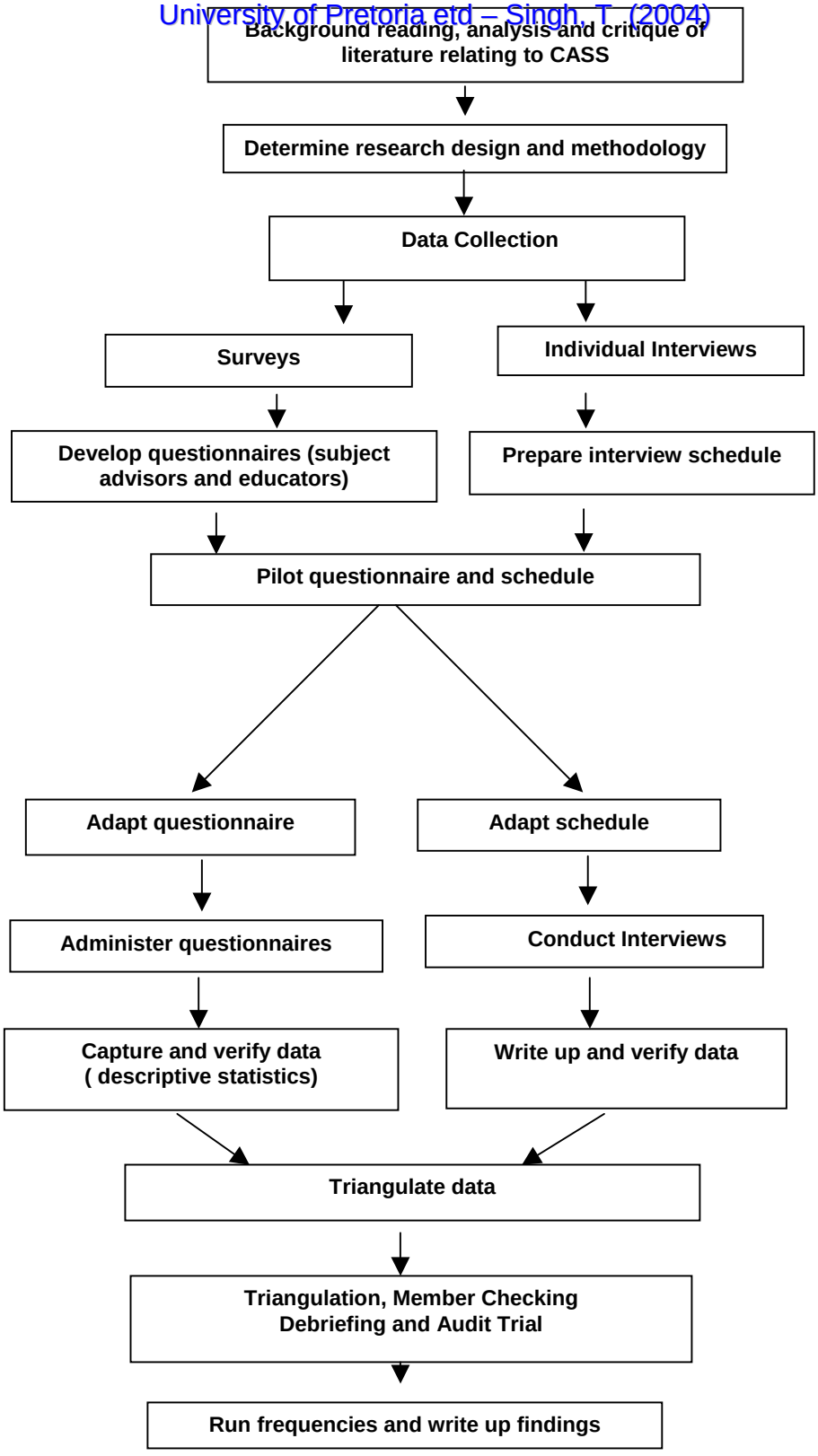

Figure 5.2 Procedures followed in conducting the research (Adapted from True, 1989, Bell, 1987 and Wiersma, 1995)

5.6 Data Analysis

Since the questionnaires of both the educators and the subject advisors consisted of open - ended, closed items and Likert scale items, a scoring procedure had to be planned to ensure consistency and accuracy during the data capturing process. All the closed items on the questionnaire were coded numerically and the responses were captured onto the computer using Microsoft Access. With the open - ended questions all the responses were recorded and a code was allocated to each type of response. In certain instances responses that were similar in nature were grouped together and allocated one numerical code. The numerical code was then captured on the system. The data was later exported to the Statistical Package for Social Sciences (SPSS). Descriptive statistics (using SPSS) are used to describe (give meaning) to the data obtained from the survey. Tables, figures and tabulations are used to summarise the data obtained from the questionnaires so that they are presented in a manner that can be easily understood. In many instances, frequencies and cross tabulations are presented to enhance and enrich the findings of this study.

5.7 Conclusion

This chapter outlined the research approach that was used to undertake this study. Data on the implementation of CASS was collected using the quantitative approach where use was made of written questionnaires and individual semi-structured interviews to gather data. The reason for adopting this data collection strategy is because it suited the exploratory nature of this study, which required descriptive information in response to certain open - ended questions. The questionnaires were completed by twenty - one (21) Grade 12 subject advisors and sixty (60) educators of Biology, Mathematics and Physical Science. The questionnaires were administered using the non - random sampling method at six provincial education departments namely, Eastern Cape, Northern Cape, Gauteng, Limpopo, KwaZulu - Natal and Mpumalanga and at various locations namely, rural, township, urban-centre of city, urban - suburbs and a mixture of schools in districts with a mix of urban, rural and township schools. The interviews were conducted with four experts from national, provincial and district levels and

an official from Umalusi. These officials were selected since they are members of the national CASS committee and because of their involvement in the monitoring/evaluation and the management of CASS.

Since the sample size was not representative of the entire target population and since questionnaire data often result in socially desirable answers, this study must be seen as an exploratory one and as such the findings from this research cannot be generalised to the entire target population.

The next chapter (Chapter 6) presents the results of this research.

CHAPTER 6

RESULTS OF THE RESEARCH

Overview of the Chapter

This chapter presents the findings of the research on continuous assessment (CASS) and is structured according to the three main research questions, namely, the problems and challenges experienced by Grade 12 Biology, Mathematics and Physical Science educators in the effective implementation of CASS; the kinds of support provided to educators to strengthen and to sustain the effective implementation of CASS, and, to what extent are the Grade 12 CASS marks fair, valid and reliable.

First the background of the respondents, namely the Grade 12 educators and subject advisors will be reported in 6.1. This is followed by a discussion on the problems and challenges experienced by Grade 12 educators in the effective implementation of CASS in 6.2. Section 6.3 examines the kinds of support provided to educators to strengthen and to sustain the effective implementation of CASS and section 6.4 examines to what extent the Grade 12 CASS marks are fair, valid and reliable.

6.1 Background of respondents

The results of this study are reported using descriptive statistics. The data gathered from the Biology, Physical Science and Mathematics educators are compared and contrasted with the data reported by their subject advisors. Although the aim of this study was to obtain much data from educators on the implementation of CASS, it was also essential to gather data from their subject advisors since subject advisors are responsible for lending curriculum and assessment support to educators. As mentioned in Chapter 4, subject advisors are meant to monitor and support schools with the aim of improving the standard and quality of teaching and learning in the classroom.

The number of subject advisors appointed by examining bodies in Biology, Mathematics and Physical Science varies according to the provincial structure.

Although the provincial structure may indicate the number of subject advisor posts that must be filled, however, not in all cases are the appointments made. This is the case in the Eastern Cape for example. The report on the CASS verification conducted by Umalusi in the Eastern Cape in Mathematics indicated that the verification panel was horrified to learn that in a province that has 24 districts and 250 highly ranked administrative posts described as Educational Development Officers and over a thousand schools offering Grade 12, there were only three Mathematics subject advisors in the entire province (Umalusi, 2002c). In this instance, the shortage of mathematics subject advisors is bound to impact negatively on the quality of support provided to the educators of Mathematics.

In particular, the subject advisors in this study are those who are directly responsible for providing support to the sample of educator respondents. The data from the interviews were used to validate the responses of the educators and the subject advisors.

The educators and subject advisors used in this study were sampled from six provinces, namely, KwaZulu - Natal, Gauteng, Northern Cape, Eastern Cape, Limpopo and Mpumalanga.

Due to the small sample size used in this study and the fact that the sample is not representative of all Grade 12 educators and subject advisors of Biology, Physical Science and Mathematics, caution should be taken when interpreting the results that emanate from this research, especially given the fact that the use of surveys may result in socially desirable responses. The results should therefore be considered as exploratory. Fifteen (15) districts and 22 schools participated in this research. In total, 21 questionnaires were completed by the Grade 12 subject advisors of Biology, Physical Science and Mathematics (through their district offices) and 60 questionnaires were completed by the Grade 12 educators of Biology, Physical Science and Mathematics (through their schools). Individual interviews were also conducted with four officials from national, provincial and district level and a representative from Umalusi. In total five individual semi - structured interviews were conducted with the experts on CASS.

To provide the context for the results of the respective research questions, a profile of the location, educational qualifications and teaching experience of the educators and subject advisory experience of subject advisors that participated in this research are presented first. The study aimed to collect data from different socio - economic backgrounds and therefore educators and subject advisors serving schools in rural, township and urban districts were sampled.

Table 6.1 Number of educators and subject advisors sampled according to their location

Respondent	Rural		Township		Urban		Mixed		Totals	
	No.	%	No.	%	No.	%	No.	%	No.	%
Educators	12	(20%)	12	(20%)	36	(60%)	0	(0%)	60	(100%)
Subject Advisors	8	(38%)	_		7	(33%)	6	(29%)	21	(100%)

Table 6.1 above shows that a larger proportion (60%) of educators were sampled in the urban districts than any other location. Schools from both urban - suburbs (29 out of 60) and urban - centre of city (7 out of 60) were sampled. The reason for this is that the questionnaires were handed to the subject advisors to administer, and it was found that the educators in the urban districts were more accessible and hence convenient for the subject advisors to sample than the educators in the rural or township areas, as the distances to the rural and township schools implied additional traveling expenses and time. However, a fair proportion of educators were sampled from the rural (20%) and the township (20%) areas.

The subject advisors that participated in this study were also located across rural (38%), urban (33%) and a mixture (29%) of rural, urban and township districts. Although subject advisors are located in urban districts they are also responsible for schools located in rural and township areas. The category "mixed" refers to schools in districts with a mix of urban, rural and township schools.

Qualifications of Educators and Subject Advisors

The highest level of qualifications obtained by the educators and the subject advisors is presented in Table 6.2.The table indicates that the vast majority of the educators have either a 3 - 4 year diploma (45%) or a 3 - 4 year Bachelors degree (38%). On the other hand, the subject advisors are on average better qualified than their educators, with the majority of subject advisors (57%) possessing a 3 - 4 year Bachelor's degree and quite a number of them (34%) possessing a Honours/or Masters degree. The fact that the subject advisors are better qualified than their educators could be as a result of them being selected from the panels of examiners and moderators that are responsible for the setting of the Grade 12 national examination question papers in Biology, Physical Science and Mathematics.

Table 6.2 Qualifications of Educators and Subject Advisors

	2 Year Teaching Certificate		3-4 Year Diploma		3-4 Year Bachelors Degree		Hons Degree		Master Degree		Totals	
Participant	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Educators	1	(2%)	27	(45%)	23	(38%)	5	(8%)	4	(7%)	60	(100%)
Subject Advisors	1	(5%)	1	(5%)	12	(57%)	2	(10%)	5	(24%)	21	(100%)

It was important to establish the level of qualification of the educators since it impacts on the effectiveness of teaching and learning, especially given the fact that research studies indicate that the results in Mathematics and Science literacy in South Africa is extremely poor in the entire schooling system (Department of Education and Labour, 2001). Further, the findings of the TIMSS - R study reports that 27% of the learners in 1998/1999 were taught Mathematics by teachers with no formal qualifications in Mathematics and 38% of pupils were taught Science by teachers with no formal qualifications in science (Howie, 2001**)**. Research conducted by the HSRC (2001) indicates that the qualification of educators have a significant effect on learner performance (Kanjee et al., 2001). In view of this it is essential that educators teaching Mathematics and Science be suitably qualified to teach their subjects so that learner performance may be improved in these subjects. However, no data were collected on the educator's subject/area of specialisation.

Teaching Experience and Subject Advisory Experience

The teaching experience of educators and the experience of subject advisors are presented in Table 6.3.The table shows that the educators and subject advisors used in this study have teaching experience and subject advisory experience that range from one year or less to eight years and more. This means that the data used in this study is not restricted to educators and subject advisors that have little or no experience. Whilst the majority of educators (62%) have more than 8 years of teaching experience, a little less than half of the subject advisors (48%) have more than 8 years of subject advisory experience. A large proportion (53%) of subject advisors have less than 5 years of subject advisory experience.

On comparing the qualifications and the experience of educators to those of subject advisors, it would seem that whilst the majority of subject advisors (91%) have a 3 - 4 year Bachelors Degree, and higher levels of qualifications than their educators, they however have less experience in their jobs than their educators. The nature of their work and the level of subject expertise required demands that subject advisors are more qualified than the educators they support.

Table 6.3 Experience of educators and subject advisors in their profession

	1 year or less		2-3 years		4-5 years		6-8 years		More than 8 years		Totals	
Participant	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Educator	4	(7%)	3	(5%)	8	(13%)	8	(13%)	37	(62%)	60	(100%)
Subject Advisors	2	(10%)	4	(19%)	5	(24%)	0	(0%)	10	(48%)	21	(100%)

The location, qualifications and experience of educators and subject advisors serves as a context for the research results presented in this chapter. Where possible, the results will be discussed reflecting on differences and similarities for the various categories of these variables.

Section 6.2 deals with the first research question, namely, the problems and challenges experienced by Grade 12 Biology, Mathematics and Physical Science educators in the effective implementation of CASS. Section 6.3 looks at the kinds of

support provided to educators to strengthen and to sustain the effective implementation of CASS and section 6.4 addresses the extent to which the Grade 12 CASS marks are fair, valid and reliable. The responses from all three sources, namely, the questionnaire responses from the educators and the subject advisors and the responses from the semi - structured individual interviews with the five officials have been used to arrive at the findings of each of the three main research questions.

6.2 Problems and Challenges experienced by Grade 12 Biology, Mathematics and Physical Science educators in the effective implementation of CASS

In this section, the results of research question 1 will be discussed, namely, the problems and challenges facing educators in the effective implementation of CASS. Table 6.4 shows that the majority (80%) of the Grade 12 educators of Biology, Physical Science and Mathematics reported experiencing problems and challenges that impact negatively on the effective implementation of CASS in the classroom. This was fully supported by all the subject advisors (100%) that participated in this study.

Table 6.4 Educators and Subject Advisors response to problems and challenges experienced by educators

Participant	Yes		No		Total	
	No.	%	No.	%	No.	%
Educator	47	(80%)	12	(20%)	59	100%
Subject Advisors	21	(100%)	0	(0%)	21	100%

Since the question on the problems and challenges was an open - ended item in the questionnaire, some of the educators and subject advisors listed more than one problem. However, the most common problems cited by both educators and subject advisors in order of prevalence are the lack of resources and equipment, an increase in the workload of educators, the negative attitude of learners towards CASS and the problem of large class sizes.

The problem of the lack of resources and equipment will be discussed in detail followed by a discussion on the other problems and challenges.

Lack of Resources and Equipment

Table 6.5 shows that 47% (28 of 60) of the educators indicated that they do not have sufficient resources to implement CASS in their subject. The table also shows that the lack of resources is evident in all areas; however, the problem is the biggest in the rural areas (75%) and the smallest in the urban - centre of city (14%).

Table 6.5 Educators with insufficient resources to implement CASS according to their location

	Rural n =12 No. %	Township n=12 No. %	Urban-suburbs n=29 No. %	Urban-centre of City n=7 No. %	Totals n=60 No. %
Insufficient Resources	9 (75%)	5 (42%)	13 (45%)	1 (14%)	28 (47%)

In this regard the five experts on CASS are also in agreement that the lack of resources is a major problem in certain districts/regions and in certain schools. The interviewees reported that in certain cases the school environment is not conducive to the implementation of CASS due to the lack of facilities, libraries and tools for experiments.

The educators were also required to list the resources that are most needed in their schools to implement CASS. The responses of the twenty - four (24) educators that responded to the question are recorded in Table 6.6. Half of these educators (12 out of 24) reported that the lack of chemicals, apparatus and laboratories for the conducting of Physical Science experiments was the biggest problem. Interestingly enough, Table 6.7 shows that half of the subject advisors (7 out of 14) also seem to agree that schools within their districts are also affected by the lack of chemicals, apparatus and laboratories.

The need for teacher and learner support materials such as textbooks, mathematical instruments and calculators (8 out of 24) appeared next on the list of the educators

followed by the need for libraries and computers (5 out of 24). However, a larger number of subject advisors (5 out of 14) felt that the schools within their districts/regions are more in need of libraries and computers than learner support materials. Another interesting observation is that whilst no educators indicated the need for more educators and classes, a significant number of subject advisors (4 out of 14) indicated that schools needed more educators and more classes.

Table 6.6 Educators response on resources needed according to the location of the school

Resources	Rural	Township	Urban	Total n=24
Chemicals, apparatus and laboratories	7	2	3	12
Teacher and learner support materials	3	1	4	8
Library and Computers	2	2	1	5
Equipment	2	1		3
More funds	1			1

Table 6.7 Subject Advisors response on resources needed according to location of district

Resources	Rural n=6	Urban n=2	Mixed n=6	Total n=14
Chemicals, apparatus and laboratories	2	2	3	7
Teacher and learner support materials (textbooks, maths sets and calculators)	2		1	3
Library and Computers	3		2	5
Equipment (photocopiers, TV & Video, scanners)	3			3
Training for teachers and principals			1	1
More educators and more classes	2		2	4

Table 6.6 shows that there is a greater shortage of chemicals, apparatus and laboratories in the rural schools than in the township and urban schools. Whilst 3 educators from the rural and township schools have mentioned the need for equipment such as photocopiers, television and videos, the educators in the urban schools do not seem to suffer from a lack of it.

Resources such as chemicals, apparatus, laboratories, learner support materials (textbooks) and libraries are basic and essential resources that schools should be provided with so that they are able to function effectively (DoE, 1999c). Without these resources, the task of teaching and learning is made more difficult. Chemicals, apparatus and laboratories are required by science teachers to carry out experiments that form 15% to 40% of the CASS component (Umalusi, 2002c). Without the provision of these resources schools are engaging their learners in theory only (DoE, 2001f) and yet the Qualification and Assessment Policy Framework for FET advocates the integration of education and training meaning that learners should be exposed to theory as well as practice to promote the development of skills (DoE, 2002d). In schools, where there is a lack of resources for experimental work, educators have no choice but to substitute the practical work for theory and award marks for theory only (Umalusi, 2001b). One of the physical science educators from Mpumalanga confirmed this by saying:

"because we have to give marks for experiments, we make use of paperwork since there are no apparatus for experiments"

One of the subject advisors from Mpumalanga also concurred with his educator by indicating that the provincial CASS policy is adjusted to accommodate the lack of chemicals and experimental equipment in certain schools. This is done by eliminating those CASS tasks that require the use of experimental equipment and chemicals. This means that all work in Physical Science is conducted in theory only.

It can therefore be argued that the lack of essential resources especially in the rural schools does impact on the effective implementation of CASS especially in subjects like Physical Science and Biology where chemicals and apparatus are needed for the

conduct of experiments. The lack of these resources has negatively affected the manner in which teaching and learning should take place.

In the questionnaire to educators, an open-ended question was included which required educators to discuss the problems and challenges facing them in the effective implementation of CASS. A similar question was included in the questionnaire to subject advisors. This resulted in the items listed in Table 6.8.

Increased workload

Table 6.8 shows that a large proportion of the educators (33%) and subject advisors (38%) from all areas reported that the introduction of CASS has led to an increased workload of educators. Research evidence also suggests that South African teachers spend more time on administrative tasks than teachers in other developing countries (Howie, 2001). Further, research indicates that a potential problem for the implementation of internal assessment at Grade 12 is that the amount of assessment in the form of written work and testing during the Grade 12 year becomes unreasonable (Oberholzer, 1998).

Below are examples of statements made by some of the educators supporting the claim that CASS has contributed to the increase in the workload of educators:

"We have a lot of administrative work, we find ourselves duplicating a lot of administrative work. The CASS requirements requested by the province sometimes differ from the provincial and national guidelines."

"The late arrival of information from district offices on how to assess learners causes duplication of work."

"CASS has resulted in a lot of marking."

The above statements seem to indicate that these educators are experiencing an increased workload in both the administrative aspect and the teaching aspect of their work. The above statements are also supported by Umalusi (2001a), who indicate that in addition to the increased administrative work that has caused an increase in the workload of educators, educators have also reported that their actual teaching load has increased. According to one of the subject advisors, "the number of CASS pieces that educators and learners have to complete seems to be too much".

Table 6.8 Problems that impact on the effective implementation of CASS as reported by educators and subject advisors

Type of Problem	RURAL		TOWNSHIP	URBAN		MIXED	TOTALS			
	E (n=12)	SA (n=8)	E (n=12)	E (n=36)	SA (n=7)	SA (n=6)	E=60 No.	%	SA=21 No.	%
Increased Workload	3	3	4	13	1	4	20	(33%)	8	(38%)
Lack of Training and Support	3		4	5			12	(20%)		
Negative Attitude of learners	2	2	2	6	1		10	(17%)	3	(14%)
Lack of Resources	4		3				7	(12%)		
Large Class Sizes	2	3			7	3	2	(3%)	13	(62%)
Lack of Commitment and Skills of Educators		2			1	2			5	(24%)
Ever-changing and Unclear Policies		1			2	1			4	(19%)
Lack of Communication	2	1	1	1			4	(7%)	1	(5%)
Poor School Management						1			1	(5%)
Language Problems						1			1	(5%)
Practical Weighed Heavily					1				1	(5%)

E = Educators
SA = Subject Advisors

However, some of the statements made by a few of the educators seems to suggest that there is also some misunderstanding amongst these educators about how CASS is incorporated into teaching and learning. Examples of such statements are:

"the syllabus is too long to complete in Biology and we have to also implement CASS".

"educators are expected to complete their work in the first semester and immediately after that implement CASS".

The perception that the syllabus must be completed and then CASS must be implemented is however contradictory to the principle of continuous assessment. According to Hattie and Jaeger (cited in Klenowski, 1999, p.40), "assessment needs to be an integral part of a model of teaching and learning if it is to change from its present status as an adjunct "to see" if learning has occurred, to a new status of being part of the teaching and learning process. "The problem is that if CASS is not implemented correctly and especially if it is not included as part of the daily teaching and learning where continuous feedback is given to learners with the aim of improving learner achievement, it will lose its significance of promoting the formative and developmental role of assessment.

With the number of CASS tasks being as many as 17 in Biology (Pierce, 2003), it would seem that the emphasis is on the number of tasks (quantity) rather than on how well the task is being performed, evaluated and feedback given to learners (quality). In reality, due to the large number of CASS tasks that is required of educators and learners, the focus is on the completion of the tasks for record purposes rather than on ensuring effective understanding of the tasks.

In this regard the interviewee from Umalusi reported, *"the spirit of CASS is lost because of the misunderstanding of CASS, educators are testing sections of the work twice and even three times"*. Hence the workload of educators is bound to increase. He went on to say that in most cases CASS is also not being conducted in a formative manner.

Another - interviewee added, *"CASS is supposed to involve learners, there is a need for learners to take responsibility for their work, but this is not happening. Teachers are compiling the files and running after the tasks."* Here again, it would seem that the educators who run after the work of their learners are in a way adding to their own workload.

In sum, it can be stated that CASS by its very nature does require additional effort by both educators and learners. However, it would seem that there is some uncertainty amongst educators about how CASS fits into teaching and learning. Further, it would also seem that the perception of implementing CASS as a separate activity would impact negatively on the formative role of CASS.

Lack of training and Support

According to Table 6.8, 20% of the educators reported that the lack of training and support impacted on the effective implementation of CASS. On the other hand, none of the subject advisors recorded this as a problem. This aspect will however be dealt with in section 6.3.

Negative attitude of learners

Table 6.8 shows that a significant proportion (10 out of 60 - 17%) of educators and subject advisors (3 out of 21 - 14%) from all areas have indicated that the negative attitude of learners is a problem. The nature of CASS requires that educators and learners work together and that feedback be given to learners on how to improve their performances. When learners are absent from school, or when discipline is poor, or when learners do not take their work seriously, this creates problems for the educator. As one educator states, "*learners do not believe that the classwork can benefit them at the end of the year*".

"If learners are not positively disposed towards learning, little learning will actually occur even though all the necessary learning skills may have been mastered" (Sadler, 2002). If learners are not willing to learn and do not co - operate with educators and participate fully in CASS, this tends to put additional pressure on educators. The consequence is that learners would obtain very low marks to no marks for CASS. Eventually, this impacts on the CASS average of the group of

learners and this is certainly problematic for educators since educators are held accountable for the results they produce.

Large Class Sizes

Table 6.8 shows that only a few educators (2 out of 60) but a large proportion of subject advisors (13 out of 21 - 62%) from all areas reported the problem of large class sizes. The main problem with large class sizes and the implementation of CASS is that educators are unable to conduct practical work in subjects like Biology and Physical Science. As one educator emphasised, "*the classes are too large, there is not enough equipment to conduct experiments"*. But there are also other problems, as is illustrated by the following remark, *"the classes are too large, it is difficult to assist slow learners"*.

The problem of large class sizes is also related to the increased workload of educators. As the interviewee from Umalusi states, "there is a lot of administration and recording, which leaves little time for individual attention and feedback to learners". According to this interviewee from Umalusi, *"CASS is an individualized approach to assessment; however, in certain instances educators are unable to implement CASS effectively because of the large class sizes*".

Research on class size conducted by the Student Teacher Achievement Ratio Study (STARS) showed higher achievement on standardised testing in reading, language, mathematics and social studies for learners in small classes (Kifer, 2001, p.90). Small classes beat both the regular classes and the classes with an aide, suggesting that it is not the ratio of adults to children that matters. Rather, it is the number of learners in the classroom that counts" (cited in Kifer, 2001).

In South Africa, the average class size for mathematics was 50 pupils and for Science 49 pupils and this is related to poor mathematics and science results (Howie, 2001).

Based on the above findings, it is reasonable to be concerned about large class sizes especially given the fact that CASS is an individualised approach to assessment and its effectiveness depends on whether educators are able to assist

all learners in the allocated teaching time. Also, where there is a lack of apparatus to conduct experiments, not all learners in the class will have an opportunity to participate in practical work. Given the logistics of operationalising CASS, one may assume that implementing CASS in large classes gives problems.

Lack of commitment and skills of educators

Whilst no educators reported that their lack of commitment and skills was a problem almost a quarter of the subject advisors (5 out of 21 - 24%) from all areas maintained that their educators lack the commitment and the skills to conduct CASS. One of the subject advisors stated, "educators do not read documents and this is a big stumbling block." The data therefore shows that there is a discrepancy between the two sets of data. It also justifies that the triangulation of the data from educators to those collected from subject advisors is an important one.

In terms of the lack of skills on the part of educators to conduct CASS, it can be assumed that since CASS is a fairly new concept in South Africa, not all educators would be completely skilled in the implementation of CASS. Therefore, subject advisors and other education managers need to ensure that educators receive the appropriate training and support to develop the skills needed to implement CASS in an effective manner.

Ever - changing and unclear national policies (guidelines)

The problem of the ever - changing and unclear national CASS guidelines was reported by a significant proportion of subject advisors (4 out of 21 - 19%) from all areas and not by any of the educator respondents. These subject advisors felt that too many changes were being made to the national CASS guidelines within a short period of time.

Given the fact that CASS is a fairly new method of assessment in South Africa, it may take educators and subject advisors a long time to grasp the skills required to implement CASS, and any changes made to the CASS guideline documents especially without consultation and discussion with educators and subject advisors may be problematic. This may lead to confusion and uncertainty amongst subject advisors and their educators.

In conclusion to the first research question, it would seem that the biggest problem facing educators is the lack of resources to implement CASS. Schools need to be adequately resourced so that they are able to function as learning institutions to facilitate the culture of teaching and learning. It is clear that many schools, especially in the rural areas lack even the basic resources and equipment such as chemicals, apparatus, learner support material (textbooks) and school libraries. Other problems of less prevalence experienced by educators across all areas include the increased workload of educators, the negative attitude of learners and the problem of large class sizes. On the other hand, subject advisors from all areas maintained that the lack of commitment & skills of educators and the ever - changing and unclear policies of the national department of education are also problematic.

6.3 The kinds of support provided to educators to strengthen and to sustain the effective implementation of CASS

This research question pertains to how educators are supported in implementing CASS. As explained in Chapter 5, this question has two prior questions, as support to strengthen and to sustain the implementation of CASS is only useful when educators know about the provincial/or national policy (guidelines) on CASS and when they have received sufficient training to implement CASS in their subjects. Both aspects will be discussed first before the data on the support of educators in implementing CASS is presented in 6.3.3.

6.3.1 Are educators familiar with the provincial/or the national CASS policy?

This question determines which CASS policy (national or provincial) is being implemented in the six provinces used in this study and is followed by a brief account of what educators understand by the term CASS and the extent of educators and subject advisors familiarity with the CASS policy (guidelines) and whether educators are able to implement the CASS policy effectively in their subjects.

It must be emphasised that although this research talks of a provincial/national policy on CASS, currently there is no national and provincial policy on CASS per se, only subject guideline documents. These subject guideline documents on CASS were developed by the National Department of Education in the six national subjects, namely, Accounting, Biology, English Additional Language, History, Mathematics and Physical Science. The CASS guideline documents for the other Grade 12 subjects were developed independently by each province. In the absence of subject policies on CASS, the subject guidelines developed by the National Department of Education are being interpreted by all public examining bodies as "policy". Recently, the only province that has promulgated policy on CASS is the North West Province through its Department of Education. However, the North West policy document on CASS is a generic document applicable to all Grade 12 subjects and does not address the CASS requirements of individual Grade 12 subjects. The provincial and national CASS policy will now be referred to as the provincial and national CASS guideline documents.

Which CASS policy (guideline document) is being implemented by the educators of Biology, Mathematics and Science across the six examining bodies?

Table 6.9 and 6.10 shows that a larger proportion of educators (55%) and a smaller proportion of subject advisors (38%) from all areas reported implementing only the national CASS guideline documents in the province. On the other hand, a smaller proportion of educators (37%) and a larger proportion of subject advisors (52%) from all areas reported implementing only the provincial CASS guideline in the province. It is disturbing to note that only 2 of the educators and 2 of the subject advisors are making use of both the provincial and the national CASS guidelines to implement CASS.

Table 6.9 Implementation of provincial/or national CASS guideline documents as reported by educators and subject advisors across the six provinces

Province	National Guideline		Provincial Guideline		Both		Not Sure	Totals	
	E	SA	E	SA	E	SA	E	E n=60	SA n=21
KwaZulu-Natal	7	1	6			1		13	2
Gauteng	7	2	2		1		1	11	2
Northern Cape	4		3	4	1			8	4
Eastern Cape	7	1	4	3		1	1	12	5
Limpopo	7	2	5	1				12	3
Mpumalanga	1	2	2	3			1	4	5
Total in No.	***33***	***8***	***22***	***11***	***2***	***2***	***3***	***60***	***21***
Total in %	***(55%)***	***(38%)***	***(37%)***	***(52%)***	***(3.3%)***	***(0%)***	***(5%)***	***(100%)***	***(100%)***

E = Educators
SA = Subject Advisors

Table 6.10 Implementation of provincial/or national CASS guideline documents as reported by educators and subject advisors according to location

Guideline	Rural		Township	Urban		Mixed	Totals E (n=60)		Totals SA (n=21	
	E n=12	SA n=8	E n=12	E n=36	SA n=7	SA n=6	No.	%	No.	%
National Guideline	3	3	5	25	2	3	33	(55%)	8	(38%)
Provincial Guideline	8	5	7	7	5	1	22	(37%)	11	(52%)
Both	1	0	0	1	0	2	2	(3%)	2	(10%)
Not Sure	0	0	0	3	0	0	3	(5%)	0	(0%)

E = Educators
SA = Subject Advisors

According to Table 6.10, the provincial guideline is being used by a greater number of educators in the rural (8 out of 12) and township schools (7 out of 12) than in the urban schools (7 out of 36). The situation is clearly the opposite in the case of the national guideline document where the majority of the educators in the urban schools (25 out of 36) seem to be using the national guideline document than the provincial guideline document.

It has been established in this research that the national guideline document stipulates only the minimum CASS requirements and does not specify the number of CASS tasks and the mark allocation for each task (see table 6.11). Hence the use of only the national CASS guideline without the provincial CASS guideline will lead to inconsistencies in the implementation of CASS within a province and this is a cause for concern.

In this regard, Umalusi has also found that in certain provinces, deviation from the minimum requirements as stipulated in the national CASS guidelines is noted in certain subjects, for example, Gauteng (Mathematics), Limpopo (Physical Science), Eastern Cape (Mathematics) and KwaZulu - Natal (Mathematics) (Umalusi, 2002a).

Further, one of the subject advisors from Mpumalanga reported that the number of CASS tasks for Physical Science has been reduced in certain schools since rural schools that do not have chemicals and apparatus are unable to carry out experiments. Hence, the reduction in the number of CASS pieces/tasks for Physical Science impacts substantially on the CASS marks achieved by learners. Many of the educators have reported that learners usually score high marks in science practical. If practical work is not being conducted in the rural schools in Mpumalanga, then it can be assumed that educators are merely conducting theory lessons, and that all CASS pieces are therefore based on theory only. This would be unfair to the learners and hence the marks allocated to learners for practical work in the rural schools would therefore be questionable.

According to the CASS verification exercise conducted by Umalusi (2002c), the provincial guideline document of the Eastern Cape in Mathematics is different from

the national guidelines in several respects. Table 6.11 shows that the most important differences are in the mark allocations of the CASS components.

Table 6.11 Variation between the national guideline and the Eastern Cape provincial guideline document for Mathematics (Umalusi, 2002c)

Guideline Document	Exams	Formal Tests	Short Tests	Classwork & Homework	Tutorial	Project
National	30%	20%	5%	15%	15%	15%
Provincial SG	25%	20%	5%	40%		10%
Provincial HG	25%	20%	5%	40%		10%

HG = Higher Grade
SG = Standard Grade

Whilst the national CASS guideline document has specified that 30% of the CASS marks must be allocated for examinations, the Eastern Cape has allocated only 25% of its CASS to examinations. However, the bigger difference between the national guideline and the provincial guideline can be seen in the allocation of marks for class work and homework. While the national guideline specifies that only 15% should be allocated for class work and homework, the provincial guideline of the Eastern Cape has allocated more than twice the specified proportion (40%). This implies that the CASS marks achieved by learners will be high since homework and class work is heavily weighted and learners usually score high marks on these tasks. The provincial and the national CASS guidelines in the case of the Eastern Cape are therefore not compatible. The Eastern Cape has deviated from the national guideline document for Mathematics to a major extent.

Another disturbing finding by Umalusi is that the trial examinations which ought to constitute part of the CASS mark are not conducted in the Eastern Cape since according to the Eastern Cape Department it is almost impossible to administer trial examinations (Umalusi, 2002d). Hence, the marks allocated for examinations are only 25% instead of 30%. This serves as an example, which shows that the

lack of a clear and coherent policy can only lead to more problems and confusion among educators (Umalusi, 2002c; DoE, 1999a).

If one applies the above findings to the statistics presented in Table 6.9 it implies that those educators (7 out of 12) from the Eastern Cape who are implementing the national CASS guideline document would have been following a different set of requirements than those educators (4 out of 12) who were making use of the provincial CASS guideline document to implement CASS. This practice will obviously lead to major inconsistencies in the implementation of CASS across all areas.

To further establish and confirm the differences between the provincial guidelines and the national guidelines, the subject advisors were asked to list the differences between the national guideline and the provincial guideline documents. Table 6.12 records the responses from some the subject advisors.

Table 6.12 Comments by some of the subject advisors on the differences between the national guidelines and the provincial guidelines on CASS

Province	Mathematics	Physics
Mpumalanga	"The provincial policy is more user-friendly."	"Some changes are made to the provincial policy to accommodate local conditions, for example the numbers of CASS tasks are adjusted."
Northern Cape	"The provincial policy is an expansion of the national policy."	"The provincial policy is more specific in terms of the number of tasks."
Eastern Cape	"I do not know."	

Most of the above responses seem to indicate that the national guidelines are used as a basis from which the provincial guidelines are developed and that the provincial guideline is more detailed than the national guideline. However, from the data reported by both the educators and subject advisors, it would seem that the provincial education departments have been more explicit in stating the provincial requirements to be met for CASS. It is also indicated that the provincial CASS guidelines are also user - friendly.

From the data reported in Table 6.9 it would seem that both the national and the provincial CASS guideline documents are being used both across and within provinces. However, the use of only the national CASS guidelines is problematic, since it does not specify the number of CASS tasks to be completed and the mark allocations for each task. These inconsistencies affect the fairness, validity and reliability of the CASS marks.

Understanding of the term Continuous Assessment

To determine the understanding that educators have of the term 'continuous assessment' (CASS), the educators were asked to explain what they understood by the term "CASS". Although, the majority of educators, 51out of 60 (85%) were able to name some characteristics of CASS, their answers were however very superficial. This clearly indicates the lack of understanding amongst educators about CASS.

Some of the responses received from the educators included:

"The use of different types of assessment done on a continuous basis."

"Assessment covering a variety of activities, not only summative."

"Ongoing everyday process that finds out about what learners know, understand and what learners can do."

"Assessment done in different forms (sic) from the beginning to the end of the year."

"The learner knows what is expected from her/him and can determine how their year - marks are going to look."

"Continuous assessment refers to the work done in the class everyday. Learners are assessed on everything they do."

From the above responses, it would seem that educators lack in - depth knowledge and the deeper understanding of the concept CASS. Besides mentioning that CASS is ongoing, from the beginning of the year to the end of the year, and the use of different types of assessment, there is little evidence that educators understand the concept completely. At least it is not shown in the responses provided.

To what extent are educators and subject advisors familiar with the provincial/ or the national policy (guideline) on CASS?

The educators and subject advisors in this study were asked to what extent they were familiar with the provincial/or the national guideline on the implementation of CASS. Table 6.13 shows that only 19 out of 60 (32%) educators from all areas indicated that they were completely familiar with the provincial/or national CASS guideline document compared to the larger proportion (62%) of subject advisors from all areas who maintained that they were completely familiar with the provincial/ or national CASS guideline in their subject. It is quite surprising that a significant proportion of educators (5 out of 12) and subject advisors (5 out of 8) from the rural schools and districts have reported that they are completely familiar with the provincial/national guideline documents. The two educators that reported that they were not familiar with the CASS policy are located in the township schools.

Table 6.13 Educator's and Subject Advisor's familiarity with the provincial/or national CASS guideline

	Rural		Township	Urban		Mixed	Totals	
	E	SA	E	E	SA	SA	E n=60 No. (%)	SA n=21 No. (%)
None of it			2		1	0	1 (3%)	1 (5%)
To some extent	3	1	4	5	0	0	14 (23%)	1 (5%)
To a large extent	1	2	2	4		0	25 (42%)	6(29%)
Totally Familiar	4	5	4	11	2	6	19(32%)	13(62%)
Totals	***12***	***8***	***12***	***7***		***6***	***60***	***21***

E = Educators
SA = Subject Advisors

Since subject advisors are responsible for supporting educators in the understanding and implementation of the CASS guidelines, it is essential that they themselves are totally familiar with the provincial/or national CASS guidelines documents before they embark on any programme to capacitate educators.

The subject advisors were also asked to indicate to what extent the majority of educators were able to understand the provincial/or national CASS guideline document in their subject. According to the responses shown in Table 6.14 only 6 out of 21 subject advisors from all districts were of the opinion that their educators understood the CASS documents totally.

Table 6.14 Subject Advisor's perception of whether educators understand the CASS guidelines in their subject

	Rural	Urban	Mixed	Totals
None of it	0	0	0	0
To some extent	2	2	0	4
To a large extent	4	5	2	11
Understood Totally	2	0	4	6
Totals	***8***	***7***	***6***	***21***

From the subject advisors responses, it can be seen that the majority of subject advisors (11 out of 21) have the perception that their educators understand the CASS guidelines to a large extent. It is also clear that the majority of these subject advisors are from the urban districts (5 out of 7) than from the rural (4 out of 8) and mixed districts (2 out of 6). On the other hand, it would seem that the majority of subject advisors (4 out of 6) from the mixed districts are of the opinion that their educators understand the CASS guidelines totally.

If the CASS documents are well understood by the majority of educators, then it is reasonable to assume that the interpretation and practical implementation of the CASS document will be less of a problem.

Effective Implementation of the CASS policy

Following the question on the extent to which the educators are able to understand the national/or provincial CASS guideline document/s in their subject, the subject advisors were asked to indicate the number of educators who in their opinion were able to implement CASS effectively in the classroom. Table 6.15 shows that a large proportion of subject advisors (15 out of 21) are of the opinion that the majority of their educators (12) and all of their educators (3) are able to implement CASS effectively in the classroom.

Table 6.15 Number of educators that are able to implement CASS effectively as reported by subject advisors

	Rural	Urban	Mixed	Totals No.	%
Few of them	3	3	0	6	(29%)
Majority of them	3	4	5	12	(57%)
All of them	2	0	1	3	(14%)
Totals	***8***	***7***	***6***	***21***	***(100%)***

Whilst 5 out of 12 educators from the rural schools have reported that they are totally familiar with the CASS guidelines (see Table 6.13), only 2 of their subject advisors as shown in Table 6.15 are of the opinion that all of their educators are able to implement CASS effectively.

However, the perception that the majority of educators are able to implement CASS effectively seems to differ from the viewpoint of the five experts interviewed. According to these experts there are mainly three levels of implementation-effectiveness in terms of CASS. They maintain that the smallest group of educators have a good understanding and grasp of CASS and are doing exceptionally well (given limitations). A second group, while willing to try, follows more of a piecemeal approach with different aspects receiving attention at different times. A third group consists of teachers who have no idea of what is to be done in CASS and could not care less about the success of CASS implementation.

The CASS experts also added that there is a big resistance by some educators in using other challenging, performance - based assessments other than the traditional tests and examinations. They maintain that the extent that educators are able to implement CASS differs according to the type of school and its socio-economic background, the availability of resources, training of educators, size of class, laboratory facilities, etc. One of the interviewees indicated that the ex-Department of Education and Training (DET) schools are grappling with CASS implementation. The reason she gave was that most of the educators in these

schools are less qualified. Further, these schools in most instances do not have the necessary resources to facilitate the implementation of CASS.

According to the interviewees, “generally the good schools are able to implement CASS effectively and rural schools are not so efficient in the implementation of CASS”. However, they stated that there are some schools that are situated in the rural areas that are able to implement CASS in the proper manner. The five experts are also of the opinion that CASS implementation also varies from province to province, district to district and from school to school within a province.” One of the interviewees stated, “one of the major problems with educators is that they create the impression that they know how to implement CASS effectively, when in fact they don't. They never admit that they don't know how to do it”. Table 6.15 also shows that a significant proportion (6 out of 21) of the subject advisors maintained that only a few educators are able to implement CASS effectively.

In conclusion to this research question, “are educators and subject advisors familiar with the provincial/or the national policy (guideline) on CASS, it was established that there are no CASS policies to regulate the implementation of CASS in Biology, Physical Science and Mathematics. The use of only the national CASS guidelines within a province is a problem since it is only a broad guideline and does not specify the allocation of marks and the number of CASS tasks to be completed by educators. The use of only the national CASS guideline by a large proportion of educators (55%), the majority of whom are from the urban areas and the use of only the provincial CASS guideline (37%) by the other educators, the majority of whom are from the rural and township areas may lead to inconsistencies in the implementation of CASS. This affects the fairness, validity and reliability of the CASS marks.

The responses of educators on their understanding of the concept “CASS” suggest that educators have a vague understanding of the concept CASS. Responses provided by educators are not entirely accurate. Only 32% of educators from all areas reported that they were totally familiar with the provincial/national CASS guideline whilst contrary to this finding just over half of

the subject advisors (57%) from all areas maintained that their educators are able to implement CASS effectively in their subject.

6.3.2 To what extent are educators trained to implement CASS?

This question provides data on the extent of training received by the educators, the duration of the training, the frequency of the training and whether the training was of assistance to educators in the implementation of CASS. The responses from the subject advisors and the five experts interviewed are also presented.

Table 6.16 reveals that the majority of educators (52%) across provinces and locations reported that they received very little training on the implementation of CASS.

In this regard, the report on the CASS verification exercise conducted in Limpopo, Free State and the Western Cape states, "school principals were trained to implement CASS at their schools, but in only one of the three provinces was there training of teachers. This is a significant weakness" (Umalusi, 2002d). The shortage of suitably qualified subject experts (subject advisors) was cited as the main reason for the non - training of teachers. The shortage of suitably qualified subject experts (subject advisors) is a reality in many provinces (Umalusi, 2001c).

The above findings have implications for the effective implementation of CASS. If school principals were trained to implement CASS, then one would assume that it is then the responsibility of the school principal to train his educators. In reality, whether the training of educators by school principals is being done is questionable since school principals are more involved in the administrative and management responsibilities of the school. In Limpopo for example 58% of the educators reported that they received very little training despite claims by Umalusi (2002d) that school principals/or educators were trained to implement CASS.

Table 6.16 Provincial analysis of training provided to educators

Province	N	No training		Very Little Training		Quite a lot of training		More than sufficient training	
		No.	%	No.	%	No.	%	No.	%
KwaZulu-Natal	13			8	(62%)	4	(31%)	1	(7%)
Gauteng	11			1	(9%)	9	(82%)	1	(9%)
Northern Cape	8			4	(50%)	4	(50%)		
Eastern Cape	12	1	(0.8%)	8	(67%)	3	(25%)		
Limpopo	12	2	(17%)	7	(58%)	3	(25%)		
Mpumalanga	4			3	(75%)	1	(25%)		
Totals	***60***	***3***	***5%***	***31***	***52%***	***24***	***40%***	***2***	***3%***

Table 6.17 Training provided to educators according to the location of schools and districts

	Rural		Township	Urban		Mixed	Totals	
	E n=12	SA n=8	E n=12	E n=7	SA n=36	SA n=6	E n=60	SA n=21
No training	2			1			3	0
Very Little Training	7	1	7	17	1		31	2
Quite a lot of Training	3	3	5	16	4	4	24	11
More than sufficient training		4		1	2	2	2	8

E = Educators
SA = Subject Advisors

Table 6.17 clearly shows that the majority of educators who are located in the rural schools (7 out of 12) and the township schools (7 out of 12) reported that they had received very little training. The 2 educators from KwaZulu - Natal and Gauteng that conceded to have received more than sufficient training are located in the urban schools (see table 6.16 and 6.17). Table 6.17 shows that the large proportion of educators who reported having received quite a lot of training (24 out of 60) are located in the urban areas (16 out of 36), township areas (5 out of 12) and rural areas (3 out of 12).

On the other hand, table 6.17 shows that the majority of subject advisors (19 of 21) from all areas reported that their educators received quite a lot of training (11) and more than sufficient training (8) in the implementation of CASS. From the statistics it is quite evident that there is a clear contradiction between the response of the educators and the response of their subject advisors on the extent of training received by educators.

Duration of the training

Table 6.18 shows that (30 out of 60) educators (50%) from across the six provinces received training in one day or less.

Table 6.18 Duration of training across the six provinces

Province	N	No Training	Less than a day	1 day	2-3 days	3 days-1 week	More than a week
KwaZulu-Natal	13		4	3	4	2	
Gauteng	11		1		2	3	5
Northern Cape	8		1	2	3	2	
Eastern Cape	12	1	5	3	3		
Limpopo	12	1	3	6	1	1	
Mpumalanga	4		1	1	2		
Totals (%)	***60***	***2 (3%)***	***15 (25%)***	***15 (25%)***	***15 (25%)***	***8 (13%)***	***5 (8%)***

Table 6.19 Cross - tabulation between the location of schools and the duration of training as reported by educators.

Location	No Training	Less than a day	1 day	2-3 days	3 days-week	More than a week	Totals n=60
Rural	1	3	5	2	1	0	12
Township	0	2	4	2	1	3	12
Urban-suburbs	1	7	5	9	5	2	29
Urban-centre of city	0	3	1	2	1	0	7
Totals(%)	***2 (3%)***	***15 (25%)***	***15 (25%)***	***15 (25%)***	***8 (13%)***	***5 (8%)***	***60(100%)***

Table 6.19 shows that the educators who received training in one day and less than a day are located in rural, township and urban schools. However, more educators from the urban suburbs (9 out of 29) received training in 2 - 3 days than the educators from the rural (2 out of 12) and township schools (2 out of 12).

On the other hand, 3 out of 12 educators located in the township schools conceded to have received training for more than a week whereas no educators from the rural and urban - centre of city schools received training for more than a week.

The question is whether a one day session or a session that lasts for less than a day is sufficient to prepare educators for an educational change that impacts on learner performance at the most important part of their careers.

Frequency of Training

On the frequency of training, Table 6.20 suggests that a significant proportion of educators (42%) from all areas received training once a year. These statistics more or less corresponded with the response of subject advisors (40%) from all areas that also conceded to the training of educators once a year. On the other hand, a significant proportion (14 out of 60) of educators maintained that the question was not applicable to them since no training was offered to them. Of particular interest is that the majority of educators (7 out of 12) from the rural

school reported that the question was not applicable to them since they received no training. One subject advisor did not respond to the question.

Table 6.20 Frequency of training as reported by educators and subject advisors according to location of schools and districts

Response	Rural		Township	Urban		Mixed	Totals			
	E	SA	E	E	SA	SA	E n=60		SA n=19	
							No.	%	No.	%
Not Applicable	7		3	4			14	(23%)	0	(0%)
Once a Month				1			1	(2%)	0	(0%)
Once a Year	4	3	6	15	3	2	25	(42%)	8	(40%)
Twice a Year	1	4	1	11	1	2	13	(22%)	7	(35%)
3-4 Times a Year	0	0	2	5	3	0	7	(12%)	3	(15%)
More Often	0	0	0	0		2			2	(10%)
Totals	***12***	***7***	***12***	***36***	***7***	***6***	***60 (101%)***		***20(100%)***	

E = Educators
SA = Subject Advisors

From the statistics shown above it would appear that only a small proportion (12%) of educators from the township and urban schools alluded to have received training 3 - 4 times a year - whilst no educators from the rural schools indicated that they had received training 3 - 4 times a year.

To explore as to whether the training was of any assistance to the educators, educators were asked to what extent the training provided to them was of assistance in the classroom. 17% of educators from all areas reported that the training was of great assistance, 50% reported that the training was of some assistance, 30% reported that the training was of very little assistance and 3% of the educators reported that the training was of no assistance.

In conclusion to the above research question, it can be stated that educators from all areas have not received sufficient training to ensure the effective implementation of CASS. However, it would seem that educators from the urban-suburbs have had more training than educators from the rural, township and urban - centre of city areas. A large proportion of educators (58%) from the rural areas reported that they have had no training. In general, the provision of training is clearly insufficient to prepare educators for the challenges of CASS implementation.

6.3.3 How are educators supported to enable them to implement CASS effectively?

Besides the provision of training to implement CASS in Biology, Mathematics and Physical Science, the educators were asked to indicate the extent of support they had received from their subject advisors to strengthen and to sustain the effective implementation of CASS in Mathematics, Biology and Physical Science. Table 6.21 shows that only 27% of the educators reported that they had received sufficient support whilst a significant proportion of educators (45%) reported receiving very little support (23%) to no support (22%).

Table 6.21 Support received by educators to implement CASS as reported by educators and subject advisors

	No Support		Very Little Support		Sporadic Support		Sufficient Support		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Educators	13	(22%)	14	(23%)	17	(28%)	16	(27%)	60	(100%)
Subject Advisors	0	(0%)	4	(19%)	7	(33%)	10	(48%)	21	(100%)

On the other hand, the response of the subject advisors contradicts the response of the educators. Nearly half of the subject advisors (48%) reported that they provided sufficient support to their educators in the implementation of CASS. These differences suggest a discrepancy between the two sets of data. The response of the majority of educators clearly indicate poor levels of support provided by subject advisors, however, a large number of subject advisors at the other hand seem to believe that the support they provide to their educators are sufficient.

Table 6.22 shows a cross - tabulation of the frequency of support provided to educators in Biology, Mathematics and Physical Science.

Table 6.22 Cross - tabulation between the frequency of support and the subjects as reported by educators

Subject	No Support		Very Little Support		Sporadic Support		Sufficient Support		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Maths	5	(25%)	5	(25%)	3	(15%)	7	(35%)	20	(100%)
Biology	5	(29%)	2	(12%)	7	(41%)	3	(18%)	17	(100%)
Physical Science	3	(13%)	6	(26%)	8	(35%)	6	(26%)	23	(100%)

From the above data it would seem that a larger number of Mathematics educators (7 out of 20) reported that they had received sufficient support compared to the educators of Physical Science (6 out of 23) and Biology (3 out of

17). However, it is disturbing to note that in Mathematics alone, 50% of the educators reported that they had received no support and very little support, and in Biology 41% of the educators reported the same. In the case of Physical Science, 39% of the educators reported having received no support to very little support. In general, it would seem that support is lacking in all three critical subjects.

One of the findings of Umalusi (2001b), is that CASS in Physical Science is problematic in certain areas due to the unsuitability of educators who need extensive ongoing and on site support and workshops to conduct CASS. Research evidence also indicates that there is still a large proportion of unqualified and under - qualified educators in the system, hence educators at all levels need sustained and systematic professional development especially as they begin to engage in the Curriculum 2005 process (DoE, 1999a).

For these reasons, the provision of ongoing and sustained support to educators to implement CASS effectively cannot be overlooked. Table 6.23 presents a cross-tabulation between the frequency of support and location where it can be clearly seen that support is insufficient in all locations.

Table 6.23 Cross - tabulation between the frequency of support and the location of schools as reported by educators

Response	Rural	Township	Urban-suburbs	Urban-centre of city	Total n=60 No. %
No Support	4	1	5	3	13 (22%)
Very Little Support	4	3	6	1	14 (23%)
Sporadic Support	2	5	9	1	17(28%)
Sufficient Support	2	3	9	2	16 (27%)
Totals	***12***	***12***	***29***	***7***	***60 (100%)***

In sum, the data indicates that professional support to educators of Mathematics, Physical Science and Biology is seriously lacking. If this is true, it would impact negatively on the effectiveness with which educators are able to implement CASS.

The most popular kinds of support received by educators according to province are shown in Table 6.24 whilst table 6.25 shows the breakdown of support according to location. The tables are followed by a discussion on the most prevalent types of support provided to educators.

Table 6.24 Types of support provided to educators according to province as reported by educators

Province	N	Cluster Meetings	Work-shops	Subject Meetings	CASS Exemplars	Contact by telephone	Workbooks
KwaZulu-Natal	13	9	10	10	7	2	6
Gauteng	11	11	10	4	5	3	4
Northern Cape	8	5	5	6	3	2	2
Eastern Cape	12	5	1	3	2	2	0
Limpopo	12	3	5	1	1	2	1
Mpumalanga	4	2	2		1		
Totals (%)	***60***	***35 (58%)***	***33 (55%)***	***24 (40%)***	***19 (32%)***	***12 (20%)***	***13 (22%)***

Table 6.25 Types of support provided to educators as reported by educators and subject advisors according to the location of schools and districts

Types of Support	Rural		Township	Urban		Mixed	Totals	
	E n=12	SA n=8	E n=12	E n=36	SA n=7	SA n=6	E n=60 No. %	SA n=21 No. %
Cluster meetings	2	4	6	27	7	6	35 (58%)	17 (81%)
Workshops	9	7	7	17	5	4	33 (55%)	16 (76%)
Subject Meetings	2	5	3	19	7	4	24 (40%)	16 (76%)
CASS Exemplars	3	6	4	12	7	5	19 (32%)	18 (86%)
Contact by telephone	3	7	5	4	6	5	12 (20%)	18 (86%)
Classroom visits		4			7	4		15 (71%)
Workbooks	0	0	2	11	2	5	13 (22%)	7 (33%)
Standardised CASS								3 (14%)
Demo Lessons								3 (14%)
Pace Setters								2 (9%)
Quarterly Moderation								1 (5%)

E = Educators
SA = Subject Advisors

Cluster Meetings

Table 6.24 shows that cluster meetings were rated as the most frequent form of support provided by subject advisors to educators. Cluster meetings are meetings held among a group of educators who are located at schools within a certain district or region or a part thereof. A large proportion of educators (58%) from all locations indicated that they attended cluster meetings where information about the implementation of CASS is shared. However, Table 6.25 clearly shows that more educators from the urban schools (27 out of 36) have been exposed to cluster meetings than educators from the township (6 out of 12) and the rural schools (2 out of 12). A large proportion of subject advisors (81%) from all locations also maintained that cluster meetings were held to provide support to educators.

Workshops

Another popular form of support is the convening of workshops. The difference between cluster meetings and workshops is that workshops usually last for more than a day whereas cluster meetings usually last a few hours to a day. The convening of workshops is an ideal way to involve educators in the practical implementation of CASS. It allows educators to exchange ideas and share skills. A large proportion of educators (55%) and even a larger proportion of subject advisors (76%) reported that workshops were held to provide support to educators. It is interesting to note that a larger proportion of educators (9 out of 12) from the rural schools have attended workshops than the educators from the township (7 out of 12) and the urban schools (17 out of 36).

Subject Meetings

Table 6.25 shows that 24 out of 60 educators reported that they had attended subject meetings hosted by their subject advisors whereas the majority (76%) of subject advisors from districts in all locations reported that subject meetings were held to disseminate information to educators on the implementation of CASS. More educators from the urban schools (19 out of 36) alluded to the attendance of subject meetings than the educators from the township (3 out of 12) and rural schools (2 out of 12).

Provision of CASS Exemplars

Whilst only 19 out of 60 (32%) educators reported that they had received CASS exemplars from their subject advisors, the majority of subject advisors (18 out of 21) (86%) indicated that they had provided support by making CASS exemplars available to educators. The two sets of data are clearly contradictory. On the basis of the responses from the educators, it would seem that the provision of CASS exemplars is inadequate across the schools in all areas or it is possible that they have not been disseminated to the educators within the school.

Other kinds of Support

Thirteen (13) out of 60 (22%) of educators reported that they also received support in terms of the provision of workbooks by subject advisors. This form of support is clearly insufficient, but is more prevalent in the urban schools (11 out of 36) than in the township schools (2 out of 12) and the rural schools (0 out of 12).

Contact by telephone was also cited as a means of support by a small proportion (20%) of educators, most of who are from the township schools (5 out of 12). At the other hand, a large majority (86%) of subject advisors from all areas reported that educators are able to contact them by telephone. There is clearly a contradiction between the two data sets.

Other forms of support that was not reported by any educators but by subject advisors include demonstration lessons, (3), provision of pace setters (2), and the implementation of quarterly moderation (1). The numbers in brackets indicates the number of responses reported by the subject advisors that participated in this study.

In conclusion to this research question on the support available to strengthen and sustain the implementation of CASS, it can be stated that the support of educators to ensure the effective implementation of CASS is clearly insufficient in all areas. However, where support is provided, the following kinds of support were most prevalent, the convening of cluster and subject meetings which seems to be taking place more in the urban areas than the rural and township areas and the convening of workshops which is more prominent in the rural areas than in any

other areas. Other types of support reported by educators include the provision of CASS exemplars, contact by telephone and provision of workbooks by subject advisors. However, it is clear that the data from subject advisors especially with regards to the support they provide to educators are clearly contradictory to the data provided by their educators.

6.4 To what extent are the Grade 12 CASS marks fair, valid and reliable?

This section presents the findings of the third and last research question, namely how fair, valid and reliable is the Grade 12 CASS marks? The principles of fairness, validity and reliability, which provide background information to the understanding of this question, were discussed in detail in Chapter 3. Chapter 4 also examined literature on fairness, validity and reliability as it is applied to OBA and to CASS in particular. This section presents a conceptual introduction of the concepts fairness, validity and reliability followed by an examination of the validity and reliability of the Grade 12 CASS marks.

McMillan (2001), indicates that the term validity is demonstrated when evidence and logic suggest that the evaluation of a task is accurate and reasonable. In other words, validity concerns the soundness, trustworthiness, or legitimacy of the inferences or claims that are made on the basis of the obtained scores. Killen (2003) also indicates that there is a shift in focus from validity being a property of a test item or assessment task to validity being a value judgement about inferences and actions made as a result of assessment. He emphasises that there is a change in focus from the question, “is my test valid?” to the question, “am I making justifiable inferences and decisions on the basis of the assessment evidence I have gathered?” Whilst valid inferences are accurate and concern the nature and meaning of the scores, reliable scores are dependable and consistent (Killen, 2003).

Since the focus in this section is on the fairness, validity and reliability of the CASS marks, it is essential to indicate that the term “fairness” in assessments is related to the concept of validity. The principle of fairness forms the basis of all assessment practices, which ensures that all learners have been treated in an

equitable manner during the assessment process (Gipps, 1994). In a fair assessment, learners have an opportunity to demonstrate their learning in a way that their scores are not affected by factors such as the lack of resources and physical facilities, gender, ethnic background and handicapped difficulties (McMillan, 2001). If assessment practices are not the same for all learners, for example, where some learners enjoy better learning conditions than others, the inferences made by the educator in the school context will impact on the validity of the CASS marks.

When reflecting on the validity of the Grade 12 CASS marks, it is essential to ascertain whether the actual CASS marks allocated to learners are indeed valid in terms of the evidence of work produced by the learner reflecting on the assessment outcomes achieved.

It is important to repeat that ensuring the fairness, validity and reliability of the Grade 12 CASS marks are important because it constitutes 25% of the Senior Certificate examination marks at the end of the schooling phase. Since the results of this assessment are often used for selection into higher education and for certification purposes, it is essential that the marks obtained by Grade 12 learners are accurate and worthwhile (Killen, 2003). Furthermore, the Senior Certificate results have a huge political, social and economic impact on our country and on its workforce as a whole. If the CASS marks are not fair, valid and reliable they cannot be legitimately used for any purposes including selection into higher education and certification purposes. The danger is that it also gives a false impression of a learner's capability and may result in the learner being unable to cope with the demands of higher education.

Educators and subject advisors that participated in this study were asked if the CASS marks obtained by their Grade 12 learners in Biology, Mathematics and Physical Science were fair and valid. This question was asked to explore the opinions of educators and subject advisors since they are involved in the implementation of CASS and ought to know whether the marks produced by their learners are fair and valid. Interestingly, Table 6.26 shows that the majority of educators (72%) and the majority of subject advisors (84%) maintained that the

Grade 12 CASS marks are indeed fair and valid. Table 6.27 shows the cross-tabulation between the location of schools and districts and the fairness and validity of the CASS marks.

Table 6.26 Responses of educators and subject advisors indicating whether the Grade 12 CASS marks are fair and valid

		No. of educator reponses			No. of subject advisor responses		
Province	**n=60**	**Yes**	**No**	**Not Sure**	**n=19**	**Yes**	**No**
KwaZulu-Natal	13	11	1	1	2	2	
Gauteng	11	7	3	1	2	2	
Northern Cape	8	5	3		4	3	1
Eastern Cape	12	9	1	2	3	3	
Limpopo	12	7	5		3	2	1
Mpumalanga	4	4			5	4	1
Total (%)	***60 (100%)***	***43(72%)***	***13 (22%)***	***4 (7%)***	***19 (100%)***	***16 (84%)***	***3 (14%)***

Table 6.27 Responses of educators and subject advisors indicating whether the Grade 12 CASS marks are fair and valid according to the location of schools and districts

Response	Rural E	Rural SA	Township E	Urban E	Urban SA	Mixed SA	Educator n=60 No.	Educator n=60 %	Subject Advisor n=19 No.	Subject Advisor n=19 %
Yes	4	6	8	31	5	5	43	(72%)	16	(84%)
No	5	2	4	4	1		13	(22%)	3	(14%)
Not Sure	3			1			4	(7%)	0	(0%)
Totals	***12***	***8***	***12***	***36***	***6***	***5***	***60***	**(*100%*)**	***19***	**(*100%*)**

E= Educators
SA = Subject Advisors

According to table 6.27, the majority of educators from the urban schools (31 out of 36) reported that their CASS marks were fair and valid, whilst a significant proportion of educators from the rural schools (5 out of 12) reported that their CASS marks were not fair and valid. On the other hand, more subject advisors located in the rural districts (6 out of 8) seem to believe that their CASS marks are fair and valid. Interestingly, the 3 educators who were not sure about the fairness and validity of the CASS marks are also located in the rural schools. However, the majority of educators from the township schools (8 out of 12) reported that their CASS marks were fair and valid.

The majority of educators (72%) who maintained that their CASS marks are fair and valid at their schools provided inter - alia the following reasons:

"Everybody works according to guidelines."

"Most of tests and practicals are done under supervision and test conditions are applied."

"The CASS marks does (sic) not differ much from the symbols the learners obtain at the end of the year."

"Worksheets are a good indication of a learner's work."

"A test or exam always reveals what a child can score (sic) or knows."

"All CASS assessments are done in class."

"Learners get the marks as marked (sic) from the memorandum."

"I have tried my best to give learners fair and credible marks for projects, practical, class work, etc."

On the other hand, some of the reasons provided by the subject advisors in support of the CASS marks being fair and valid are:

"CASS is valid because it uses established trends like the three year average."

"Teachers try their best not to let pupils down. Here and there you can see that CASS marks are artificial, (too high), but these are generally marked down with reference to previous experience."

"Educators are following policy."

"Most of the educators are trained to some extent."

When one examines the above statements made by both the educators and subject advisors supporting the fairness and validity of the CASS marks at their schools, it can be clearly seen that most of the reasons provided are not educationally sound. For example, the statement that "the CASS marks are fair and valid because everybody works according to the provincial and national guidelines" does not indicate that the CASS marks allocated to learners are based on evidence and logic or legitimate assessment criteria nor does it indicate that the assessment instrument was of an acceptable standard. These answers also tap on the reliability of the CASS marks. We can assume that if different standards of assessment are operational at different schools, the CASS marks will not be consistent.

Another example is the statement made by one of the subject advisors in this study when he indicated, "*teachers try their best not to let pupils down. Here and there you can see that CASS marks are artificial, (too high), but these are generally marked down with reference to previous experience"*. This was a statement made by a subject advisor from Mpumalanga. The fact that the CASS marks are too high seems to suggest that CASS is not being conducted properly. However, to ensure the validity of the CASS marks, the subject advisor has indicated that 10% of the learner's portfolios in each school within the district are moderated at the end of the year. He indicated that moderation is done by comparing the average CASS marks of the school to the average achievement of learners in the subject of the past three years. Adjustments are then made to the CASS marks of all the learners within the school.

The above - mentioned approach to moderation does not ensure the validity of the CASS marks. It is also improper and unfair for subject advisors to compare the learner's CASS marks to the norms of the past three years and effect adjustments to the CASS marks. The cohort of learners is also not the same. This adjustment of the learner's CASS mark is done even before the learner sits for his final examination. This process is clearly unjustified. The question is why learners should be disadvantaged when the system to implement CASS is not yet ready. However, this process of arriving at a learner's CASS marks impacts on the validity of the CASS marks.

Another educator reported that the CASS marks in Biology were valid because, "worksheets are a good indication of a learner's work." This statement however does not confirm the validity of a learner's mark since the worksheet could have been of sub - standard, the learner could have been assisted by his parents or friends, or the learner could have engaged in copying. Various possibilities exist.

According to the interviewee from Umalusi, "evidence indicates that some teachers are faking marks. This is also reiterated by a couple (2) of the sampled educators and their subject advisors.

It is sad to note that although the majority of educators and subject advisors reported that their CASS marks were fair and valid, the reasons provided by them did not adequately address the fairness and validity of CASS. Nowhere are educators and subject advisors talking about the legitimacy of their CASS tasks or how the CASS tasks are evaluated. The statements made by both educators and subject advisors supporting the claim that the CASS marks are valid are rather superficial. It also indicates that there is a lack of understanding of what constitutes validity amongst educators and subject advisors. This question however explored the many opinions, views and perceptions of educators and subject advisors on the fairness and validity of the CASS marks.

However, a significant proportion of educators (17 out of 60 - 29%) and subject advisors (3 out of 19 - 14%) indicated that the CASS marks were either not fair or

valid or that they were not sure. Some of the reasons cited by these educators and other educators include:

" Our CASS is more demanding than those of other schools."

"It is all new to me and a lot of hard work. Maybe they can standardise the content in the province and it will make it more fair."

"Teachers lack skills and there is no support to improve the implementation of CASS."

"In Physical Science, too much marks are allocated to practicals. Therefore the CASS marks are unrealistically high."

"Teachers manipulate marks."
"Practicals inflate the CASS marks too much."
"Learners achieve too many marks for too little work."

As one educator in this study reported, "in Physical science, too much marks are allocated to practical, therefore the CASS marks are unrealistically high". This can be a real problem since it impacts on the validity of the CASS marks. In this regard another educator in this study pointed out that Physical science practical constitutes 40% of the total CASS marks at Grade 12 level and since most practical are conducted in group work, the marks are unrealistically high. These marks therefore do not reflect the true abilities of the learner and are therefore not valid. Learners are also left with a false perception of their true worth.

Comments like "learners score high marks on easy tests", tells us something about the type of test given to learners. If the test were simple, the result would be that learners would score high marks. The assessment instrument is therefore flawed and the result would therefore be invalid. On the other hand, a comment like "teachers manipulate marks" must be interpreted with caution. This is a general statement but it may only apply to a certain category of educators, for example, those that set very easy tasks or those that believe that the higher the CASS mark, the better the chances that the learner will pass.

On the other hand, a small proportion (14%) of the subject advisors reported that CASS was not being conducted in a fair manner at their schools. They provided the following reasons:

"I think each school/teacher more or less does his/her own thing. Standard in this hit and run approach can be queried."

"The standard in all schools are not the same level."

"Some educators do not implement assessment continually through the year. They let learners write a high percentage of the tests during the third term."

The above reasons seem to strongly suggest that there is a degree of uncertainty and inconsistency in the assessment process leading to the allocation of marks for CASS. The manner in which CASS is conducted determines the validity and reliability of the CASS marks. If aspects of the assessment process is inconsistent as indicated by the statements, *"our CASS is more demanding than those of other schools and some educators do not implement assessment continually through the year and they let learners write a high percentage of the tests during the third term"*, then there is some doubt created about the validity and reliability of the CASS marks. The different standards of CASS operating at the different schools affects the reliability of the CASS scores since each educator determines her/his own standards and will also evaluate the task based on her/his own interpretation of the standards operating at the school.

In 2002, a CASS verification exercise for the Grade 12 Mathematics was conducted by Umalusi in the Eastern Cape (Umalusi, 2002c) and the findings of this exercise is quite disturbing. Although the verifiers indicated that the minimum requirements in terms of the national guideline were met, they made the following observations:

"We had ample reason to doubt the authenticity of some of the portfolios. We saw in some cases a flurry of short tests and class tests given just before the August moderation exercise. In one case, four tests were given on four consecutive days,

suggesting that learners were copying model answers. For the most part short tests were based on Grade 11 work. We estimate that over 60% of these tests were based on logs and indices, which cover less than 10% of the syllabus. Euclidean Geometry which comprises about 30% of the paper was hardly ever tested."

We may conclude from the data that there are many doubts about the fairness, validity and reliability of the CASS marks. Since subject advisors in all provinces play an important role in ensuring that CASS requirements are met by educators, the subject advisors that participated in this study were asked what measures were taken at district level to ensure that the CASS marks of the Grade 12 learners at the schools within their district/region are fair and valid. Table 6.28 shows that the majority of subject advisors (55%) conceded to the use of cluster moderation as a tool to ensure that the CASS marks were fair and valid. Table 6.29 shows that cluster moderation is more prevalent in mixed and urban districts than in rural districts.

Since the provincial samples used are not representative, the findings in this study are presented according to the location of educators and subject advisors. However, in certain instances the provincial data has been presented to highlight information that is both necessary and valuable to this study. The data may be used to address ways to improve the implementation of CASS in provinces.

Table 6.28 Measures taken by subject advisors to ensure the validity of CASS marks according to provinces

Province	n=21	Cluster Moderation	Std tests, exam and CASS	Monitoring and Support	Not Sure
KwaZulu - Natal	2	1		2	
Gauteng	2	2			
Northern Cape	4	1	2	1	
Eastern Cape	5	4			1
Limpopo	3	1		1	
Mpumalanga	4	2		1	1
Totals		***11 (55%)***	***2 (10%)***	***5 (25%)***	***2 (10%)***

Table 6.29 Measures taken by Subject Advisors to ensure the validity of CASS marks according to the location of the districts

Measures	Rural n=8	Urban n=7	Mixed n=5	Totals n=20 No.	%
Cluster Moderation	2	4	5	11	(55%)
Std tests, exam and CASS	2	0	0	2	(10%)
Monitoring and Support	3	2	0	5	(25%)
Not Sure	1	1		2	(10%)
Totals	***8***	***7***	***5***	***20***	***(100%)***

Although, it seems that cluster moderation is taking place in all areas as reported by 55% of the subject advisors, the manner in which the moderation takes place differs from area to area. In other words, each district has its own method of moderation, which seems to be flawed. Cluster moderation of the CASS marks seems to be a popular measure adopted by subject advisors in all provinces to ensure the validity of the CASS marks. However, cluster moderation at present only takes place at the end of the academic year, just before the marks are

submitted to the provincial departments of education for inclusion on the computer system. However, it would seem that the subject advisors from the Northern Cape have gone a step further to make available examples of tasks (standardised tests and CASS pieces) to their educators. This is indeed a good way of contributing towards the professional development of educators and is also helps educators to know the standard of work that is expected of them.

However, a rather disturbing finding is that whilst the majority of subject advisors in the Eastern Cape (4 out of 5) conceded to the use of cluster moderation to validate the CASS marks of their Grade 12 learners (see table 6.28), the following was discovered in the CASS verification report of the Mathematics marks in the Eastern Cape (Umalusi, 2002c):

"We saw little or no evidence of moderation of class and formal tests. Of great concern however, is that real moderation did not occur at the "cluster level". We learnt that cluster leaders were often not subject specific, contrary to the requirement spelt out in the provincial CASS document, which states that the subject leader (advisor) must organise the cluster of schools. Educators were found (by checking signatures) to be playing the role of moderators for their own schools. There were no moderation reports. A careful study of the provincial moderation procedures document in the Eastern Cape revealed that the aim of cluster meetings was not to moderate so as to find a common standard but to artificially adjust the marks to 10% of the predicted final average of the centre for the final examination. This is done to optimize the likelihood of the acceptance of the CASS mark by Umalusi" (Umalusi, 2001b).

The above findings are specific to parts of the Eastern Cape, however, Umalusi has also gathered evidence from other provincial education departments which indicates that the validation of some CASS marks are problematic. However, the extent of the problems relating to the validation of the CASS marks seems to differ from province to province. For example, in KwaZulu - Natal, the following statements were noted for Physical Science:

"The weighting of the CASS components were in line with the provincial and national guideline documents. However, the class tests of poorly performing schools (pass rate below 50%) were below the required standard. Assessment criteria for the evaluation of learner's CASS were not always available from educators. About 60% of the educator and learner's portfolios were disorganised."

From the above remarks on the KwaZulu - Natal verification, it can be stated that the verification of the CASS marks is problematic especially if the assessment criteria is not available. This seems to be a common problem across the provinces. For example, it has been stated that in the Eastern Cape, educators compiled their portfolios just before the CASS verification exercise and the assessment criteria in most instances were not available (Umalusi, 2002c). In one instance in the Eastern Cape, it was found that the assessment criteria used by the educator to make inferences about the learner's work was only 20% correct (Umalusi, 2002c). This implies that the marks allocated by this educator using the said assessment criteria were definitely not valid.

According to the experts on CASS, the validity and reliability of marks depends a lot on teacher competency and her/his approach to CASS. They are of the opinion that approximately 25-30% of the CASS marks are definitely not valid. If the CASS marks are being faked in certain instances, then it suggests that the CASS tasks were either not completed or if they were completed the educator did not mark them. This means that the CASS marks that are faked have no validity and hence will also not be a reliable indicator of a learner's capability.

Table 6.30 illustrates the number of schools in all provinces for 2002 that submitted CASS marks ranging from more than 5% below the adjusted examination mark to 20% and more above the adjusted examination mark. This variation across the provinces and within provinces further suggests that there are no set standards or consistency in the conduct of CASS in the various subjects. The range of CASS marks also suggests a lack of common understanding in the compilation of the CASS marks.

Table 6.30 Number of schools in each province whose raw CASS marks show significant deviation from the adjusted examination marks for the 2002 Senior Certificate examination

Province	CASS marks of more than 5% below the adjusted examination marks	%	CASS marks of 5% below to 5% above the adjusted examination marks	%	CASS marks of 5% to 10% above the adjusted examination marks	%	CASS marks of 10% to 20% above the adjusted examination marks	%	CASS marks of more than 20% above the adjusted examination marks	%	Total no. of schools with 8 or more candidates
Western Cape	447	11%	1 224	29%	872	21%	1 149	27%	517	12%	4 209
Northern Cape	101	12%	284	33%	176	21%	202	24%	89	10%	852
Free State	111	4%	570	20%	555	19%	1 013	36%	603	21%	2 852
Eastern Cape	275	4%	766	11%	827	12%	2 330	34%	2 742	40%	6 940
KwaZulu-Natal	724	7%	2 483	22%	2 008	18%	3 384	31%	2 473	22%	11 072
Mpumalanga	67	2%	493	14%	530	15%	1 289	37%	1 106	32%	3 485
Limpopo	874	9%	2 763	30%	1 852	14%	2 610	28%	1 137	12%	9 236
Gauteng	706	1%	1 666	24%	1 204	17%	2 125	30%	1 334	19%	7 035
North West	370	12%	1 210	39%	647	21%	731	23%	81	6%	3 139
Totals (%)	***3 675 (8%)***		***11 459 (23%)***		***8 671 (18%)***		***14 833 (30%)***		***100 82 (21%)***		***48 820 (100%)***

Source: (Umalusi, 2002e)

According to Table 6.30, a large proportion of schools (30%) have submitted raw CASS marks of between 10% - 20% above the adjusted examination marks and a significant proportion of schools (21%) have submitted raw CASS marks of more than 20% above the adjusted examination marks. These figures constitute 51% of the schools whose CASS marks were totally unacceptable by Umalusi, the quality assurance council responsible for the credibility of the Senior Certificate examinations. These variances in the CASS marks are problematic since the acceptable difference between the adjusted examination mark and the raw CASS mark for 2002 was pegged at 5% above the adjusted examination mark (DoE, 2003c). If 5% was the acceptable difference between the adjusted examination marks and the raw CASS mark then Table 6.30 clearly indicates that for the 2002 Senior Certificate examinations more than 60% of the schools submitted CASS marks that had to be statistically adjusted so that they are not more than 5% above the adjusted examination marks of learners. The argument provided by education officials for the use of the 5% tolerance factor is that, "if a class worked hard through the year and realistic CASS marks were compiled by educators, it will be reflected in a good average examination mark and a good CASS mark, which will correlate with the examination mark" (DoE, 2003c).

If one examines the table from a provincial perspective, it can be seen for example that in the Eastern Cape, as much as 2 742 (40%) of schools submitted raw CASS marks as high as 20% and above the adjusted examination mark whereas in the same province 275 (4%) of schools submitted raw CASS marks of below 5% of the adjusted examination marks. It is shocking to note that less than a quarter of the total number of schools would have submitted CASS marks that were accepted as is for the 2002 Senior Certificate examinations. The inconsistencies within and across provinces are quite evident.

The question arises, which category of marks is more valid? This is indeed a challenging question. Considering the nature of CASS, that CASS is conducted throughout the year in a more relaxed environment and that the CASS components usually cover a small quantity of the work, it is an accepted principle amongst the education fraternity that the CASS marks should be higher than the adjusted examination marks (DoE, 2003c). However, the question arises, how

much higher? In the case of the Eastern Cape the 40% of schools that submitted CASS marks of 20% and above the adjusted examination marks are immediately advantaging their learners compared to the 4% of schools that submitted CASS marks of more than 5% below the adjusted examination marks.

On the question of how much more than the examination mark should the CASS marks be, 3 of the 5 CASS experts agreed that it would be acceptable when the CASS marks are approximately 10% more than the examination mark. One (1) interviewed official was adamant that the CASS marks should be at least 20% more than the adjusted examination mark. The reason given by this individual is that the nature of the work undertaken for CASS differs considerably from the type of work set in an examination. He argued that CASS tasks demands more practical application and reasoning, that there are no serious time limits as experienced in examinations and that the learner is more relaxed. He added further, that CASS also comprises a number of class work, homework and practical work pieces and that learners generally score good marks in these components.

On the other hand, the official from Umalusi did not commit himself to a figure but indicated that the reasonable difference (tolerance factor) between the raw CASS mark and the examination mark needs to be investigated further. In this regard, Umalusi has planned to conduct research on the acceptable difference between the CASS marks and the examination marks by engaging in classroom observations and an analysis of the CASS tasks. The finer details of this project are not yet known.

For the 2003 Senior Certificate examination, the statistical adjustments for CASS were pegged at 10% more than the examination mark (DoE, 2003c). It is now three years since the start of the implementation of CASS and yet the education authorities are still resorting to statistical adjustments of CASS. This implies that it is acknowledged that the current CASS marks are not valid in all cases. The decision to adjust the CASS marks may be interpreted as educationally sound on the basis that the education authorities need to ensure that all learners are treated

in a fair manner. However, although the action to adjust the CASS marks may be interpreted as fair, it is nevertheless not a valid action.

According to 4 of the 5 experts on CASS “the statistical adjustment of marks is the only way to deal with inflated marks. They indicate that, “in order to set and keep good standards drastic measures have to be taken”.

However, one of the interviewees is of the opinion that the implementation of statistical moderation is unfair since educators have not been given proper guidance and clear policy on CASS implementation. He indicates that a large proportion of educators are not ready to implement CASS and that the standard of CASS has not been clearly spelt out and therefore there are problems with the CASS marks. The 4 interviewed officials added that it is good for educators to know that there is variation in the marks between CASS and the examination. They added further, “it is a good opportunity for educators to reflect. A lot of educators get defensive. The problem is that the CASS tasks are too simplistic, tests are short, little pieces of work are used for CASS and they are not Graded correctly. The work is not challenging enough. The result is that the standard of CASS is lower.” This results in the CASS marks being much higher which in turn undermines the validity of the CASS marks.

Four of the five - interviewed officials indicated that one of the responsibilities of Umalusi is to standardise the CASS marks. They indicated, “this is a reasonable step taken to ensure the validity and reliability of the CASS marks. This step will help educators to take CASS more seriously.”

Educators and learners need to know that the raw marks achieved by learners in a test, examination or for CASS are what they have actually earned and what is due to them. In the school context, learners are evaluated on an ongoing basis from Grade 0 to Grade 12. The raw marks that the learner scores in a test, examination or in oral and practical work are the mark that determines her/his achievements. If this is the case throughout a learner’s schooling career, why do the marks of learners in their final year of their schooling be subject to adjustments?

The adjustment of CASS marks is however an interim arrangement until all examining bodies are able to ensure that CASS is being conducted in a manner that will ensure the integrity and credibility of the Senior Certificate examination. It is crucial that assessment for such a high - stakes purpose as the Senior Certificate incorporate high degrees of validity and reliability. Reliability and validity can only be improved when educators understand what skills they are assessing and how they should assess them in order to recognize different levels of performance by candidates.

6.5 Conclusion

The following points are conclusively drawn from the evidence presented on each of the research questions. In terms of the first research question on the problems and challenges experienced by Grade 12 educators of Biology, Mathematics and Physical Science in the implementation of CASS, it is clear that the majority of the educators are experiencing problems that affect the practical implementation of CASS in the classroom. The main problems cited by educators include the lack of basic resources such as chemicals, apparatus and laboratories, learner support materials and the lack of libraries and computers. The lack of resources seem to be a problem in all areas, however, it is more serious in the rural areas.

Other problems of significance cited by educators from all areas are the increased workload of educators, the negative attitude of learners and the problem of large class sizes. On the other hand, a significant proportion of subject advisors from all areas were of the perception that the lack of commitment and skills of educators and the ever - changing and unclear national policies (guidelines) is a problem.

Evidence from the second research question, on the support of educators in the implementation of CASS, reveals that a larger proportion of educators from all areas are making use of only the national guideline document to implement CASS compared to a smaller proportion of their subject advisors. Conversely, a larger proportion of subject advisors from all areas and a smaller proportion of educators from all areas are making use of the provincial guidelines. The use of only the national CASS guidelines is a problem since it provides only a broad outline of the

Grade 12 CASS requirements, which provinces have used to produce more detailed guidelines.

The statistics on the training of educators reveal that the majority of educators from the rural and township schools received very little training to implement CASS. Further, it would seem that half of the educators from all areas received training within a day/or less than one day. A large proportion of educators from all areas received training once a year. It is obvious that the training of educators to implement CASS is insufficient to ensure the effective implementation of CASS.

Support from subject advisors also seems to be problematic in all three subjects, namely, Biology, Mathematics and Physical Science. The most popular kinds of support received by educators from their subject advisors included the convening of cluster and subject meetings, which seem to be more common in the urban areas than in the township and rural areas. On the other hand, the convening of workshops seems to occur more in the rural areas than in the township or urban areas. Other types of support reported by educators, although to a very limited extent include the provision of CASS exemplars, provision of workbooks and contact by telephone.

On the question of the extent to which the CASS marks are fair and valid, the majority of educators (73%) and the majority of subject advisors (81%) from all areas maintained that the CASS marks are fair and valid. However, the reasons provided by the educators and their subject advisors in support of the CASS marks being fair and valid lack meaning and authenticity.

The five experts on CASS claim that the validity of the CASS marks would for example depend on the educators level of competence, the nature, standard and quality of the CASS task, the assessment process and the accurate evaluation of the learner's work. Furthermore they have also reported that in certain cases educators are faking the CASS marks. This is even more serious than the lack of validity and meaningfulness of the CASS marks.

Although subject advisors are implementing cluster moderation to ensure the fairness and validity of the CASS marks, procedurally this is done incorrectly. The mere adjustment of marks within a 10% range of the previous three - year norms by subject advisors cannot be regarded as a sound measure of ensuring the validity and reliability of the Grade 12 CASS marks. For the 2002 Senior Certificate examinations, more than 60% of the examination centers across all provinces produced CASS marks that had to be statistically adjusted within a 5% range (5% higher) of the adjusted examination marks before they were accepted as part of the Senior Certificate results.

It is evident that there are inconsistencies in the implementation of CASS in all areas. This is not surprising given the fact that there is a lack of ongoing and sustained support, a lack of clear and coherent policy to regulate a common understanding of the implementation of CASS. This implies that there is a clear lack of common procedures/processes for the assessing of CASS tasks; a lack of understanding of how to implement CASS and the lack of uniformity in the development and the interpretation of the assessment evidence.

It can therefore be stated that there is no evidence that CASS marks are fair, valid and reliable. The validity of the CASS marks would depend on a large extent on the educators understanding of the CASS process, his knowledge and skills on how to implement CASS, the standard and quality of the CASS tasks, the accuracy of the assessment criteria/rubrics used by educators and the educators ability to make valid inferences of learner's work.

Since the design of this research did not allow for an in - depth investigation into the CASS process, a conclusive statement cannot be made on the fairness, validity and reliability of the CASS marks. One of the things that this research makes clear is that more research is needed on the fairness, validity and reliability of CASS.

CHAPTER 7

CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS

Overview of the Chapter

This chapter presents a summary of the main findings of the research. The summary is dealt with according to the three main research questions that emerged from the problem statement discussed in chapter 1. This is followed by a discussion on the lessons that can be learnt from the research design adopted in this study and lastly, the recommendations for further research, recommendations for educational policies relating to CASS and the recommendations for educational practice at district and school level.

It is important to reiterate that this study focuses mainly on Grade 12 educators of Biology, Mathematics and Physical Science who are the key respondents in this study and who comprise the sample of the target population. Since it is acknowledged that questionnaire data often result in socially desirable answers, it was necessary to triangulate the responses from the sample of 60 educators to another data source that would enhance the internal validity of the research. As subject advisors are linked to educators in terms of the professional support they are expected to provide, they were identified as the second data source.

To further enhance the internal validity of the data from the sample of educators (60) and subject advisors (21), a third data source was identified on the basis of their link to district offices. This involved the collection of data from a few (5) CASS experts involved in the management/monitoring and evaluation of CASS from national, provincial and district level and from Umalusi. The third data source through a different method (namely, semi-structured individual interviews) was perceived to provide a different perspective to the implementation of CASS (from a management point of view) that would add credibility to the results of the study.

The individual interviews also complement the small sample size used in the case of both educators and subject advisors. However, although the sample is not representative of the entire target population, it is nevertheless an acceptable sample size. Further, this study can be characterised as an exploratory one where the findings cannot be generalised to the entire target population.

7.1 Summary of Findings

The purpose of this section is to highlight the main findings of the research in relation to the problem statement, the rationale for the research as discussed in chapter 1, the literature review presented in Chapter 4 and the conceptual framework dealt with in Chapter 5.

As mentioned, the findings are presented according to the three main research questions, namely, (1) what are the problems and challenges experienced by Grade 12 Biology, Mathematics and Physical Science educators in the effective implementation of CASS; (2) what kinds of support are provided to educators to strengthen and to sustain the effective implementation of CASS; and (3) to what extent are the Grade 12 CASS marks fair, valid and reliable.

Research question 1

What are the problems and challenges experienced by Grade 12 Biology, Mathematics and Physical Science educators in the effective implementation of CASS?

In the problem statement discussed in Chapter 1, the central concern raised was that the implementation of CASS in South Africa proved to be problematic (DoE, 1999b; DoE, 2003c). Research studies conducted in the UK also shows that the implementation of OBA (CASS) even in well-developed countries is problematic (Towers, 1992; Guskey, 1994; Kendall, 1999; Combrinck, 2003). According to Towers (1992, p. 89) "some schools are well along the process, some are experimenting with it in selected classes, and others have barely begun the conversation".

Further, evidence also shows that, "the effectiveness of teaching and learning has been found to be related to certain minimum inputs such as textbooks and libraries" (DoE, 1999c, p. vi). This means that schools that are better resourced are better able to deliver more effective teaching and assessment activities than schools that lack resources. As indicated in the conceptual framework to this study, apart from the management and administrative role of school principals, it is essential that they provide ongoing support to their educators. Since the educator functions within the context of the school, the quality of education she/he delivers is largely influenced by the school environment, which includes the availability of resources. As head of the school, it is the role of the school principal to ensure that his educators have all the necessary material to deliver quality education.

As indicated in Chapter 5, the support of the subject advisor is crucial to the effective implementation of CASS. Subject advisors need to ensure that their educators have the necessary resources to implement CASS. The literature reviewed also shows that when districts don't work, teachers don't receive curriculum guidelines, textbooks and stationery (Bisseker, 2003, p. 26). This affects the delivery of quality education and in particular it would impact on the effective implementation of CASS.

The result of the first research question shows that the extent of the problems and challenges experienced by educators seem to vary from area to area. Before reporting on the actual problems, it is important to indicate that the majority of educators (80%) from rural, township and urban areas reported experiencing problems and challenges that impact on the effective implementation of CASS in their subjects.

This research shows that the main problems and challenges experienced by a significant proportion (47%) of educators across all areas is the lack of basic resources and equipment such as chemicals, apparatuses and laboratories for conducting practical work, the lack of teacher and learner support material (textbooks, mathematical instruments and calculators) libraries, computers, photocopiers, scanners, television and videos. Of particular interest, this research reveals that the problem of lack of resources is the biggest in the rural areas (75%) and the smallest in the urban - centre of city (14%).

If one applies the above findings to the findings reported by the Department of Education (2002a) where it was indicated that CASS implementation is especially problematic in poorly resourced schools, then it becomes clear that the majority of schools located in the rural areas would be affected. This also implies that the educators in these schools would apply and implement CASS differently compared to those educators in areas where the provision of resources are adequate. As indicated in Chapter 6, where schools experience the lack of resources to implement CASS, they have no alternative but to adjust their teaching and learning by omitting all practical work in subjects like Physical Science and Biology.

Undoubtedly, resources are essential to the effective functioning of any educational institution. If educators have not been supplied with the appropriate resources, the consequence is that effective teaching and learning is compromised. This is so, notwithstanding that educators may be suitably qualified and have the necessary expertise to implement CASS.

A matter for concern is that despite the Department of Education's promise to ensure equity of resources across schools, many schools located in the rural and township areas still remain under - resourced.

Other problems of significance cited by educators and subject advisors from all areas include an increased workload, a negative attitude among learners, large class sizes, lack of commitment and skills of educators and the ever-changing and unclear policies of the Department of Education.

The problem of increased workload was reported by a significant proportion of educators (20 out of 60 - 33%) and subject advisors (8 out of 21 - 38%). A review of literature also suggests that South African teachers spend more time on administrative tasks than teachers in other developing countries (Howie, 2001) and that a potential problem for the implementation of internal assessment at Grade 12 is that the amount of assessment in the form of written work and testing during the Grade 12 year becomes unreasonable (Oberholzer, 1998). The literature reviewed also shows that performance - based assessment would require a lot more time to administer and score (Guskey, 1994).

Whilst research suggests that OBE and OBA have increased the workload of educators, it also shows that educators have not been provided adequate support and training to deal with these challenges (Combrinck, 2003). Of greater concern are the research findings which illustrate that OBA imposes enormous demands on teachers to further individualise instruction, plan remediation and enrichment, administer diagnostic assessment, and keep extensive records (Towers, 1992).

The data in this study also suggests that the problem of increased workload is caused by the fact that educators have not had sufficient training on the implementation of CASS. Hence, educators are unable to properly organise and manage their teaching and learning according to the new approach to assessment.

The problem of the negative attitude among learners was reported by a significant proportion of educators (10 out of 60 - 17%) and subject advisors (3 out of 21 - 14%). Here too, the literature reviewed indicates that if learners are not positively disposed towards learning, little learning will actually occur despite the necessary learning skills that may have been mastered (Sadler, 2002).

The problem of large class sizes was reported by a few educators (2 out of 60 - 3%) and subject advisors (13 out of 60 - 62%) from all areas. This problem is linked to the problem of an increased workload. If classes are larger, it is expected that there will be more work for educators; however, the ability of the teacher to deal with larger class sizes is important. A review of literature indicates that large class sizes are making the implementation of CASS difficult especially with respect to individualising instructions to suit the diverse language needs of learners (Johnson, 1998).

The lack of commitment and skills of educators was reported by 5 out of 21 - 24% of the subject advisors and the problem of ever - changing and unclear policies of the Department of Education was reported by 4 out of 21 - 19% of the subject advisors from all areas. It is not surprising that none of the educators reported that they lack the commitment and skills to conduct CASS. In terms of the lack of commitment of educators, the conceptual framework adopted in this study emphasised the need for educators to show commitment to the implementation of CASS. Sadly, if the level of commitment and motivation is low, not much success will be achieved. The literature reviewed indicates that if teachers are to lead change, it is important that they commit themselves to the meaning that a particular innovation has for them and for their school (Brady, 1996).

Furthermore, the need for educators to have appropriate skills needed for the effective implementation of CASS was also highlighted at the input level of the conceptual framework. The lack of skills to implement CASS does have an adverse effect on its implementation.

The problem of ever - changing and unclear policies, although reported by a small proportion (19%) of subject advisors is a cause for concern. Literature shows that the lack of proper planning and the absence of clear curriculum and assessment policies can cause confusion amongst subject advisors and educators (Black & Wiliam, 1998). In South African, the absence of clear and coherent policy on CASS is causing a great deal of uncertainty and dissatisfaction amongst subject advisors and educators (Umalusi, 2002c).

In sum therefore, it can be argued that the problems and challenges mentioned above are serious enough to impact negatively on the effective implementation of CASS. The fundamental concern is that if assessment is not conducted appropriately and effectively due to, for example, the lack of resources or the problem of large class sizes, the marks allocated to learners for CASS in their Grade 12 year may not be fair, valid and reliable. This is especially true in the case where practical CASS tasks are replaced by theory due to the lack of chemicals and equipment to carry out practical work.

Research Question 2

What kinds of support are provided to educators to strengthen and to sustain the effective implementation of CASS?

This research question investigates three aspects relating to CASS implementation, the first aspect seeks to determine to what extent educators are familiar with the provincial/ or the national policy (guidelines) on CASS. The second aspects examines to what extent Grade 12 educators are trained to implement CASS effectively in Biology, Mathematics and Physical Science. The third aspect examines how educators are supported to enable them to implement CASS effectively. A summary of the findings on each of the three aspects is presented in the next section.

To what extent educators are familiar with the provincial/ or the national policy (guidelines) on CASS

The success of any project or business depends on how well it is run. However, if proper rules and procedures are not in place the project is doomed to be a failure. By a similar analogy, the success of CASS is largely dependent on how well the policy is written and understood by those who are implementing it. In the problem statement discussed in Chapter 1, it was indicated that the composition and quality of CASS varied from province to province and this was solely attributed to the lack of policy to regulate the implementation of CASS (Umalusi, 2002b). An investigation carried out by the Department of Education (1999a) showed that the implementation of CASS was problematic in three out of the nine provinces that were offering CASS at Grade 12 level (Chapter 4). Other literature reviewed in Chapter 4 highlighted the need for clear curriculum and assessment policies.

In Chapter 5 and 6 of this study, it was indicated that there are no national or provincial policies to regulate the implementation of CASS in Biology, Physical Science and Mathematics. However, national guidelines have been developed in these subjects since they are examined externally at national level**.** Provinces have however elaborated on the national guidelines in each subject to suit their own context. It is important to repeat that the subject guidelines developed by the National Department of Education and the provincial guidelines developed by provincial examining bodies are currently being interpreted as “policy”.

It has been established in this research that the national guideline document stipulates only the minimum CASS requirements and does not specify the number of CASS tasks and the mark allocation for each task. As is evident from the findings presented in Chapter 6, there are major variations in terms of mark allocations and CASS requirements between the national and provincial CASS guidelines in subjects like Mathematics and Physical Science. Therefore, the use of only the national CASS guideline without the

provincial CASS guideline will lead to inconsistencies in the implementation of CASS both within and across provinces. This is a cause for concern.

In this context, the result of the research shows that a larger proportion of educators (55%) and a smaller proportion of subject advisors (38%) from all areas are implementing the national CASS guideline document compared to a smaller proportion of educators (37%) and a larger proportion of subject advisors (52%) from all areas that are implementing the provincial CASS guideline document. An analysis in relation to the location of educators shows that the provincial guideline is being used by a greater number of educators in the rural (8 out of 12) and township schools (7 out of 12) than in the urban schools (7 out of 36). The scenario is clearly the opposite for the national guideline where the majority of the educators in the urban schools (25 out of 36 - 69%) seem to be using the national guideline rather than the provincial guideline.

The results of this research also show that 32% of educators from all areas are totally familiar with the provincial/or national guideline on CASS. It is of interest to note that, as much as 42% of the educators from the rural areas reported that they were familiar with the provincial/or national guideline on CASS. On the other hand, only 29% of subject advisors from both rural and mixed districts are of the opinion that their educators understood the CASS documents totally. The data on the familiarity of the CASS policy from educators and their subject advisors seem to be contradictory.

In sum, it can be stated that the use of only the national CASS guideline without the provincial CASS guideline will lead to inconsistencies in the standard and quality of CASS both across and within provinces. The fact that only 32% of educators from all areas are totally familiar with the CASS guidelines (both the national and the provincial) used by them indicates that the majority of educators that are not familiar with the CASS guidelines will experience problems in the implementation of CASS.

To what extent are Grade 12 educators trained to implement CASS effectively in Biology, Mathematics and Physical Science?

In the rationale to this study it was indicated that the nature of CASS demanded a dramatic shift from the assessment practices of the past and as such sufficient preparation had to be made to ensure that the CASS system and structures were in place to deal with this challenge. This also meant that educators should also have undergone proper training to familiarise themselves with this new approach to assessment. This would have improved their levels of competence and skills so that they would be able to effectively implement CASS with ease and confidence.

To assist educators in becoming competent, the conceptual framework used in this study stressed the need for high quality professional support from subject advisors as one of the key variables at the input level. As indicated in Chapter 2 and in Chapter 6 of this study, the role of district offices (subject advisors are located at district offices) are crucial to the improvement of the standard and quality of teaching and learning. The literature reviewed indicates that when districts don't work, teachers don't receive curriculum guidelines, textbooks and stationery and this is problematic for educators (Bisseker, 2003).

The literature review also argues that educators need sufficient time and professional training on how to adapt to this new form of assessment (Klenowski, 1999; Combrinck, 2003). It is expected that the more time and training provided to educators to clearly understand the basic concepts and terminology before commencing with the actual implementation of CASS would place educators in a better position to improve the quality of their interaction in the classroom (Black & Wiliam, 1998).

The research evidence in this study shows that the majority of educators (52%) from all areas state that they have not received sufficient training to ensure the effective implementation of CASS. This data is seemingly contrary to the data provided by subject advisors who reported that 52% of their

educators from all areas had received quite a lot of training. These findings illustrate the different perspectives of educators and subject advisors. However, it would seem that educators from the urban - suburbs have had more training than educators from the rural, township and urban - centre of city areas. Of particular interest, the majority of educators (58%) from the rural areas reported that they have had no training. In general, the provision of training is clearly insufficient across all areas and in all subjects namely, Biology, Mathematics and Physical Science. Further, most of the educators from the rural and township schools seemed to have received training in one day or less than a day. Only 17% of the educators from all areas reported that the training was of great assistance.

Clearly, the amount of training offered to educators in Biology, Mathematics and Physical Science is insufficient to guarantee that educators will be competent or sufficiently equipped to implement CASS effectively in their subjects. Certainly, a one - day training session, or a training session that lasts for less than a day, is inadequate to prepare educators for educational changes that impact on the validity and reliability of learner achievement at the end of Grade 12 level.

How are educators supported to enable them to implement CASS effectively

As mentioned in the summary to the previous question, support from subject advisors is a necessary element in the grooming of educators to effectively operationalise CASS. One of the findings of Umalusi (2001b) is that CASS in Physical Science is problematic in certain areas due to the unsuitability of educators who need extensive, ongoing and on site support and workshops to conduct CASS. Research evidence also indicates that there is still a large proportion of unqualified and under - qualified educators in the system, hence educators at all levels need sustained and systematic professional development especially as they begin to engage in the Curriculum 2005 process (DoE, 1999c).

Further, the literature reviewed shows that high quality professional support to educators is associated with trust and empowerment that lends itself to continuous quality improvement and professional development (Yung, 2002). According to Yung, the empowerment of teachers enables them to be regarded as professionals, exercising judgement and creativity.

Against the literature on the educators' need for high quality support, the results of this research question shows that only 27% of the Biology, Physical Science and Mathematics educators from all areas reported having received sufficient support from their subject advisors whilst a large proportion of educators (45%) reported to have received very little support to no support. In contrast to this data nearly half (48%) of subject advisors indicated that they had provided sufficient support to their educators.

Where support is provided, educators conceded to having received the following kind of support from their subject advisors; namely the attendance of cluster and subject meetings. This seems to be taking place more in the urban areas than in the rural and township areas. On the other hand, the attendance of workshops is more prominent in the rural areas than in any other areas. Other kinds of support received by educators include the provision of CASS exemplars, contact by telephone and the provision of workbooks by subject advisors.

Although the data in this research shows that there is some support from subject advisors, this is very limited and in some instances there is no support at all. In this regard, the official interviewed from Umalusi is of the opinion that subject advisors themselves are not totally competent in the understanding of CASS. He indicates that this is the very reason why some subject advisors are unable to detect that some educators are not competent to deal with CASS in an effective manner. This may be the reason for the discrepancy between the data from educators and the data from subject advisors.

It can therefore be stated that high quality professional support to educators of Biology, Mathematics and Physical Science in all areas is seriously lacking.

Regrettably, if educators are not fully supported through this new and complex process, it is expected that they will not have the expertise and professionalism to engage in the effective implementation of CASS.

Research Question 3

To what extent are the Grade 12 CASS marks fair, valid and reliable?

In terms of this research question, it is important to repeat that in the problem statement discussed in Chapter 1, it was mentioned that CASS has been introduced as an essential component of the final exit examination of the schooling phase (NQF level 4). Due to the importance of the Grade 12 examination and the fact that the fairness and appropriateness of examination results are always a matter of public concern (Riding & Butterfield, 1990), it is important that the CASS marks awarded to learners are fair, valid and reliable so that they can be legitimately included as part of the final achievement at the end of the schooling phase.

The literature reviewed in Chapter 4 suggests that when the assessment principles (meaning fairness, validity and reliability in the context of this study) are understood they provide a clear framework for all major decisions that teachers need to make on assessment. However, when they are misunderstood or ignored, the resulting assessment practices are likely to result in the generation of worthless data (Vandeyar & Killen, 2003).

Data from this research question shows that although the majority of educators (73%) and subject advisors (81%) indicated that the CASS marks in their subjects are both fair and valid, the reasons provided by them in support of their answers are not educationally sound. The superficial nature of their answers seem to suggest a lack of understanding amongst both educators and subject advisors on what constitutes a fair and valid mark. The different standards of CASS operational at schools and the lack of expertise and knowledge of educators in the area of compiling assessment criteria (SAFCERT, 2002a) also affect the reliability of the CASS marks.

It would seem that since educators and subject advisors are not totally familiar with what constitutes a fair, valid and reliable mark, not all CASS marks could be accepted as fair, valid and reliable. According to the CASS experts interviewed, the validity of the CASS marks would depend on the educators level of competence, the nature, standard and quality of the CASS task, the assessment process and the assessment criteria, the inferences made by the educator based on evidence of the learner's work and whether the CASS marks reflect the true abilities of the learner. Where educators are faking CASS marks and when marks are given to learners for practical work where no such practical work was conducted, the marks are definitely not fair, valid or reliable.

7.2 Discussion

This section examines the lessons that can be learnt from this research in terms of its methodology and the literature reviewed.

Methodological Reflection

This research is based predominately on the quantitative research design where use was made of surveys (written questionnaires) to collect data from a sample of educators and subject advisors. However, the use of the semi-structured interviews from the CASS experts required a qualitative analysis of data. Therefore, it can be indicated that this study is a mixture of both the quantitative and qualitative methods of data collection and analysis.

The surveys were administered to a sample of 60 Grade 12 educators and 21 subject advisors of Biology, Mathematics and Physical Science across six provinces, namely, Gauteng, Eastern Cape, Mpumalanga, KwaZulu - Natal, Northern Cape and Limpopo and across all areas, namely, rural, township, urban - suburbs and urban - centre of city. The methodological approach adopted in this study has had the following influence on the research results:

- firstly, the fact that a small but acceptable sample was used that is not representative of the entire target population, implies that the results

from this research cannot be generalised to the entire target population which would be all the Grade 12 educators teaching Biology, Mathematics and Physical Science. In the case of the subject advisors, the same principle would apply. Therefore the results from the study must be seen as exploratory;

- secondly, the use of surveys often leads to respondents giving answers that are socially desirable. Since written questionnaires were used to collect data from the sample of educators and subject advisors, the socially desirable answers may influence the internal validity of the data;

- thirdly, it would have been beneficial if data were also collected from Grade 12 learners of Biology, Mathematics, and Physical Science. Since CASS is characterised by transparency and openness, the additional data from learners would have added a different perspective to the implementation of CASS in the classroom. Since learners are directly involved in the practice of CASS, they are in the best position to evaluate the CASS processes that take place within the classroom. They are also in the best position to evaluate the work of the educator; and

- as indicated in Chapter 5, the role of school principals in the provision of professional support to educators is important, since without their support, the goals of teaching and learning cannot be fully achieved. The fact that no data was collected from school principals on the implementation of CASS has left a gap in this research. Nevertheless, since this study focuses on the educator, it was considered sufficient to collect data from the educators and their subject advisors for the purposes of this study.

However, in the context of this study it must be stated that the use of surveys to collect data from educators and subject advisors was the best option since this research was mainly interested in the collection of first hand information of a descriptive nature from educators and subject advisors. Furthermore, since questionnaires can be specially designed to focus on a particular area of study or topic, it was therefore considered appropriate to use surveys.

Also, the collection of data from a large number of participants, 60 in the case of the educators and 21 in the case of the subject advisors could best be accomplished through the use of written questionnaires. Any other method of data collection, for example, the use of telephonic interviews would have consumed a lot of time, energy and financial resources. Educators and subject advisors would also have been reluctant to participate in this study due to time constraints.

However, in order to enhance the internal validity of the research results, the responses of the educators were considered in relation to the data collected from subject advisors. The data from the two sources were compared and contrasted and triangulated with the data gathered through the individual interviews conducted with the group of CASS experts.

Substantive Reflection

Since CASS is a fairly new approach to assessment in South Africa, not much research has been conducted on the actual implementation of CASS at Grade 12 level. However, the literature used in this study is from studies conducted both nationally and internationally and are related to the implementation of OBA within OBE.

In the literature reviewed in Chapter 4, the results of research studies show that the implementation of OBA is generally problematic (Towers, 1992; Guskey, 1994). The results of this research, especially regarding the problems and challenges experienced by Grade 12 Biology, Mathematics and Physical Science educators in the effective implementation of CASS are closely related to the results of research studies conducted even in well - developed

countries. However, in addition to the problems and challenges noted in other research studies, this study has revealed new problems and challenges such as the lack of chemicals, apparatuses and laboratories needed for the conduct of science experiments, without which practical work in CASS cannot be done. Further, this research has shown that the ever - changing and unclear national policies are also a problem. However, a fundamental finding of this research is that although the majority of educators (78%) are experiencing problems and challenges in the implementation of CASS, the problems are most evident in the rural and township areas than in the suburban areas.

In terms of the second research question on the support of educators, the literature reviewed in Chapter 4 shows that support to educators is clearly insufficient to adequately prepare educators for a fundamental change such as the implementation of CASS. The results of this research also shows that support from subject advisors also seems to be insufficient in all three subjects, namely, Biology, Mathematics and Physical Science at Grade 12 level. For example, in a subject as important as Mathematics where the pass rate in South Africa is clearly unsatisfactory, as much as 10 out of 20 (50%) of educators reported that they had received no support or very little support to assist them with the practicalities of CASS. In general, it would seem that support is lacking in all three critical subjects.

Statistics on the training of educators reveal that the majority of educators from the rural and township schools received very little training to implement CASS. Further, it would seem that half of the educators from all areas received training within a day/ or less than one day. A large proportion of educators from all areas received training once a year. It is obvious that the training of educators to implement CASS is insufficient to ensure the effective implementation of CASS.

In terms of the third research question on the fairness, validity and reliability of the CASS marks, the literature reviewed in Chapter 4 showed that there are concerns by Higher Education Institutions on how students are evaluated and the reliability and validity of their results were doubted (Freeman & Lewis,

1998, p. 27). According to Freeman and Lewis, "the employer's assumption is that a university degree should prepare students for work, but their experience is that the courses do not in fact succeed in doing this". If this assumption is true, then the validity of the assessment is questionable. In a study conducted by Entwistle and Percy (cited in Freeman & Lewis, 1998, p. 27), lecturers agreed that one of the aims of higher education was to promote higher order intellectual activity and outcomes such as critical or creative thinking and conceptual understanding. However, on analysing the assessment given to students it was found that the assessment was merely requiring a detailed and accurate reproduction of course content. The gap between the stated aims and the actual performance required of learners in the assessment was therefore inconsistent. Hence the validity of the decisions made by the lecturer is considered invalid.

In the South African context, similar sentiments are expressed regarding the reliability and validity of the Grade 12 results since these results are used for selection into Higher Education (Jansen, 2003). The results on the fairness and validity of the CASS marks shows that the majority of educators (73%) and the majority of subject advisors (81%) from all areas maintained that the CASS marks are fair and valid. However, the reasons provided by the educators and their subject advisors in support of the statement that the CASS marks are fair and valid are not educationally sound.

It can therefore be stated that there is no evidence that the CASS marks are fair, valid and reliable. The validity of the CASS marks would depend to a large extent on the educators' understanding of the CASS process, their knowledge and skills on how to implement CASS, the standard and quality of the CASS tasks, the accuracy of the assessment criteria/rubrics used by educators and the educators' ability to make valid inferences of the learner's work.

Since the design of this research did not allow for an in - depth investigation into the CASS process, a conclusive statement cannot be made on the fairness, validity and reliability of the CASS marks. However, if the CASS

marks are not valid, they are therefore not dependable; hence they are not a reliable indicator of a learner's worth. This would apply to all learners in all Grades in the education system.

One of the things that this research makes clear is that more research is needed on the fairness, validity and reliability of CASS.

7.3 Recommendations

This section presents the recommendations of this research. The recommendations are dealt with under the following sub - headings; recommendations for educational policies and practice relating to CASS; recommendations for educational practice at district and school level; recommendations for further research, and recommendations for development work.

Recommendations for educational policies and practice relating to CASS

This research shows that the implementation of CASS is inconsistent across examining bodies. This is largely due to the fact that there is a lack of clear and coherent policy on CASS to regulate the conduct thereof in the various Grade 12 subjects. If government is serious about improving the quality of academic performance of learners, then policies need to be promulgated that would give direction and guidance to educators and learners on the effective implementation of CASS. This would also help to standardise assessment practices across the different examining bodies. The following recommendations are made in this regard:

- firstly, a national CASS policy should be developed and promulgated so that educators and other stakeholders know what is expected of them. The national policy would for example indicate the role of the educator in implementing CASS, the number of CASS components for each of the Grade 12 subjects and the composition of the CASS marks; and

- secondly, there should be a clear and coherent subject policy or subject manual that articulates the specific CASS requirements to be met in each of the Grade 12 subjects. The details of this would include for example:

  - the mark allocation for the different CASS components, namely, practical or orals, assessment of classroom - based work and controlled tests/examinations; and

  - a detailed breakdown of each assessment component, the skills to be assessed, the methodology to be used for the assessment and the criteria to be used to evaluate the task.

This document should be developed at national level, with the expertise drawn from other examining bodies and other key stakeholders. It is imperative that subject specialists are involved in the drafting of these documents since the nature and requirements of subjects are different. Each subject must have its own CASS policy document and provinces should not be allowed to deviate from the policy document. However, it would be essential to conduct high quality and continuous training with the educators (implementers) on the interpretation and common understanding of the policy documents. Ongoing support from subject advisors and school principals is a necessity.

- The third recommendation involves the establishment of moderation systems and structures at provincial and district level to ensure the fairness, reliability and validity of the CASS marks.

It has been established that the moderation of the CASS marks is not being addressed sufficiently by provincial education departments at present. Although it is claimed that moderation is being done in certain districts within certain provinces, the moderation process and procedures are inconsistent and flawed (DoE, 2002c). Whilst certain provincial education departments/districts are using their previous experience to 'moderate' the CASS marks, other provinces and districts are applying the norms of the

previous year's CASS marks to 'moderate' the CASS marks and there are yet other provincial education departments/districts that are using the marks achieved by learners in the preparatory examination to 'moderate' the final CASS marks. To avoid these inconsistencies, a standard policy of moderating CASS across all examining bodies should be promulgated.

- Fourthly, professionally qualified subject specialists with in - depth knowledge, skills and understanding of CASS should undertake moderation. Moderation practices should reflect on current teaching and assessment practices, the development of formative performance-based assessment tasks and scoring tools (criteria) with clear identification of 'anchors' for the scoring system.

Particular attention should be paid to the nature, quality and standard of the CASS tasks, the assessment criteria used; the educator's evaluation of the evidence of work submitted by the learner and the inferences made by educator in terms of the criteria used. Moderation should be undertaken at school level on an ongoing basis by the subject head and at district or regional level by the subject advisor. Moderation at district level should be done at least once a school term. This should be followed by some kind of moderation by national officials (subject specialists) at least once a year and verified by Umalusi.

Recommendations for educational practice at district and school level

- At district level, it is recommended that sufficient subject advisors be appointed to ensure that all schools within the district/region are visited and supported on a regular basis.

- Of particular importance is that all subject advisors should be professionally trained to deal with the implementation of CASS in their subject.

- Subject committee meetings and cluster meetings should be held on a more regular basis than indicated by the sample of educators.

- Subject advisors should conduct regular classroom visits. High quality classroom support is essential for subject advisors to know and understand what is happening in the classroom so that they may be able to conduct follow – up visits and provide additional support to educators when necessary.

- All practical and oral CASS marks must be face moderated. Subject advisors may undertake this task once during each school term. Of particular importance is that feedback should be given to educators on the fairness, validity and reliability of the CASS marks.

- Educators need to keep continuous and accurate records on the progress of each learner as well as the evidence of feedback given to learners with the aim of improving learner achievement. This record must be made available to the subject head, the subject advisor, parents and to the provincial and national officials.

- Through training and "hands on" practice in classroom assessment, educators will be better able to understand and promote learning, and increase their ability to help learners to become more effective, self assessing and self directed learners. The purpose of this exercise is to empower educators who then pass on the improved quality of teaching, learning and assessment to their learners with the ultimate aim of improving the quality of learning in the classroom. All educators should be part of a training programme that arms them with the necessary skills and competences in CASS so that they are able to implement CASS effectively.

Recommendations for further research

In terms of further study, it is recommended that this study be taken a step further by investigating the acceptable difference between the raw CASS marks and the adjusted examination marks of Grade 12 learners. At present the statistical adjustment to the CASS marks, although accepted in practice, is not a valid action.

Recommendations for further development work

It is recommended that an investigation into the fairness, validity and reliability of the Grade 12 CASS marks be conducted by analysing samples of teachers' and learners' CASS portfolios from different schools/socio - economic backgrounds/areas.

7.4 Conclusion

The main reason for embarking on this study was to identify the problems and challenges experienced by Grade 12 Biology, Mathematics and Physical Science educators in the effective implementation of CASS, determine the kinds of support provided to educators to strengthen and to sustain the effective implementation of CASS and to examine to what extent the Grade 12 CASS marks are fair, valid and reliable.

Having presented the research findings in Chapter 6, the results of the research suggest that although there is evidence that some measures are being taken by provincial education departments to implement CASS, the efforts are minimal. The lack of a clear and coherent policy further exacerbates the issue of ensuring consistency in CASS implementation across all provincial examining bodies. If South Africa is serious about raising the standard and quality of the Senior Certificate examination, and in particular improve the results in Mathematics and Sciences, then it ought to take drastic measures to improve the current assessment practices in the classroom.

According to Black and Wiliam (1998), there is a firm body of evidence, which indicates that the use of CASS in a formative manner could improve standards of learning. However, this fundamental educational change can only be achieved slowly through programmes of professional development that build on existing good practice (Black & Wiliam, 1998). The plea is that national policy will grasp this opportunity and give a lead in this direction.

REFERENCES

Anderson, G. (1990). *Fundamentals of Educational Research*. London: Falmer Press.

Angelo, T.A. (1995). *AAHE Assessment Forum. Definitions of Assessment*. Retrieved November 21, 2003 from http://www.aahe.org/assessment/assess fag.htm.

Angelo, T. A., & Cross, K.P. (1993). Classroom Assessment Techniques. *A Handbook for College Teachers*. San Francisco: Jossey-Bass Inc.

Baker, E.L. (1994). Making Performance Assessment Work: The Road Ahead. *Educational Leadership*, 53 (1), 58-62. Los Angeles.

Bell, J. (1987). *Doing your research project*. Milton Keynes: Open University Press.

Bisseker, C. (2003, September 12). Future Imperfect: Business is Paying a High Price for a Dysfunctional Schooling System. *Financial Mail*, pp. 18-23.

Black, P. J., & Wiliam, D. (1998). *Inside the Black Box: Raising Standards Through Formative Assessment*. London: King's College.

Blasé, J., & Blasé, J. R. (1994). *Empowering Teachers. What Successful Principals Do*. California: Corwin Press.

Brady, L. (1996). Incorporating Curriculum Outcomes into Teaching Practice: Learning from Literature. *Curriculum Perspectives*, 16 (3), 25-33.

Broadfoot, P. (1996). *Liberating the learner through assessment*. London: Routledge.

Broadfoot, P. (ed). (2002) *Assessment in Education: Principles, Policy and Practice,* 9 (1), 5-7. London: Carfax Publishing.

Carr, M. & Claxton, G. (2002). Learning Dispositions*. Assessment in Education: Principles, Policy and Practice,* 9 (1), 9-37. London: Carfax Publishing.

Chisholm, L. (1999). *International and Comparative Perspectives: Outcomes-based Education and the Senior Certificate Examination*. Pretoria: DoE.

Clarke, N. (1997). *Curriculum 2005*. Cape Town: Maskew Miller Longman.

Combrink, M. (2003). An International Comparative Perspective on Outcomes-Based Assessment: Implications for South Africa. *Perspectives in Education*. 21 (1) 51-65.

Government of South Africa (1996). *Constitution of the Republic of South Africa.* Government of South Africa.

Cowie, B. (1996). *Formative assessment and science classrooms*. *Teacher development: A model from science education.* London: Falmer Press.

Department of Communications. (2001). *Strategy for Information and Communication Technology in Education.* Pretoria: Department of Education.

Department of Education. (1995). White Paper on Education and Training. *Government Gazette*, 357 (16312). Pretoria: DoE.

Department of Education. (1998a). *Investigation into the Senior Certificate Examinations by the Ministerial Committee*. Pretoria: DoE.

Department of Education. (1998b). Green Paper on Education. Pretoria: DoE.

Department of Education. (1998c). *Draft Assessment Policy for Grades R to 9 and ABET*. Pretoria: DoE.

Department of Education. (1999a). *Report on a Consultancy Visit to South Africa to Assist the Ministry of Education with the Review of all Procedures Relating to the Conduct of the Senior Certificate Examination*. Pretoria: DoE.

Department of Education. (1999b). Media Release. *International Greenlight for Matric Exams*. Pretoria.

Department of Education. (1999c). *Quality Assurance Indicator Project Report*. Pretoria: DoE.

Department of Education. (2000a). *National Guideline for the Implementation of Continuous Assessment.* Pretoria: DoE.

Department of Education. (2000b). *Education Statistics in South Africa at a Glance in 2000*. Pretoria: DoE.

Department of Education. (2000c). *National Curriculum Framework for Further Education and Training*. Pretoria: DoE.

Department of Education. (2001a). *Report on the 2001 Senior Certificate Examination*. Cape Town: DoE.

Department of Education. (2001b). *Grade 12 examination: The Statistical Moderation Process of Year Marks Compiled by means of Continuous Assessment*. Pretoria: DoE.

Department of Education. (2001c). *Education in South Africa. Achievements since 1994*. Pretoria: DoE.

Department of Education. (2001d). *National Education Policy Act*. *Government Gazette*, 433 (22512). Pretoria: Government Printer.

Department of Education. (2001e). *News Bulletin*, 4, (6), 3-6. Cape Town: Government Printer.

Department of Education. (2001f). *National Strategy for Mathematics, Science and Technology Education in the General and Further Education and Training*. Pretoria: DoE.

Department of Education. (2001g). *A Résumé of Instructional Offerings for Schools*. Pretoria: DoE.

Department of Education. (2002a). *Trends in Senior Certificate Examination Enrollment*. An investigation by the Department of Education. Pretoria: DoE.

Department of Education. (2002b). Revised National Curriculum Statement Grades R-9 (Schools). *Government Gazette*, 443 (23406). Pretoria: Government Printer.

Department of Education. (2002c). *Report on the Investigation and Advice on a Single Examination and Assessment System for NQF Levels 1 to 4*. Pretoria: DoE.

Department of Education. (2002d). *Qualification and Assessment Policy Framework. Grades 10-12 (Schools)*. Pretoria: DoE.

Department of Education. (2002e). *National Qualifications Framework*. Report of the Review Committee. Pretoria: DoE.

Department of Education. (2002f). *Report on the 2002 Senior Certificate Results*. Cape Town: DoE.

Department of Education. (2003a). *Incremental Phasing-in Strategy for Outcomes Based Education in Further Education and Training*. Pretoria: DoE.

Department of Education. (2003b). *Education Statistics in South Africa at a Glance in 2001*. Pretoria: DoE.

Department of Education. (2003c). *Shortcomings in the CASS Statistical Moderation Formulae as used for the November 2002 examination*. Pretoria: DoE.

Department of Education and Labour. (2001). *Human Resource Development Strategy for S.A*. Pretoria: DoE.

Dore, R. (1976). *Education, Qualification and Development*. London.

Education Information Centre & Independent Examinations Board. (1996). *Understanding the NQF*. Johannesburg: EIC & IEB.

Edward, K. (2001). *Large Scale Assessment*. Sage Publications: USA.

Evans, S. S., William, H. E., & Mercer, C.D. (1986). *Assessment for Instruction*. Inc. Massachusetts: Allyn and Bacon.

Fataar, A. (1999). School Curriculum Policy and Politics in South Africa. Paper presented to the Annual Conference of the Comparative and International Education Society, Canada, April 1999. Canada.

Fischer, C.F.E. & King, R.M. (1995). *Authentic Assessment: A guide to implementation*. California: Corwin Press.

Freeman, R. & Lewis, R. (1998). *Planning and Implementing Assessment*. London: Kogan Page.

Frith, D. S. & Macintosh, H. G. (1990). *A Teacher's guide to Assessment*. U.K.: Stanley Thornes Publishers.

Fowler, F.C. (2000). *Policy Studies for Educational Leaders*. Columbus, Ohio: Prentice Hall.

Fullan, M.G. (1991). *The New Meaning of Educational Change.* New York: Teachers College Press.

Fullan, M. (1994). The Meaning of educational Change: A Quarter of a Century of Learning. *International handbook of educational Change*, 214-228.

Gay, L. R., & Airasian, P. (2001). *Educational Research. Competencies for Analysis and Applications*. Seventh Edition. Europe: Prentice Hall.

Gipps, C., & Murphy, P. (1994). *A Fair Test? Assessment, achievement and equity*. Great Britian: Buckingham.

Government of South Africa. (2002). *South Africa's National Research and Development Strategy*. Pretoria: Government of the Republic of South Africa.

Govender, P. (2003). A critique of the moderation system of Continuous Assessment in the Senior Certificate as implemented in the Gauteng Department of Education (South Africa). Paper presented at the Manchester Conference, October 2003. Manchester.

Greaney, V., & Kellaghan, T. (1996). *Monitoring the Learning Outcomes of Education Systems*. Washington D.C.: The World Bank.

Guba, E. G., & Lincoln, Y. S. (1989). *Fourth generation evaluation*. Newberry Park: Sage Publications.

Guskey, T.R. (1994). *What you Assess May Not Be What You Get*. Kentucky.

Howarth, R.B. (1999). *Interim Report After Visits to Five Provinces*. Cambridge International Examinations.

Howie, S.J. (2001). *Mathematics and Science Performance in Grade 8 in South Africa 1998/1999*. TIMSS-R. South Africa. Pretoria: Human Sciences Research Council.

Jansen, J. (1993). *Measuring the Monkeys: The limits of Assessment in the South African Context*. Durban.

Jansen, J. (2003, October 22). Matriek te maklik. Article retrieved October 23, from http://sabc. news. com. Newspaper Article, Beeld.

Jeevanantham, L.S. (1998) Curriculum Content: A quest for relevance. *Curriculum Studies*, 6 (2), 217-231.

Johnson, D. (1998). Teacher Assessments and Literacy Profiles of Primary School Children in South Africa. *Assessment in Education,* 5 (3), 381-412.

Jones, R.L.E., & Bray, E. (1986). *Guides to assessment in Education: Assessment from Principles to Action*. Hong Kong: MacMillan.

Kahn, M. (2000) *Towards a strategy for the development of Science, Mathematics and Technology Education*. Working document presented at a workshop for strategising Science Education Policy. Pretoria.

Kahn, M. , & Volmink, J. (1999). *Review of recent trends on teaching and learning in Mathematics and Science Education with implications for a South African Mathematics and Science Education strategy within the context of lifelong learning development*. Pretoria: DoE.

Kanjee, A., Paterson, A., Prinsloo, C., Khosa, G., Moore, A., Kivilu, M., & Pheiffer, C., (2001). *Improving Learning in South African Schools. The Quality Learning Project Baseline Evaluation*. Pretoria: HSRC.

Kendall, H.G. (1999). *Managing Educational Change*. Gwent: Pontypool College.

Kifer, E. (2001). *Large-Scale Assessment*. Calfornia: Corwin Press.

Killen, R. (1996). Outcomes-Based Education: Rethinking teaching. A paper presented at the University of South Africa. Pretoria, October, 1996.

Killen, R. (2003). Validity in outcomes-based assessment. *Perspectives in Education*, 21 (1).

Klenowski, V. (1999). Enriching Pre-Service Teacher Knowledge of Assessment. *Curriculum Perspectives*, 19, (1), 33-42.

Lewin, K.M. (1992). *Science education in developing countries*: *issues and perspectives for planners*. *International Institute for Educational Planning*. Paris: (UNESCO).

Lissitz, R.W., & Schafer, W.D. (2002). *Assessment in Educational Reform. Both Means and Ends*. London: Allyn and Bacon.

Maryland Assessment Consortium (1999). *Fact Sheet*. Retrieved August 7, 1999 from Maryland Assessment Consortium Web Site: http://elm.maine.edu).

Marzano, R.J. (1994). Lessons from the Field About Outcome-Based Performance Assessments. *Educational Leadership*. 51, (3), 44-50.

McMillan, J.H. (2001). *Essential Assessment Concepts for Teachers and Administrators*. USA: Sage Publications.

Huberman, M., & Miles (1984). *Innovation Up Close*. New York: Plenum.

North West Department of Education (2001). *Guideline for Continuous Assessment*. North West: North West Department of Education.

Norwich, B., & Kent, T. (2002). Assessing the Personal and Social Development of Pupils with Special Educational Needs: Wider lessons for all. *Assessment in Education: Principles, Policy and Practice*, 9 (1), 59-80. London: Carfax Publishing.

Oberholzer, A. (1998). *Research Project: School-Based Assessment 1998. Draft Document for Discussion*. *Unpublished article.* KwaZulu-Natal.

Oberholzer, A. (1999). *An overview of current assessment practice in provinces and the need for consistency. Unpublished article.* KwaZulu-Natal.

Pahad, M. (1997). Curriculum 2005. *Assessment and the national qualifications framework. A guide for teachers*. Sandton: Heinemann.

Pierce, L. (2003). Concerns of Apek members. Unpublished article. KwaZulu-Natal.

Riding, R.E., & Butterfield, S. (1990). *Assessment & Examination in the Secondary School*. London: Routledge.

Ross, J.A., Rolheiser, C., & Hogaboam-Gray, A. (2002). Influences on Student Cognitions About Evaluation. *Assessment in Education*: *Principles, Policy and Practice,* 9 (1), 81-95. London: Carfax Publishing.

Sadler, D.R. (2002). Learning Dispositions: can we really assess them? *Assessment in Education*, 9 (1): London: Carfax Publishing.

SADTU (1999). *Paper on Assessment*. Unpublished article. Pretoria: SADTU.

SAFCERT (2000). *External moderation System for School-based Assessment for the Senior Certificate.* Unpublished document. Pretoria: SAFCERT.

SAFCERT (2001). *Report on the Audit of the Systems and Processes of Examining Bodies to Implement School-Based Assessment (CASS*). Pretoria: SAFCERT.

SAFCERT (2002a). *IPEC Workshop. Annexure D: Report on SAFCERT'S Audit of the Systems and Processes of Examining Bodies to Implement School-Based Assessment (CASS*). Pretoria: SAFCERT.

SAFCERT (2002b). *Report to the Minister of Education, Professor Kader Asmal, MP, on the Quality Assurance of the 2002 Senior Certificate and ABET examination*. Pretoria: SAFCERT.

Siebörger, R. (1997). How the Outcomes came out. A personal account of and reflections on the initial process of development of Curriculum 2005. Paper presented at Kenton-at- the-Gap Conference, Hermanus, October-November 1997.

Sieborger, R., & Macintosh, H. (1998). *Transforming Assessment: A guide for South African Teachers*. Cape Town: Juta.

Spady, W. (1999). Recommendations Regarding Curriculum 2005. Memorandum to the Minister of Education, Professor Kader Asmal. Pretoria.

Steyn, P., & Wilkinson, A. (1998). *Understanding the Theoretical Assumptions of Outcomes-Based Education as a Condition for Meaningful Implementation*. South African Journal of Education, 18 (4), 203-208.

Stobart, G. (2003). The Validity of National Curriculum Assessment. *British Journal of Educational Studies*, 49 (1), 26-39.

Timmins, R. (2003). *Changing the Conditions for Success: the introduction of school-assessed coursework and student performance in the VCE*. Retrieved July 29, 2003 from Victorian Curriculum and Assessment Authority. Web Site: http://www.aare.edu.au/02pap/tim02529.htm.

Towers, J.M. (1992). Some concerns about Outcome-Based Education. *Journal of Research and Development in Education*, 25 (2), 89-95.

True, J. A. (1989). *Finding out*. *Conducting and evaluating social research*. California: Wadsworth, Inc.

Umalusi (2001a). *Cass verification report of Mathematics conducted in the Free State*. Pretoria: Umalusi.

Umalusi (2001b). *Cass verification report of Physical Science conducted in KwaZulu-Natal*. Pretoria: Umalusi.

Umalusi (2002a). *Report to the Minister of Education, Professor Kader Asmal, MP, on the Quality Assurance of the 2002 Senior Certificate and ABET*. Pretoria: Umalusi.

Umalusi (2002b). Quality Assuring the Senior Certificate and Level Four in Adult Basic Education and Training. *Report to the Minister of Education.* Pretoria: Umalusi.

Umalusi (2002c). *Report of the Verification of CASS moderation in the Eastern Cape for Mathematics Grade 12*. Pretoria: Umalusi.

Umalusi (2002d). *Report of the Verification of CASS moderation in KwaZulu-Natal for Physical Science Grade 12*. Pretoria: Umalusi.

Umalusi (2002e). *Manual for Moderators and verifiers of Site-Based and external Assessment in School Education*: Umalusi.

Van der Horst, H., & McDonald, R. (1997). Outcomes Based Education. *A Teacher's Manual*. Pretoria: Kasigo.

Vandeyar, S., & Killen, R. (2003). Has curriculum reform in South Africa really changed assessment practices, and what promise does the revised National Curriculum Statement hold? *Perspectives in Education*, 21 (1): 119 -133.

Welch, T. (1999). Evaluating the quality of assessment practices in teacher development programmes: lessons from the Educator Development and Support (EDS) Project 1999. *Open learning through distance education*, 12-15.

Wiersma, W. (1995). *Research Methods in Education: An introduction*. 6th Ed. Boston: Allyn and Bacon / Longman.

Wolf, A. (1995). *Competence-Based Assessment*. Philadelphia: Open University Press.

Yu, A. (1998) *Educational Assessment*. Retrieved March 29, 2003, from http:// seamonkey. Ed. Asu edu/ alex/teaching/assessment/structural. html.

Yung, B.H-W. (2002). Professional Consciousness in School-based Assessment. *Assessment in Education: Principles, Policy and Practice*, 9 (1), 97-116. London: Carfax Publishing.