CHAPTER FOUR

THE INSET OF MATHEMATICS EDUCATORS OF PRIMARY SCHOOLS IN KWAZULU-NATAL

4.1 INTRODUCTION

This chapter begins with a general overview of the INSET of educators in KZN and mathematics in the primary schools prior to 1994. This serves as a background to the INSET of educators with particular reference to mathematics in the primary school in KZN in the post 1994 period which constitutes the main thrust of this research. The reason for this chronological division is due largely to the researcher's view that with the shift in political power in 1994, came many changes in education and in order to place these changes into proper context, reference must be made to the past.

4.2 A GENERAL OVERVIEW OF THE INSET OF EDUCATORS IN KWAZULU-NATAL PRIOR TO 1994

In order to place the INSET of educators in KZN prior to 1994 into perspective, it is imperative to state that the education system which existed prior to 1994 in South Africa was organised on a differentiated racial basis resulting in separately administered education systems. Due to government policy, five separate Education Departments existed in KZN. These were, the KwaZulu Department of Education and Culture (KZDEC), the Department of Education and Training (DET), the Natal Education Department (NED), the Department of Education and Culture:House of Delegates (HOD) and the Department of Education and Culture:House of Representatives (HOR).

Reference will now be made to these Education Departments reflecting the INSET of educators among the different Departments. In this section the researcher referred primarily to the following sources, Mkhize (1989 : 38-66), Bagwandeen (1991 : 273-480), Hofmeyr (1991 : 299-307) and Pather (1995 : 245-326). The aforementioned sources provide detailed studies of INSET for educators in the period prior to 1994.

4.2.1 INSET IN THE KWAZULU DEPARTMENT OF EDUCATION AND CULTURE (KZDEC)

The KZDEC was established in 1972. Preceding this period Black education was controlled by the Department of Bantu Education. The education of Blacks was shared between the KZDEC and DET in KZN.

With regard to formal INSET in the KZDEC, Bagwandeen (1991:301) refers to Dhlomo (1979:182) who indicated that while everything possible was done in KZN to afford Black educators the opportunities for INSET, not all of them were able to attend such courses. It was against this background that all teacher education institutions that existed under the control of the KZDEC were to be equipped with INSET facilities thus playing a dual role as PRESET and INSET centres.

Subsequently, the KZDEC established the Umlazi In-Service Training Centre. Mkhize (1989:61) outlines the following main objectives of the in-service courses at the centre:

- to upgrade educators' skills and techniques;
- to increase the educators' knowledge content-wise in subjects of their speciality;
- to train leaders of the circuit, so that they could in turn train educators in the circuit;
- and, to invite organisations to run courses on critical subjects such as mathematics, physical science and biology.

Follow-up in some circuits were conducted to ascertain how educators who have attended INSET courses conducted the courses in the circuit. However, due to various problems the centre was subsequently closed.

The Umlazi College for Further Education was established in 1983 (Mkhize, 1989:60). The college provided upgrading courses for educators through correspondence, organised outreach programmes and provided ongoing seminars and workshops throughout the year (Bagwandeen, 1991:322).

With regard to non-formal INSET, subject committees were established by the Department to promote INSET. Furthermore, a Departmental Projects Forum to coordinate Non-Governmental Organisation (NGO) activities was established in 1990. The Department also published a bi-monthly journal entitled "Fundisa" which was circulated to all schools. In the main, the journal concentrated on education news, informing the educators and the public on developments in the KZDEC. Educators were also requested to submit constructive criticisms which could lead to enhancing the professional growth of educators.

In addition to departmental INSET, the Black teacher organisations also provided INSET through conferences, seminars and subject interest groups. Black educators could also study either as part-time or full-time students at various universities.

4.2.2 INSET IN THE DEPARTMENT OF EDUCATION AND TRAINING (DET)

In terms of formal INSET, Superintendents of Education attached to regional offices visited schools and conducted INSET courses for educators at regional and circuit level (Bagwandeen, 1991:311). Hofmeyr (1991:301-304) highlighted the following initiatives mounted by the DET to upgrade educators' qualifications:

- the establishment of 51 adult education centres where educators were offered instruction to help them obtain a standard ten certificate;
- further training courses, part-time or full-time for diplomas or degrees at Colleges of Education and Universities;
- the use of modern technologies such as micro-teaching, interactive video and modular, competency based approaches.

Hofmeyr (1991:302-303) also indicated the following that was provided by the DET with regard to improving teaching competency:

- subject-direct INSET courses of one to three weeks a year at the College for Continuing Training at Soshanguve;
- "Project Alpha" which assisted educators in specific subjects;

- teachers' centres where educators voluntarily received instruction and encouragement from colleagues;
- subject-related INSET courses provided by Subject Advisors in the regions.

With regard to non-formal INSET, the DET supported various NGO INSET programmes. The "Educamus" was published ten times a year containing articles on methodology and general professional matters such as conditions of service or departmental policy on education.

As was mentioned previously, the Black teacher organisations also provided INSET programmes in addition to departmental INSET. Black educators of the DET could also study either as full-time or part-time students at various universities.

4.2.3 INSET IN THE NATAL EDUCATION DEPARTMENT (NED)

Emphasis on INSET in white education dated back to the 1970s. The first College of Education for Further Training was established in Pretoria and teachers' centres were started (Hofmeyr, 1991:298).

In terms of formal INSET, curriculum-related INSET was generally provided to upgrade subject knowledge, teaching and didactic skills. Bagwandeen (1991:286) describes the activities organised by the NED as ranging from one-day orientation courses, *ad hoc* seminars, one-day regional seminars to major courses of three to five days duration. INSET was provided through a period of induction for the new educators and general education orientation for other experienced educators provided by management or other members of staff in the school. Superintendents of Education also visited schools and provided INSET regarding content, method, departmental examination requirements and so on (Bagwandeen, 1991:287).

With regard to non-formal INSET subject committees played a vital role. In addition to a range of functions relating to the development of the subject, subject committee members also promoted education development through INSET. In doing so, a

committee functioned as an agent of change and renewal, ensuring that educators kept abreast of new developments in order to improve their competencies (Pather, 1995:291). There were no special publications to promote INSET, however, depending on the type of INSET, bulletins and guides were published. General articles on education were published in the "Neon" (Pather, 1995:301).

In addition to departmental INSET, various teacher organisations and their respective subject societies or associations as well as institutions of higher learning provided INSET. Educators could also elect to pursue studies for higher degrees or advanced diplomas either as full-time or part-time students at various universities.

4.2.4 INSET IN THE DEPARTMENT OF EDUCATION AND CULTURE:HOUSE OF REPRESENTATIVES (HOR)

The main priority in INSET in this Department was the upgrading of educators' qualifications. Other priorities were specialised to improving competencies and skills in specific areas.

In terms of formal INSET, Superintendents served as primary INSET agents. They visited schools and provided assistance where required. Activities were mainly curriculum-related and courses varied in length and duration.

Subject Advisors offered INSET courses as the need arose on a one- to-one basis or by withdrawing educators from a cluster of schools. Individual attention was given to educators after an evaluation visit. If a number of educators was visited, the Subject Advisors drew up a list of common problems and met all the educators concerned (Pather, 1995:319). Regional INSET courses were held when there were changes in the curriculum.

In terms of non-formal INSET, Pather (1995:318) comments that no departmental subject committees were established. There were neither any special publications to promote INSET.

In addition to departmental INSET, the organised teaching profession and institutions of higher learning provided INSET for Coloured educators. Upgrading of educators' qualifications were undertaken through part-time correspondence study or full-time study at various universities.

4.2.5 INSET IN THE DEPARTMENT OF EDUCATION AND CULTURE:HOUSE OF DELEGATES (HOD)

In terms of formal INSET, Bagwandeen (1991:480) mentions that the primary objective of INSET for Indian educators was to improve professional qualifications through the provision of full-time study and part-time correspondence courses. Bagwandeen (1991:426-480) provided an in-depth study with regard to the upgrading programmes provided by this Department.

Superintendents were responsible for organising refresher, extension and conversion courses. These courses were intended to provide educators with the opportunity of becoming acquainted with the most recent developments in their subjects and changes to the syllabi. The courses were designed with a view to solving problems relating to a school or groups of schools as well as updating educators in their specialised discipline. Bagwandeen (1991:467) describes these courses as being orientated towards the professional growth of educators.

Bagwandeen (1991:469) echoes the sentiment that a significant departmental initiative with regard to INSET was the establishment of councils, societies, committees and associations on a regional basis. Such organisations were created through the co-operation between Superintendents of Education and the educators. Classroom-based problems were solved at grassroot-levels through these organisations. Educators were also responsible for various publications relating to their subject.

With regard to non-formal INSET, Pather (1995:306) claims that the Teachers' Centres Working Document entrenched the policy. Pather (1995:306) states further that the six centres which were situated in Chatsworth, Durban Central, Phoenix, Tongaat, Stanger and Pietermaritzburg responded to and satisfied the professional needs of the educators and gave expression to the belief that

teacher education was not a terminal process but a continuum of pre-service and in-service training. Bagwandeen (1991:471) reiterates that the plenitude of newsletters, publications and reports from the various centres underscored the phenomenal contribution made by these centres in the field of INSET. Allied to these publications was the "Education Bulletin", an official departmental publication which fulfilled the intended purpose of enhancing INSET.

In addition to departmental INSET, the organised teaching profession also provided INSET for the educators. Bagwandeen (1991:473) mentions that the Association's annual conferences, publications and establishment of subject societies were cardinal vehicles for INSET from a non-departmental perspective. Educators could also study either as part-time or full-time students at various universities.

4.2.6 SUMMATION

An overview reflecting the INSET of educators among the different Education Departments clearly indicates that all the Departments employed strategies to improve the professional competence and academic qualifications of the educators in their employ. This served as an attempt to improve the quality of education imparted in schools. However, it could be argued that improvement in academic qualification need not necessarily lead to better teaching. On completion of an academic degree or courses, educators were regraded and were remunerated accordingly. This could have served as an incentive to most educators upgrading themselves academically. Nevertheless, it must be stated that prior to 1994, the Education Departments offered INSET and central to this provision of INSET was the consensus that INSET is vitally important and pivotal to the concept of life-long education of educators, the enhancement of professional competence, the improvement of the repertoire of classroom skills, personal development, the development of a positive attitude to change and the fostering of a culture of learning (Pather, 1995:428).

At this point it is also important to state that due to the limited funds that the South African Government allocated for general educational needs, some responsibility for INSET had shifted to

Non-Governmental Organisations (NGOs). This leads to the next sub-section which will briefly outline the contributions of some of the NGOs prior to 1994.

4.3 THE CONTRIBUTIONS OF NON-GOVERNMENTAL ORGANISATIONS (NGOs) TOWARDS INSET PRIOR TO 1994 IN KWAZULU-NATAL

A vast number of NGOs made crucial contributions to INSET. Bagwandeen (1991:330) refers to a host of researchers who have made comprehensive surveys of the activities of NGOs in South Africa. Pather (1995:178-200) refers to NGO projects that were active in promoting INSET in KZN. Due to this vast array of information, the researcher for the purpose of this research, chose to outline the contributions of the following NGOs pertaining particularly to mathematics teaching in the primary schools in KZN.

- The Toyota Teach Primary Schools Project was launched in 1992 and coordinates the INSET programmes of several NGOs. The target groups are educators in the Durban South area. Attention is given to the cognitive development and the improving of the teaching of mathematics, science and English in the primary school. The contributions of this NGO will be discussed more extensively in the latter part of this chapter.

- Teacher Opportunity Programmes (TOPS) provided mathematics, science and English INSET programmes for primary school educators. These programmes were aimed at developing numeracy, literacy and basic technical skills in primary schools. In addition, educators received tuition to complete the requirements for the Senior Certificate. The emphasis of the programmes was on the methodology and the production of curriculum materials relevant to Black schools. These programmes, however, have ceased to exist.

- The Research and Development in Mathematics, Science and Technology (RADMASTE) project, which was attached to the University of Witwatersrand, promoted science and mathematics through research, INSET development of

resources and educator guides. This project does not exist at present.

- The Shell Science and Mathematics Resource Centre Educational Trust was formed in 1985 and was also referred to as the Centre for the Advancement of Science and Mathematics Education (CASME). It was based at the University of Natal in Durban. One of the fostering activities of CASME was to provide in-service training programmes for mathematics educators. Botha (1989:45) mentions that although the course was designed to answer the needs of secondary school educators, INSET services have also been provided for mathematics educators in primary schools. Programmes focused on problems of teaching, including methods of teaching, curriculum construction, selection of textbooks, corrective teaching, the psychology of learning mathematics and science and methods of assessing learners' progress (Botha, 1989:45). These programmes do not exist at present.

Pather (1995:181) refers to Bot's (1986) research which claimed that NGO INSET programmes have been found to be more innovative and successful than those offered by Education Departments. One of the reasons given for the success is that educators were involved in the planning and design of the courses.

Having considered the INSET of educators in the different Education Departments and the contributions of NGOs in KZN prior to 1994, the researcher will now give consideration to mathematics in the primary school prior to 1994. This will place the sub-sections to follow into perspective.

4.4 MATHEMATICS IN THE PRIMARY SCHOOL PRIOR TO 1994

The Third International Maths and Science Study (1996), coordinated in South Africa by the Human Sciences Research Council reveals the legacy of mathematics and science in the primary school. Forty -five countries were involved in the research project. South African learners scored the lowest of all the participating countries in both the subjects. South Africa's scores were based on a racially and geographically representative sample

of 5 301 standard five (grade seven) and 4 491 standard six (grade eight) learners who took the tests at 114 and 137 schools respectively. In the mathematics component the South African learner managed to answer only 24% correctly, as opposed to the world average of 55% (Arnott *et al.* 1997:7).

The researcher being a mathematics educator in the primary school for the past 16 years attributed these results to a combination of poor teaching and outdated mathematics curricula. The most serious charge that could have been laid at the door of Fundamental Pedagogics which dominated apartheid education was that it discouraged the following qualities regarded as essential for sustainable development:

- risk taking;
- a sense of adventure;
- curiosity;
- a critical and questioning attitude;
- self motivation and reflection;
- inventiveness and independence of mind; and,
- creativity and innovation.

Instead the mathematics curriculum handed down to educators for implementation was experienced as very prescriptive, content-heavy, detailed and authoritarian with little space for education initiative. Educators concentrated on completing every section in the mathematics syllabus and consequently were unable to build up affective and cognitive structures of understanding mathematics. In practice the mathematics teaching and learning process was characterised by learner passivity, rote learning, content-orientation, rigidity of syllabus and chalk and talk presentations. Christie (1997:112) aptly characterised the teaching and learning as:

> ***'.... relatively low participation, high selection system of comparatively poor quality for the majority of the learners.'***

The mathematics curricula had little relevance to the lives and aspirations of learners. Moreover, it accounted for a pervasive lack of critical and creative thinking.

Interactive mediated learning and teaching styles needed to be developed as such approaches are particularly important for the teaching of mathematics where curiosity and intellectual risk taking are essential. More than that, learner centred mediated and interactive strategies are vital to the demystification of mathematics which have developed an aura of unintelligibility and remoteness from the daily lives of the learners.

It can be assumed that against this background there would be a strong desire to create a new school mathematics experience which includes rather than excludes, is relevant and connected to the everyday lives of learners and has the potential to empower learners mathematically. This leads the researcher to the next sub-section on the changes in mathematics in the post 1994 period.

4.5 MATHEMATICS IN THE PRIMARY SCHOOL IN THE POST 1994 PERIOD

In 1997, the National Department of Education marked the break from the apartheid curriculum with the announcement of a new ambitious curriculum that signalled the comprehensive curriculum change in post apartheid South Africa. Curriculum 2005 (C2005), so called because it was envisaged that it would be completely implemented and practised by all compulsory school grades by the year 2005. C2005 was built around the philosophical principles of Outcomes Based Education. This new emphasis on outcomes instead of input, on learner centredness instead of educator centredness and on activity learning instead of passive learning, signalled a revolutionary new way of teaching and learning in South Africa.

4.5.1 CURRICULUM 2005's KEY CHANGES AND ITS IMPACT ON MATHEMATICS IN THE PRIMARY SCHOOL

C2005 was marketed as the major policy that would foster the integration of education and training, promote human resource

development and refocus from 'education for compliance' to 'education for democratic participation' (Osman and Kirk, 2001:175). In breaking from the apartheid curriculum, C2005's key changes were:

- New educators' beliefs and teaching approach: New pedagogical assumptions were advocated, such as, that all learners can succeed at a pace allowed by the individual and that learning takes place best during discovery and learner activity (Spady and Schlebusch, 1999:29). For the mathematics educator teaching would be more learner centred, activity based and flexible. This implies that educators would have a more facilitative role and that they would make use of a variety of teaching and assessment strategies. Furthermore, the mathematics teaching and learning processes would be designed from ambitious generic outcomes which would focus on learners being able to demonstrate proficiency in particular, pre-determined knowledge, skills and values. Overarching all mathematics teaching would be the development of critical outcomes such as critical and creative thinking, teamwork and efficient organisational skills.

- New organisational structures: The syllabi has been replaced by the Policy Document. The Policy Document is phase specific and not grade specific and although it replaces the syllabi, it is not content-based, that is, content is no longer prescribed for the educator. The Policy Document thus serves as a guide for mathematics teaching.

The traditional discipline orientated subjects were to be phased out to make way for eight learning areas as indicated in table 4.1 on page 109. The learning area pertaining to mathematics was initially called numeracy and mathematics. After many hours of deliberations the Learning Area Committees (LACs) changed this to mathematical literacy, mathematics and mathematical sciences. Brodie (1997:3) outlines the following reasons for the change:

- numeracy is too narrow to capture the variety of skills that a mathematically literate person needs;

- mathematics as a term on its own is too narrow to capture all the aims of teaching mathematics in a school;
- as mathematics educators we should be aiming to equip learners with mathematical skills that they might need to function effectively in the world (mathematical literacy); and,
- as mathematics educators we should also be providing foundations for further study in mathematics and related areas, particularly the mathematical sciences.

Table 4.1 THE EIGHT LEARNING AREAS

LEARNING AREA	CONTENT
Languages, Literacy and Communication	Literacy, South African Official Languages, Classical Languages, Modern Languages
Mathematical Literacy, Mathematics and Mathematical Sciences	Numeracy, Mathematics and Statistics
Natural Sciences	Integrated Studies, Biological Sciences, Physical Sciences, Agricultural Sciences, Engineering
Technology	Technology Education, Information Technology, Technical Education, Applied Arts and Sciences
Arts and Culture	Visual, Expressive and Performing Arts, Music Education, Movement, Oracy Studies
Human and Social Sciences	Geography, History, Democracy Education Development Studies, World Ethics and Belief Systems, Utility and Social Services
Life Orientation	Health Education, Career Guidance, Life-Long Learning Skills, Inter and Intra-personal Development, Religious Studies, Physical Education
Economic and Management Sciences	Economic Education, Financial Management, Business Education including Entrepreneurship, Public Management

Source: Handout in workshop (2001)

The terms, aims and objectives, have been replaced by critical outcomes and specific outcomes. The critical outcomes are defined as: cross-curricular, broad, generic outcomes that inform all teaching and learning. Their purpose is to lead to the development of conceptual skills and understanding that transcend the specific, gradually developing the learner's capacity to transfer learning from one context to another (Brodie, 1997:30).
Brodie (1997:30-31) maintains that all teaching and learning in schools should ultimately aim towards the following critical outcomes. A learner should be able to:

- Identify and solve problems, which display that responsible decisions, using critical and creative thinking have been made.
- Work effectively with others as a member of a team, group, organisation or community.
- Organise and manage oneself and one's activities responsibly and effectively.
- Collect, analyse, organise and critically evaluate information.
- Communicate effectively using visual, mathematical and a language skill in the modes of oral or written presentation.
- Use science and technology effectively and critically show responsibility towards the environment and health of others.
- Demonstrate an understanding of work as a set of related systems by recognising that problem solving contexts do not exist in isolation.

Part of the LACs task was also to develop specific outcomes that reflect and give meaning to the aforementioned critical outcomes. Specific outcomes are termed specific because they are derived from and specified for particular learning areas. Specific outcomes define the skills, abilities, competencies and values, which are to be developed through various learning programmes at schools.

Van Der Horst and McDonald (1997:57) outline the following specific outcomes of the mathematical literacy, mathematics and mathematical sciences learning area. Learners should be able to:

- demonstrate understanding about ways of working with mathematics;

- manipulate number patterns in different ways;
- demonstrate understanding of the historical development of mathematics in various social and cultural contexts;
- critically analyse how mathematical relationships are used in social, political and economic relations;
- measure with competence and confidence in a variety of contexts;
- use data from various contexts to make informed judgements;
- describe and represent experiences with shape, space, time and motion, using all available senses;
- analyse natural forms, cultural products and processes as representations of shape, space and time;
- use mathematical ideas, concepts, generalisations and thought processes; and,
- use various logical processes to formulate, test and justify conjectures.

The promises and possibilities with which C2005 was introduced, brought excitement and hope for a better teaching and learning future. However, the researcher, being a practising educator witnessed the frustration and confusion colleagues suffered at the hands of C2005 due to the following factors:

- short linear and rigid cascade training provided by the Department of Education;
- the complexity of the curriculum design;
- the arcane language of C2005; and,
- the tightness of the implementation schedule of C2005.

The aforementioned factors provide strong evidence that curriculum change is indeed complex and while educators play a critical role in curriculum change it is of paramount importance that attention is paid to whether and how educators make sense of and practise the curricular changes in the classroom. This leads to the argument that when educators are required to change their curriculum practises, INSET must be seen as the vehicle through which these changes can be implemented. Consideration will now be given to the needs and requirements for the successful implementation of INSET in South Africa.

4.6 THE NEEDS AND REQUIREMENTS FOR INSET IMPLEMENTATION IN SOUTH AFRICA

Hofmeyr (1994:35) is of the firm belief that teacher development is one of the most vital components of education reconstruction because educators are the most critical and expensive education resource. Hofmeyr (1994:35) further believes that South Africa's biggest challenge in teacher development lies in the area of INSET and considers the following INSET needs:

- reorientation of all educators to new goals and values;
- preparing educators to cope with curriculum change;
- upgrading of unqualified or under-qualified educators;
- management training for senior staff at schools;
- language development of educators;
- retraining in scarce or new subjects;
- training in new teaching and learning methods.

The challenges of providing for all these varied needs is enormous when one takes into account the qualitative challenge of providing effective INSET that results in improved teaching and learning in the classroom. According to Hofmeyr (1994:37) the successful

implementation of INSET in South Africa will require the following to be in place:

- A national policy framework that links PRESET and INSET in a continuum of teacher development.
- A separate long-term budget must be allocated for INSET. This will finance the national priorities, provide grants for school focused INSET on a compensatory basis and allow for state contracts with NGOs and private agencies for INSET services.
- Available INSET agencies will have to be utilized to deliver INSET on the scale required; the public sector and NGOs will have to be involved.

Hofmeyr (1994:37) states that the approach will have to be eclectic: school focused wherever possible, but in conjunction with courses and district-level workshops. Both distance and contact education will have to be used to reach the educators involved. Radio and television programmes, workbooks, peer learning groups, visits by INSET Advisors and mentor educators in the school can be used to very good effect. Furthermore, a phase stepwise implementation would ensure successful INSET provision (Hofmeyr, 1994:38).

Having considered Hofmeyr's needs and requirements for the successful implementation of INSET in South Africa, consideration will now be given to the INSET of primary school educators with particular reference to mathematics teaching in the Department of Education and Culture:KZN.

4.7 THE INSET OF PRIMARY SCHOOL MATHEMATICS EDUCATORS IN THE DEPARTMENT OF EDUCATION AND CULTURE:KWAZULU-NATAL

In order to place this aspect into perspective it is imperative to state that with the demise of apartheid in 1994, the five separately administered Education Departments in KZN discussed in the beginning of this chapter amalgamated to form a single department now referred to as the Department of Education and Culture:KZN

(KZNDEC). To glean information with respect to the nature of INSET provided by the Department, the researcher contacted P.Mfeka, the Subject Advisor of mathematics in the primary schools.

4.7.1 FORMAL INSET

According to Mfeka (2002) the absence of a national or provincial INSET policy or clearly articulated and documented published objectives results in INSET provision being directed and guided by the Subject Advisor's job-description. They are expected to maintain regular contact and develop a policy document. Mfeka (2002) is of the firm belief that the following major factors influence the effective provision of INSET in the KZNDEC:

- Lack of funding by the government of the day for education. Adequate funding would enable a planned sequence of INSET programmes or courses for senior primary mathematics educators.

- Lack of human resource. Mfeka (2002) stressed that greater emphasis is placed on secondary school mathematics due to the exit level of learners. The neglect of primary school mathematics is clearly evident in the unequal distribution of human resources in terms of Subject Advisors of mathematics at provincial level. Table 4.2 on page 115 reflects the appointment of Subject Advisors of mathematics in KZN.

Table 4.2 Appointment of Subject Advisors of Mathematics in KZN

REGION	SUBJECT ADVISORS	
	SECONDARY SCHOOLS	PRIMARY SCHOOLS
North Region	4	1
South Region	5	0
Port Shepstone	1	0
Pietermaritzburg	3	1
Ladysmith	4	1
Vryheid	0	0
Ulundi	2	0
Empangeni	4	0
TOTAL	**23**	**3**

Source: Mfeka (2002)

Mfeka (2002) claims that the unequal distribution of Subject Advisors affects the effective provision of INSET of senior primary mathematics educators. Mfeka (2002) believes that in developing an infrastructure for INSET, the KZNDEC should make provision for the utilization of educators, college and university lecturers and other educationists as consultants. Educators would benefit from the varied experience of experts in the mathematics field.

In introducing curricular changes, the KZNDEC uses the Cascade Model of training. This involves training national facilitators, who train provincial facilitators, who train district facilitators, who in turn train educators. The training programmes consist of short courses to minimize the disruption of the culture of teaching and learning at schools.

4.7.2 NON-FORMAL INSET

With regard to non-formal INSET a major breakthrough is the formation of District and Circuit Support Structures which is referred to in KZN Circular 92 of 2001 (Mfeka:2002). The core function of these structures is to develop learning programmes, which are central to the successful implementation of C2005. In

addition, educators in the mathematical literacy, mathematics and mathematics sciences have the opportunity of networking and interacting with each other to discuss matters of common interest in respect of their learning area. Teachers' centres also provide adequate resource centres for educators. In addition, the KZNDEC supports the initiatives of the Maths Centre for Primary Teachers (MCPT) and the Toyota Teach Primary Schools Project with respect to the INSET of mathematics educators in the primary schools in KZN.

4.7.3 NON-DEPARTMENTAL INSET

In addition to departmental INSET, the teacher organisations also provide INSET through workshops, seminars, conferences and publications. Educators could also study either as full-time or part-time students at various universities. Furthermore, educators have the opportunity of becoming members of the Association of Mathematics Education of South Africa (AMESA) which provides a forum for all concerned with the teaching of mathematics at all levels of education.

4.8 A REVIEW OF THE INSET OF MATHEMATICS EDUCATORS IN THE PRIMARY SCHOOLS IN KWAZULU-NATAL IN THE POST 1994 PERIOD

The researcher concurs with Hofmeyr (1994:37) that a national policy framework and a separate long-term budget are essential for the successful implementation of INSET. The Subject Advisor of mathematics, Mfeka (2002), clearly outlined that the absence of a national or provincial policy or clearly articulated and documented published objectives, further exacerbated by inadequate funds hinder the provision of effective INSET of educators of mathematics in KZN. Additional human resources in terms of Subject Advisors could also prove central to the successful implementation of INSET of mathematics educators.

With regard to the Cascade Model of training, the researcher's personal experiences showed that District trainers did not understand the principles of C2005 themselves thus resulting in their not using these principles in their own methodology of training. Even after loaded crash courses, mathematics educators

still felt incapable and insecure about C2005. Taylor and Vinjevold (1999:57) maintain that after a few months of practise, false clarity seemed to prevail. Educators would often confidently testify of how they are mastering C2005 in their classrooms, while the on-site research showed very little change from traditional practises. Many simply reproducing the lessons presented at training workshops without understanding the underlying learning theories (Taylor and Vinjevold, 1999:230).

The KZNDEC must acknowledge that training programmes were inadequate, top-down and rigid, losing sight of educators' experiences and existing professional insights. Lack of follow-up courses is also disappointing, especially considering Green's (2001:137) discovery that many educators do not have the high level of intellectual vigour required to understand C2005, and that not understanding it can only contribute to their sense of inadequacy. With respect to the formation of District and Circuit Support Structures, the researcher, being a member of the mathematical literacy, mathematics and mathematical sciences committee often finds that meetings need to be postponed due to poor attendance. Poor attendance could be attributed to the venue and time being unsuitable for educators or educators displaying apathy towards teacher development due to the lack of motivation or incentives.

The KZNDEC could provide incentives for attendance at INSET courses in the form of certificates of attendance. The KZNDEC should recognise these certificates for service awards or eligibility for promotion. Substitute educators could also be provided to enable mathematics educators to attend INSET courses during school hours.

Educators who are committed and dedicated to the profession may pursue higher qualifications or upgrade their academic qualifications while many educators will require intrinsic incentives to study further. The KZNDEC should consider incentives in the form of salary increments or enhanced eligibility for promotion to motivate educators to study further. At present upon completion of a degree or diploma educators are given a one off payment which many educators regard as dismal in respect to tuition fee expenditure. The KZNDEC needs to provide incentives

to motivate educators to enrol at universities. In view of the aforementioned criticisms levelled at the Department of Education and Culture:KZN and due to the limited funds allocated for educational needs, some responsibility for INSET shifts to NGOs. A discussion will be provided on the contributions of relevant NGOs.

4.9 THE CONTRIBUTIONS OF NON-GOVERNMENTAL ORGANISATIONS (NGOs) TOWARDS THE INSET OF MATHEMATICS EDUCATORS OF PRIMARY SCHOOLS IN KWAZULU-NATAL

The emergence over the years of independent INSET projects in South Africa should be seen as an attempt by the private sector to get more involved in education and curriculum innovation or change and to attempt to redress the educational deficiencies and lack of opportunities in a system which was entrenched with unequal and differentiated education for decades (Botha, 1989:1). In order to glean information on the contribution of NGOs towards the INSET of senior primary mathematics educators, the researcher was successful in contacting the project managers of the following NGOs which will be discussed further.

- The Toyota Teach Primary Schools Project
- The Maths Centre for Primary Teachers (MCPT)

4.9.1 THE TOYOTA TEACH PRIMARY SCHOOLS PROJECT

The rationale behind the establishment of this project is the belief that an improvement in the quality of primary school educators in the Umlazi and Umbumbulu areas would render learners to benefit from subsequent education in the academic, technical and vocational fields (Graham-Jolly, 1994:43). To achieve the project's objectives an effective partnership between other NGOs and tertiary institutions had been established. The project presently headed by Lesley Davy extends to 50 schools and approximately 85 educators.

The project also offers educators an opportunity to obtain an Advanced Certificate in Education: Primary School Competencies (Further Diploma in Education) which is accredited by the University of Natal. Contact sessions are presented at the Toyota Teach offices in Prospecton. The Advanced Certificate in Education: Primary School Competencies is completed part-time over two years. Modules include:

- Language and Learning
- Principles of Teaching Competencies
- Mathematics Education (Senior Primary or Junior Primary)
- Science Education (Senior Primary or Junior Primary)
- Technology or Environmental Education

The aim of improving the educator's academic qualification is to bring about school improvement, so that learning can be enhanced through better teaching and school management. The project is also committed to whole school development in the primary schools.

In addition, facilitators visit schools and work with the management, staff and learners to improve teaching and learning by:

- Offering management support and training at schools.

- Providing support areas in:
  Language, Literacy and Communication
  Mathematics
  Natural Science
  Technology
  Environmental Education
  Teaching strategies with the aim of improving classroom practice.

- Conducting regular workshops on topics of current interest.

According to Lesley Davy, the project manager, the following problems and difficulties were identified in the Toyota Teach schools:

- Educators are not able to teach certain mathematical concepts.
- There is a lack of qualified mathematics educators in the schools.
- There is a negative attitude on the part of learners towards mathematics, as mathematics is seen as a difficult subject. This could be attributed to a lack of a concrete foundation in mathematics teaching and learning.
- Poor approaches and methods of teaching mathematics. The chalk talk method is used, resulting in learners not being able to discover mathematics by themselves.
- The written test is being utilized as the only strategy to assess learners' mathematical knowledge.

It is against this background that the project hopes to achieve its aim of improving teaching and learning through improving the educator's qualification and classroom practice. By working with the management, staff and learners, the commitment to the whole school development will be fulfilled.

4.9.2 THE MATHS CENTRE FOR PRIMARY TEACHERS (MCPT)

This project was launched in 1998 and is funded by the Zennex foundation. It is currently headed by Thami Mhlobo and is based at Vukuzakhe High School in Umlazi. The target groups are educators in the Lower Tugela, Stanger and Inanda areas. The project funds the INSET programmes in each area for a period of three years.

The programme consists of workshops, class visits and each school is supplied with a kit consisting of the necessary resources for improved mathematics teaching and learning. At the beginning of the year, a year plan containing workshop dates is provided to schools. Educators are then workshopped on teaching strategies with the aim of improving classroom practice. Practical lessons are conducted and reviewed at the workshops to enable educators to identify and solve common problems experienced in mathematics teaching. Furthermore, the workshops also serve as common ground for mathematics educators to meet, form links and discuss ideas.

In terms of follow-up, classroom visits are conducted by facilitators to gauge whether educators are implementing what they have learnt at workshops. In addition, common tests are set by facilitators to gauge learners' progress. Class visits and tests assist the facilitators to plan their future workshops, which is based on common problem areas.

Mhlobo (2002) claims that the success of the project has been phenomenal since its launch, as drastic improvement in the teaching and learning of mathematics has been witnessed in the areas in which the project has been and is being conducted. Furthermore, educators have also remarked that the project has instilled a sense of confidence in them, resulting in mathematics teaching and learning becoming more enjoyable.

4.10 CONCLUSION

This chapter opened with a general overview of the INSET of educators in KZN and mathematics in the primary schools prior to 1994 which served as a background to the discussion of the INSET of educators with particular reference to mathematics in the primary school in the post 1994 period. It can be concluded that the past decade has brought tremendous change, which led to educational reform. Its success will depend on a commitment from everyone involved in education.

In the next chapter an empirical investigation on the INSET of senior primary mathematics educators will be discussed. A questionnaire (See Appendix H) was used as the vehicle to conduct a survey amongst mathematics educators in the senior primary phase in primary schools in KZN with the objective of obtaining data and feedback on INSET with respect to mathematics.