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Closing the gap? Continuous assessment in primary education in Uganda

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September 2003

DECLARATION

I declare that this thesis is my own work, except where indicated, and that it has not been submitted before for any degree or examination at any other university.

Signed: Signed by candidate

Mary Goretti Nakabugo
September 2003

University

DEDICATION

This thesis is dedicated to my father Charles Lwanga Kato and my late mother Mary Nakimera, for giving me education in the early years. And to my elder brothers Rev. Frs. Paschal Mugerwa and John Bosco Settumba, for sacrificing all they had to give me secondary education. All of you my other brothers and sisters, uncles and friends who have assisted me in all possible ways during my education journey, this work is dedicated to you, too, in appreciation of your contribution.

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ABSTRACT

In 1989 the Ugandan National Education Policy Review Commission recommended the introduction of continuous assessment in primary schools. It was concerned to improve both the summative and formative aspects of assessment, and suggested that continuous assessment should become an integral part of teaching and learning. Such assessment would make use of multiple strategies and feedback from these strategies would be used to improve learning.

The thesis investigates aspects of the implementation of the policy of continuous assessment since its introduction in 1998, with a view to analysing how teachers have perceived and used it. It poses questions about how teachers accustomed to the old system of assessment use the new continuous assessment, their understanding of continuous assessment, and what facilitates or hampers their adopting practices that exploit the advantages of formative assessment.

Data was collected from interviews, classroom observation, video recording of lessons and a teacher workshop, and assessment evidence from 14 primary year five teachers of mathematics. The teachers' use of continuous assessment was analysed from their written feedback in pupils' exercise books and their verbal feedback in video-recorded lessons. Their understanding of continuous assessment was studied from interview responses and an in-service workshop. The data was interpreted using instruments developed from the literature on formative assessment.

It was found that the teachers in the sample did not have a good grasp of formative assessment. They assessed frequently, used multiple forms of assessment and did a great deal of marking, which, however, provided almost entirely summative information about the pupils. The teachers were dedicated and concerned about the learning of their pupils, showing that there is fertile ground for formative assessment in Ugandan schools. Some incorporated elements of it in their teaching, although not consistently.

If the policy of continuous assessment is to achieve the goals set by the review commission, there must be total commitment to formative assessment and support for teachers in using it..Teachers must be provided with a thorough conceptual understanding of the policy and helped to make shifts in their classroom approaches to embrace a changed view of teaching. Changes in assessment and teaching are unlikely to take place as long as the policy emphasises something else.

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ACRONYMS

CCT	Centre Coordinating Tutor
DEO	District Education Officer
MoES	Ministry of Education and Sports
NCDC	National Curriculum Development Centre
NEPRC	National Education Policy Review Commission
NRM	National Resistance Movement
PLE	Primary Leaving Examination
PTTC	Primary Teacher Training College
TGAT	Task Group on Assessment and Testing
UG	Uganda Government
UNCST	Uganda National Council for Science and Technology
UNEB	Uganda National Examinations Board
UPE	Universal Primary Education
USHEPiA	University Science, Humanities and Engineering Partnerships in Africa
ZPD	Zone of Proximal Development

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CHAPTER 1

INTRODUCING THE STUDY

A brief account of primary education reform in Uganda

When Uganda gained independence in 1962, the responsibility for the administration and control of education, particularly primary education, was transferred from the hands of churches and mission organisations to regional administrations and urban authorities (Evans and Senteza-Kajubi 1994: 54; Ssekamwa 1997: 52). Previously, the churches not only determined policies but were also responsible for the implementation of those policies in the areas in which they operated (Evans and Senteza-Kajubi 1994: 127). Thus any attempts to improve primary education during the pre-independence and immediate post-independence era had not been co-ordinated uniformly countrywide.

National reform initiatives in education after independence began with the appointment of a commission, the Castle commission, by the central government in 1963. The purpose of the commission was to examine the content and structure of education, to consider how it could best be improved and adapted to the needs of the newly independent country, and to submit recommendations accordingly (Castle 1963). The problem that faced the commission in trying to suggest improvements in education at the time is summarised in an observation from its report:

> When over half the nation is illiterate and the people rightly clamour for education, when teachers are in short supply and inadequately trained, when government and industry demand trained recruits, when unemployment is widespread and increasing, when the nation is poor – what policy should the government pursue? (Evans and Senteza-Kajubi 1994: 130).

The options open to the Castle commission were thus constrained by the prevailing conditions in the country at the time. The commission grappled with the competing demands for large-scale expansion of primary education and high-level human resources. It reached a consensus in favour of expanding post-primary education so as to provide human resources and to train teachers for both primary and secondary schools. Little was suggested relating to the quality of education, apart from recommending improvements in relevance and access to primary education in more

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remote areas. Policies relating to the goals, content, and operation of the education system as a whole were mentioned only in passing (Evans and Senteza-Kajubi 1994: 131,134; Ssekamwa 1997: 165-166). A notable feature of the commission was that its membership excluded representatives of the missionary bodies that had created and still operated most of the educational institutions in the country at the time of independence (Evans and Senteza-Kajubi 1994: 132). This was a first step in making education a state-controlled activity.

The report of the Castle commission (Castle 1963) formed the foundation on which Uganda's educational system was based during the first period after independence, until 1977, when an Education Policy Review Commission was appointed to review the education system. By the time the commission was appointed, Uganda was in complete isolation from the rest of the world as a result of the military regime of Idi Amin. The expulsion of the British Asians, the decline of the economy and severe human rights violations led to a brain drain as many professionals and qualified personnel fled the country. External assistance for education was cut off because many countries suspended diplomatic relations with Uganda (Evans and Senteza-Kajubi 1994: 135). The appointment of the 1977 commission was therefore driven by the need to review the education system in order to achieve self-reliance. But its report was neither published nor implemented due to the 1978-79 war which overthrew Idi Amin (NEPRC 1989: 3). When a new regime came into power under the presidency of Milton Obote in December 1980, it was the beginning of yet another armed struggle between Milton Obote's army and Yoweri Museveni's guerilla forces. During the five-year period until 1985 trying to keep any sort of an education system functioning was almost futile and new education reforms could hardly be introduced.

When Museveni's National Resistance Movement (NRM) finally came to power in January 1986, the country was in total disarray in all aspects of life. Social services, including education, as well as the physical infrastructure of the country, had collapsed completely. The new government therefore embarked on a series of policy reforms in an attempt to transform the country in all spheres. Reforms in education were given top priority because it was hoped that positive changes in education would facilitate an improvement in other sectors (UG 1992: 3).

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Ugandan National Education Policy Review Commission 1987

A wide-ranging reform of education began with the appointment of the National Education Policy Review Commission (NEPRC) in 1987 whose role was to investigate issues pertaining to the structure, curriculum, organisation, management and financing of education and to recommend new policies to reform the education system. The report of the NEPRC, published in 1989, contains several recommendations for improving education from the primary to the tertiary levels.

With regard to education at the primary level, several weaknesses of the prevailing curriculum were identified. These included, amongst others, the following:

- The curriculum emphasised rote learning and the acquisition of factual knowledge at the expense of critical thinking and problem solving. In turn, assessment tended to focus more on testing factual knowledge rather than on reasoning power or problem-solving skills. As a result, the pupils also tended to prepare for examinations mainly by memorising facts (NEPRC 1989: par. 4.7.1).
- Subjects such as Art and Physical Education, though found on the timetable, were often neglected in favour of the four core subjects, i.e. mathematics, English, science and social studies, and teachers were concerned more with covering the syllabus by the end of the year, irrespective of whether or not the pupils understood what was being taught or not (NEPRC 1989: par. 4.7.2).
- Examinations had a central position in the system, so all teaching and learning was examination-oriented. The Primary Leaving Examination (PLE), held at the end of the seventh year of primary schooling, had assumed a central position and was having a negative backwash effect on teaching and learning. Primary schools were characterised by a simplistic and rote approach to teaching and learning: teaching was regarded as talking and writing on the blackboard by the teacher, and learning was committing to memory by the pupil what had been taught by the teacher for purposes of remembering it in the examination (NEPRC 1989: 7). There was also a tendency for teachers to teach what they thought would be examined in the PLE and to disregard what they thought would not be examined. There was a general view that the PLE was not assessing the skills and values that were needed for development in the country, rather, it was assessing predominantly factual

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knowledge and not useful skills such as critical thinking or values. In addition, as schools and teachers were often judged on the performance of their students in the PLE, their top priority was to ensure that as many children as possible passed in the First Grade[1]. Consequently, coaching had become prevalent and more attention was given to able pupils while weaker pupils were neglected. Performance in the PLE was the sole criterion by which pupils were selected for further education. Many pupils failed to proceed to secondary education because of failure to attain the required grades (NEPRC 1989: par. 1.3.17; Senteza-Kajubi 2001: interview[2]).

It was against the above background that the NEPRC made recommendations to reform the prevailing examination system. It recommended a continuous assessment system (see Box 1 overleaf) in the hope that it would become a comprehensive system of assessment that would include aspects of cognitive, physical, social, emotional and aesthetic development (NEPRC 1989: par. 1.3.17). In other words, aspects that had been totally neglected in the old system of assessment would be given due consideration in the new system. In this way, a pupil's potential, in whatever area, could be assessed and enhanced, and individual differences accommodated. The NEPRC made the following specific recommendations regarding assessment:

- Assessment should be both formative and summative (Box 1) and should serve the purpose of improvement of teaching and learning. It should not be just a tool for declaring students 'pass' or 'fail' [sic] (par. 1.3.17).

- Assessment should become an integral part of teaching and learning so that it enhances the learning of children (par. 4.7.2).

- Assessment should make use of multiple assessment strategies such as periodic tests, observations, assignments, practical, oral and written examinations, and feedback (Box 1) from these strategies should be used for improvement of teaching and learning (Recommendation 28).

- Examinations should not be merely a tool to decide whether to promote a student from one grade to the next but should serve the purpose of facilitating learning and forming the basis for effective and meaningful teaching and learning (par. 5.10.2).

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1. Performance in the PLE is classified in six grades: First Grade, Second Grade, Third Grade, Fourth Grade, Grade U and Grade X.
2. Prof. Senteza Kajubi was the chairman of the NEPRC.

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- Cumulative record cards of pupils showing their performance in all areas of the curriculum should be maintained (par. 4.7.2) (NEPRC 1989).

BOX 1: **Key concepts**

Continuous assessment, summative assessment, formative assessment and feedback

Continuous assessment is used in the context of this research to refer to the process of appraising pupils' understanding and achievement at regular intervals during the course of teaching and learning. In other words, assessment of learning is an on-going process that is integrated into the normal course of teaching and learning and is not delayed until the end of the learning episode, term or year. It uses a variety of assessment measures such as observations, written, practical and oral assignments, self-assessment, peer-assessment, tests and examinations (Flanagan 1995: 83; Capper 1996: 33; Reddy and Le Grange 1996: 18; Le Grange and Reddy 1998: 19). Continuous assessment can be used summatively or formatively. It is *summative assessment* if it is used to evaluate and to sum up what the pupils have achieved in a given lesson or course of learning. It is *formative assessment* if it is used to inform instruction with a view to modifying the teaching and learning activities in which teachers and pupils are engaged (Tunstall and Gipps 1996: 186; Siebörger and Macintosh 1998: 24; Black and Wiliam 1998a: 7-8; Malcolm et al. 1999: 2). Thus it is not the assessment strategy used per se or how frequently it is used that makes assessment formative or summative, but how the results of the assessment are utilised.

Assessment is summative if its results are merely used to sum up achievement. On the other hand, the assessment becomes formative when its results are used to modify teaching and learning. "In everyday classroom terms, this means teachers using their judgements of children's knowledge or understanding to feedback into the teaching and learning process and to determine for individual children whether to re-explain the task, to give further practice on it, or to move to the next stage" (Tunstall and Gipps 1996: 186).

Feedback and formative assessment are inextricably intertwined (Black and Wiliam 1998a: 47). One cannot discuss formative assessment without referring to feedback because formative assessment depends on utilising or acting on the feedback obtained from the use of an assessment strategy. Feedback is thus central in formative assessment. Ramaprasad (1983: 4) defines feedback as "...information about the gap between the actual level and the reference level of a system parameter which is used to alter the gap in some way". It is the information regarding the pupil's current level of performance and understanding and what remains to be performed and/or understood (the intended or desired level of performance and understanding).

Measuring the amount of knowledge and understanding, and the level of performance currently possessed by the individual and reporting this back to him or her, does not make assessment formative. Acting on the information ("feedforward" as Bell and Cowie 2001: 130 refer to it) to alter or close the gap between current understanding and the intended understanding is what makes assessment formative (Cowie and Bell 1999: 105; Wiliam 1999b: 10).

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In response to the recommendations, a Government White Paper on Education (UG 1992) was produced. It endorsed the NEPRC report but added that:

> Teachers should be trained to carry out both formative and summative evaluation of students through periodic tests, assignments, practical, oral and written examinations using both objective and essay type of questions. They should use feedback from testing for improvement of teaching, particularly by organising remedial teaching for the weak students and providing enriched instruction to the bright ones.... Continuous assessment will be done in form of written tests as much as possible and will ensure a high degree of objectivity. However, assessment of pupils/students' practical work in all subjects – particularly in vocational ones – and in co-curricular activities, will be given special emphasis. In order to ensure objectivity in this form of assessment, standardised tests will be devised with the guidance of the Uganda National Examinations Board, and administered at short regular intervals across schools in given regions and throughout the country (UG 1992: 51).

Continuous assessment had the dual aims of producing more reliable and regular assessment, together with improving teaching and learning. While the government White paper placed much emphasis on standardised tests for purposes of ensuring objectivity and comparability across schools, it also stressed using feedback from these tests for the improvement of teaching and learning.

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The research

Rationale

Continuous assessment is part of an international trend to emphasise the formative use of classroom assessment as a means to improving learning. The recommendation to introduce continuous assessment in Uganda was also premised on the view that it would promote quality teaching and learning in the primary school classrooms (Academy for Educational Development 1995: 1; Carasco et al 1996: 1). This thinking was in line with that of the World Conference on Education For All held in Thailand in1990, as a result of which several African countries started reforming their assessment systems to improve the quality of their education (Bude and Lewin 1997). In South Africa, for example, continuous assessment was introduced to reduce a

dependence on examinations (Johnson 1998: 384-385; Le Grange and Reddy 1998: 6; Glover and Thomas 1999: 126).

The decision to conduct research on the implementation of continuous assessment was made because continuous assessment is such a key element in the transformation of primary education in Uganda. It was hoped that investigating it would open a window to a general understanding of the nature of primary education reform and change in Uganda. It was further hoped that the research would,

- contribute to current academic debates on using assessment for improving teaching and learning and curriculum development,
- analyse the policy-practice relationship and make general recommendations on how the best fit between policy and practice could be achieved in the implementation of continuous assessment, and
- document interpretations of continuous assessment as a means to enhance this understanding.

Finally, it was hoped that any evidence of the formative use of continuous assessment by Ugandan teachers in their classrooms could be analysed to produce a picture of the common practices of Ugandan primary teachers in this regard.

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Research questions

Recommending the use of continuous assessment for the improvement of teaching and learning (the formative use of assessment) was a major change in the Ugandan education system, where assessment has been used solely for summative purposes: grading, promotion, selection and certification. The concepts of continuous assessment and using assessment formatively are new to Ugandan teachers. In the past the assessment of pupils was conducted mainly through end-of-term and end-of-year tests and examinations. These tests and examinations measured the extent to which pupils were able to memorise the content knowledge taught to them. Pupils' reasoning and problem-solving skills and the ability to demonstrate meaningful learning were hardly assessed. The overall function of the tests and examinations was,

in most cases, to determine the level of achievement in order to rank, select and promote pupils to the next levels of education (NEPRC 1989: 46). Although teachers asked questions during the course of teaching and gave written exercises at the end of each lesson, these were aimed mainly at recapitulating the lesson at hand rather than informing the teaching and learning process.

Teacher training, likewise, was also based on the traditional teaching and assessment system with the emphasis on rote learning. Teachers were not trained to be critical, reflective, innovative or adaptive. Mwanamoiza (1991: 32), for example, found that in Primary Teacher Training Colleges (PTTCs), tutors defined concepts and gave student teachers mathematical ideas or formulae which they had to write down in their books. It was expected that the students would simply reproduce them in tests and examinations. Sometimes the tutors gave assignments at the end of a lecture to assess if the student teachers had acquired the transmitted mathematical knowledge. This state of affairs has remained more or less unchanged to the present, as revealed in a recent study that was commissioned by the Uganda National Council for Science and Technology (UNCST) on the state of mathematics training in Uganda (UNCST 1999).

Continuous assessment now requires teachers not only to assess regularly and make use of multiple strategies of assessment, but also to use assessment as a basis for facilitating and improving pupils' learning.

The questions that the research intends to answer are:

- How are teachers accustomed to the old system of assessment using continuous assessment?
- What is their understanding of continuous assessment and how can that understanding be improved?
- What factors facilitate and/or hamper their adopting assessment practices that exploit the formative use of continuous assessment?

The thesis is that, while teachers would find it relatively easy to assess pupils continuously using multiple assessment strategies, they would find it much more difficult to use continuous assessment formatively. To use assessment for aiding

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teaching and learning demands far greater skill than simply assessing continuously or using a variety of assessment strategies. Assessing formatively changes the role of the teacher as well as the purpose for which assessment is intended (Nakabugo and Siebörger 1999: 288) while assessing continuously may only involve collecting voluminous records without using them to effect changes in teaching and learning.

Data collected from interviews, the observation of lessons, a workshop, records of assessment and exercise books is analysed. The research is conducted against the background that "there has been research that indicates that formative assessment improves standards in education whatever way you implement it, but there has been little, if any investigation identifying the issues and problems involved in teachers actually including this form of assessment in their classrooms" (Kellogg College 1999: 5). These factors need to be identified and addressed if teachers are to embrace the potential of continuous assessment in facilitating teaching and learning.

Closing the gap

There are three ways in which the research may be said to close gaps in the area of continuous assessment:

It draws on the literature of current trends in assessment for the design of instruments to analyse how teachers use continuous assessment to mediate pupils' learning. The instruments include one for measuring the teachers' written feedback and a video observation schedule to study their verbal feedback in class.

It examines the teachers' existing understanding of continuous assessment and constructs a model for mediation to enhance their understanding. The model is drawn from theories of learning and an application of some of the findings of the research.

It reflects on the research process and findings of the research, and makes suggestions about bridging the gap between current policy and practice in Uganda and possible future research.

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Summary of the thesis

Chapter 1 has set out the scope of the study and the questions to be examined in the thesis. Chapter 2 locates the study within contemporary literature on assessment. Chapter 3 describes how Uganda's attempts to implement continuous assessment fit trends highlighted in the literature and argues for the investigation of the neglected aspect of formative assessment. Chapter 4 describes the methods and processes involved in the investigation as well as the limitations of the research. Chapter 5 interprets what teachers researched said that they did when they assessed continuously. Chapter 6 analyses what the teachers did in practice when they marked pupils' exercise books and when they assessed verbally in class. Chapter 7 probes their understanding of continuous assessment and Chapter 8 develops a model of mediation to enhance their understanding. Chapter 9 discusses some of the factors affecting the successful implementation of continuous assessment in Uganda, and Chapter 10 concludes and makes recommendations on how the best fit between policy and practice could be achieved in the implementation of continuous assessment, and makes suggestions for future research.

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CHAPTER 2

CONTEXTUALISING CONTINUOUS ASSESSMENT: The literature

The literature on assessment is a growing one and in the last decade there have been significant advances in this field of education. Within a relatively short period, assessment has become a key aspect of curriculum innovation and the literature reflects its changing status and use. Much that has been written is based on empirical research but there is also much that is of a more popular nature, following the mode. It is also apparent that while most writers claim a theoretical basis for interpreting the role of assessment, the theory is in most cases merely alluded to and is not well developed.

The trend of educational assessment

In the 1980s and 1990s there was a perceptible shift in the approach to assessment, from a psychometric culture focussed on measuring and quantifying learning achievements, towards an assessment culture that also supported and enhanced learning (Berlak et al. 1992; Kilpatrick 1993; Gipps 1994; Broadfoot 1996; Capper 1996; Biggs 1998; Torrance and Pryor 1998; Malcolm et al. 1999). In the psychometric culture assessment centred on the summative purposes of grading, reporting, selection, certification, accountability and comparability (Torrance and Pryor 1998: 1). These purposes have now broadened to reflect the shift that has taken place (Gipps 1994: 1).

The psychometric model was characterised by the assumption that intelligence could be compartmentalised into observable components that are measurable (Gipps 1994: 5; Broadfoot 1996: 179). This assumption resulted in the design of standardised intelligence tests for groups of pupils. The test results were then analysed and used to select and cluster individuals for particular streams, groups or schools where the pupils supposedly belonged, according to their measured intelligence levels (Hoskin 1979: 137; Kilpatrick 1993: 32). Since pupils were assumed to belong to permanent intelligence/ability groups, little attempt was made to increase their learning. Furthermore, in emphasising the observable and the measurable there was a tendency

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to disregard learning that is internal and specific to individual pupils, but which could not easily be seen and measured (Malcolm et al. 1999: 5).

Assessment was usually norm-referenced, that is, an individual pupil's performance in tests was graded in relation to the performance of his/her peers (Gipps 1994: 5). Tests were deliberately structured and moderated to spread scores along a normal curve in varying proportions of high, medium and low. As test results were manipulated so as to produce varying patterns of performance, they did not necessarily give a true picture of individual pupils' performance.

The standardisation and reliability[3] of assessment tasks were key technical aspects of the psychometric model. It worked on the assumption that "if individuals are to be compared with one another, then we need to be certain that a test or assessment is carried out in the same way for all individuals, scored in the same way and scores interpreted in the same way" (Gipps 1994: 5). Issues of quantification and objectivity were important to ensure that test results produced accurate results. An emphasis on the standardisation of assessment assumed that pupils were homogeneous and that they learned in similar contexts and in the same way. Standardisation meant, too, that forms of knowledge that were subjective in nature, that is, those that could not be measured and quantified easily, such as higher order thinking, were not assessed. Thus, there was a tendency to exclude assessment tasks that embodied higher order thinking skills and which presented pupils with more demanding and authentic tasks because of the challenge to objectivity and reliability. Furthermore, an exclusive reliance on standardised assessment tasks also meant little, if any, focus on informal on-going classroom assessment conducted by individual teachers in their classrooms on a daily basis. While teachers engaged in the informal assessment of their pupils, the assessment that counted most was externally designed.

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3. Reliability may be defined as, "the extent to which an assessment would produce the same, or similar score on two occasions or if given by two assessors. *It* is the 'accuracy' with which an assessment measures the skill or attainment it is designed to measure" (Gipps 1994: viii). It is associated with the concept of validity which is "the extent to which an assessment measures what it purports to measure". In other words, "if an assessment does not measure what it is designed to measure then its use is misleading" (ibid).

The psychometric model has had a marked influence on assessment policy and practice worldwide, long dominated by assessment procedures that come at the end of the learning process in the form of formal exercises and tests and examinations of knowledge recall (Nuttall 1986: 10; Black 1993: 50). The exercises and tests measured mainly what individual pupils have achieved after a period of learning or training. The focus has been on evaluating, quantifying, summing up of pupils' achievements and comparing individuals and groups (Gipps 1994: 14).

The model was effective while the purpose of assessment remained static (that is, fit for the intended purpose and wide application for systemic and baseline evaluation), ensuring the quantification and comparability of results. It needed to be extended if assessment was to be required to perform other functions.

Broadened functions of assessment

Beyond the traditional purposes of prediction, grading, selection, certification and quantification of educational achievement, assessment is now used for more widely improving classroom instruction and learning. A growing recognition of the limitations of traditional approaches to assessment and a desire to harness the powerful ability of assessment to promote, rather than inhibit, learning is apparent (Nuttall 1987; Gipps 1994; Gipps and Murphy 1994; Torrance and Pryor 1998; Assessment Reform Group 1999).

There is an increasing awareness of the problems inherent in the traditional formal tests and examinations in terms of their inability to provide the kind of information that educators need to facilitate learning and the educational progress of pupils. Written tests have been deemed inadequate to enhance learning because, inter alia, they assess the products (end-results) of learning and disregard learning processes (Murphy and Torrance 1988: 16; Frederickson et al. 1991: 21; Flanagan 1995: 83) and block interaction between the assessor and the assessed, and therefore overlook the pupils' responsiveness to the assessment context (Gallimore et al. 1989: 56). A growing number of educationalists have recognised the importance of context in the assessment of individuals and the fact that pupils' learning cannot be separated from how they are taught and the contexts in which learning takes place (Frederiksen 1984:

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194; Wood 1988: 441; Frederickson et al. 1991: 21; Solity 1991: 12). The belief is that formative assessment that is integrated with the normal course of teaching and learning can offer a useful perspective on pupils' learning and on how teaching can be structured to facilitate this learning better than any standardised or external assessment can (Minick 1987:1987: 116).

The idea of the teacher using assessment formatively was influenced by social constructivist theories, particularly those of Levi Vygotsky. Psychologists began investigating Vygotsky's concept of the zone of proximal development (ZPD)[4] in experimental contexts. Their interest lay in how the ZPD could be measured to make it possible to structure learning activities in a way that increased pupils' learning (Brown and Ferrara 1985). Based on studies of this nature, small-scale interventions were designed for use in normal classroom contexts to facilitate the thinking and meaningful learning of pupils (see for example, Newman et al. 1989 and Oldfather et al. 1999).

Formative assessment was first popularised at school level in the United Kingdom. Teachers supervising nationally assessed tasks gave pupils feedback on their drafts to give them the opportunity to submit improved final products.[5] It was hoped that the quality of the pupils' final practical work would be improved if teacher-assessed coursework was introduced, with pupils' class teachers providing feedback on drafts of work to enhance the quality of the final product (Torrance 1986). A corresponding approach, linked to particular examination syllabuses, was that of graded assessment (Pennycuik and Murphy 1988). In it, short unit tests were designed according to the syllabus with the intention that they would give pupils the opportunity to progress at their own pace, taking the tests whenever they felt they were ready. It was found, however, that the practice tended to have a negative backwash effect on learning, in

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4. The ZPD is defined as "...the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978: 85-6). In other words, the ZPD is the gap between what the pupil can do on his/her own (self-regulated learning), and what the pupil cannot do alone but may be able to do if assisted by an adult or a more capable person (assisted learning or other-regulation).

5. It should be noted that these tasks also served an important summative purpose.

that pupils often focused more on working for grades rather than on whether they had actually understood a particular unit of study. Their learning tended to be restricted to memorising the test material, and learning gains were tied to the passing of a particular test unit rather than on applying knowledge to varied contexts beyond the test situation.

In the 1990s, the National Curriculum Task Group on Assessment and Testing (TGAT) attempted to introduce elements of formative assessment to facilitate individual pupils' learning at classroom level, while maintaining accountability at school level through national testing (Torrance and Pryor 1998: 10) - a proposal that was never fully implemented. The intention was to put the teacher in control of the process of assessment to facilitate effective progression of pupils through the National Curriculum. It was intended that assessment by teachers would provide information on pupils' strengths and weaknesses to help them to structure teaching, learning and assessment activities appropriate to pupils' progress. Concerns regarding the accountability of teachers, schools and the education system as a whole influenced the task group's recommendations on the assessment procedures to be used. Hence, it was argued that the formative role for national assessment "would be best realised through extensive use of teacher assessment (TA) with externally devised Standard Assessment Tasks (SATs) used sparingly to moderate TA for reporting purposes and ensure some degree of comparability in the system" (Torrance and Pryor 1998: 11).

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Interest in the use of formative assessment by teachers has grown markedly since then. It has been stimulated by research that has revealed that teachers who use it facilitate the development of pupils' learning and thinking skills better than teachers who rely exclusively on summative procedures (Black 1993; Pryor and Torrance 1996; Tunstall and Gipps 1996; Torrance and Pryor 1998). Black and Wiliam (1998a) was a landmark literature study of over 250 research articles from a range of countries, aimed at establishing whether or not formative assessment could be shown to raise levels of attainment. The review concluded that formative assessment strategies do indeed raise standards of attainment. These strategies include,

- the provision of effective feedback to pupils;
- the active involvement of pupils in their own learning;
- adjusting teaching to take account of the results of assessment;

- a recognition of the profound influence assessment has on the motivation and self-esteem of pupils, both of which are crucial influences on learning; and
- the need for pupils to be able to assess themselves and understand how to improve (Black and Wiliam 1998a: 4).

Research interest in formative assessment and its application to the classroom has been further stimulated by the publication of a series of influential booklets: Black and William (1998b), the Assessment Reform Group (1999), Black et al. (2002), and the Assessment Reform Group (2002). Other writers, such as Clarke (1998, 2001), Dann (2002), Lambert and Lines (2000) and Weeden et al. (2002) have popularised the use of formative assessment for teachers on the basis of this and other research.

Continuous assessment

"Continuous assessment" represents one of the broadened functions of assessment. As such it has summative and formative purposes. The summative use of continuous assessment has been described as "to produce a snapshot or summary of the learner's achievements", while the formative use is an integral part of the teaching and learning process and informs it (Malcolm et al. 1999: 49).

Summative assessment aims at determining the extent to which a pupil's work has met given target criteria and how well or badly the individual has performed (Wiliam and Black, 1996). In other words, summative assessment is assessment of learning and is not intended to shape it, while formative assessment is assessment for learning, intended to shape the process of which it is a part. In explaining this to primary school teachers, Clarke (2001: 1) uses a gardening analogy:

> If we think of our children as plants... summative assessment of the plants is the process of simply measuring them. The measurements might be interesting to compare and analyse, but, in themselves, they do not affect the growth of the plants. Formative assessment, on the other hand, is the garden equivalent of feeding and watering the plants – directly affecting their growth.

Defined on its own, formative assessment may be described in two ways (Torrance and Pryor 1998: 14). The first is one-way feedback from the teacher. In this case, assessment means the teacher assessing the pupil and giving feedback to the pupil on how well he or she is learning, as well as using the information from the assessment to

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plan for further teaching and learning (Harlen et al. 1992: 219; Harlen and James 1996: 14). This understanding of formative assessment does not recognise the importance of the interaction between the teacher and the pupil in establishing what the pupil can do, identifying misunderstandings in learning, and providing help and positive reinforcement.

Educators and researchers, inter alia Sadler (1989), Perrenoud (1998) and Torrance and Pryor (1998), have questioned the effectiveness of one-way formative assessment of this kind, and have argued strongly that even the best quality of teacher feedback does not necessarily lead to improved learning if the pupil is not permitted to engage actively in the assessment process:

> ...the common but puzzling observation is that even when teachers provide students with valid and reliable judgements about the quality of their work, improvement does not necessarily follow. Children often show little or no...development despite regular, accurate feedback (Sadler 1989: 119).

In other words, "no learning takes place without the learner" involved (Perrenoud 1998: 87).

The second is two-way feedback. It exists within the notion that "...the design and interpretation of assessment work has to be conducted within a strategy concerned with the development of the active and thoughtful learner. Such active learning is quite different from passive reception learning" (Black 1998: 105). Pupils have to be involved actively in the learning process, which means that they also have to be involved actively in the assessment process (Lambert and Lines 2000: 141). Hence, assessment can be most effectively used for formative purposes when both the teacher and the pupil work collaboratively during the process of assessment. In other words, "teacher-learner interaction goes beyond the communication of test results, teacher judgements of progress and the provision of additional instruction, to include a role for the teacher in assisting the pupil to comprehend and engage with new ideas and problems" (Torrance and Pryor 1998: 15). Engaging in dialogue with pupils on what they are doing or saying is not only influential in revealing the pupils' current level of understanding, but is also very effective in enhancing further learning (Cordon 1992; Ross et al. 1993: 158).

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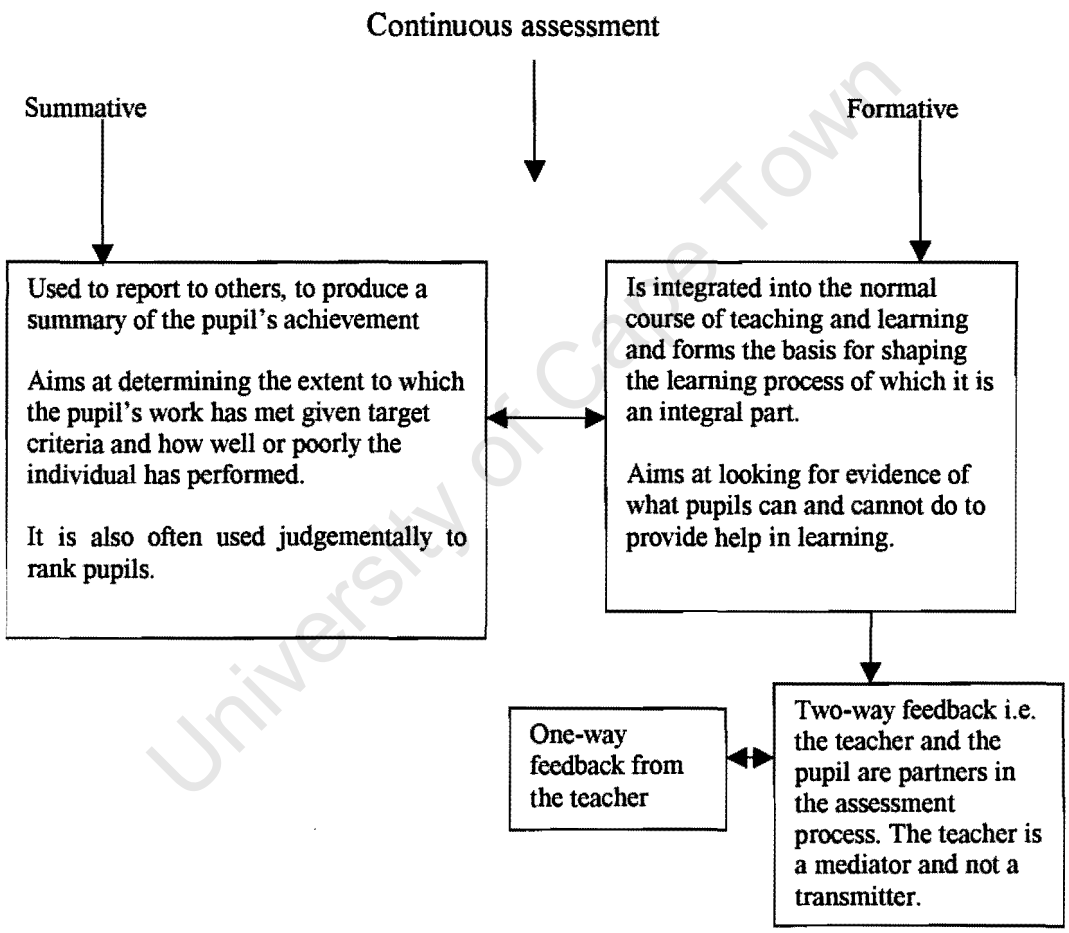
It can therefore be said that continuous assessment is used in three overlapping ways, namely, continuous assessment (summative), continuous assessment (formative: one-way feedback) and continuous assessment (formative: two-way feedback). Diagram 1 has been constructed to illustrate this.

DIAGRAM 1: **Contemporary understanding of continuous assessment**



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Theory that informs formative assessment

Among the relatively few writers who have attempted to provide a theoretical basis for formative assessment, some have explained its roots dualistically, tracing them distinctly in behaviourist and constructivist theory. Torrance and Pryor (1998: 14-15), for example, note that:

> With respect to theories of learning, Sadler's [1989] distinction offers some clues.... He identifies two very different perspectives on formative assessment which certainly seem to have had an implicit impact on UK policy and practice, even if they are rarely acknowledged explicitly. ... One remains essentially behaviourist in the mastery learning tradition... a second and rather more ambitious model of formative assessment, [derives] from the social constructivist perspective in cognitive psychology, ambitious in that it does indeed take account of the role of teacher-pupil interaction in the learning process.

Lambert and Lines (2000:129-130) similarly identify two theoretical origins of formative assessment:

> For the sake of simplicity we will briefly examine in turn two fundamentally contrasting theories of learning, both of which have had positive impact on the ways teachers do their jobs, and also help make the case for making classroom assessment formative in practice: behaviourism and constructivism. ... Essentially, *behaviourist thinking* requires the clarification and definition of specific objectives which are then taught and learnt in carefully graded stages. ... *constructivist perspectives* of learning see educational encounters as interactive in the sense that both teacher and learners bring material (in the form of information, ideas, imagination, etc.) to them. ... albeit for significantly different reasons, *both theoretical perspectives on learning (behaviourist and constructivist) justify formative assessment practice, in terms of accounting for how it works.* [Original emphasis].

They suggest that a typically behaviourist approach to formative assessment does not integrate assessment with teaching and learning. A constructivist approach they regard as making assessment an integral part of teaching and learning to facilitate the pupils' learning potential (Lambert and Lines 2000: 130).

The distinction they make between approaches to formative assessment that have a behaviourist or a constructivist outlook, however, is unhelpful, because in many instances both perspectives come into play and impact each other. Lambert and Lines

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(2000: 129), for example, view learning that involves breaking down knowledge into its constituent parts and requires pupils to master the bits hierarchically (i.e. beginning with simple facts before moving on to learn more complicated material) as behaviourist. But building on pupils' prior knowledge (what they know, what is familiar) before introducing new material is also advocated by constructivists. Furthermore, the claim that a behaviourist approach does not integrate assessment with learning is not consistent. Mastery learning, which draws heavily on behaviourism, employs diagnostic tests (a form of formative assessment) that are integrated with learning to aid pupils' mastery. Bloom (1971: 58) records:

> We have ... analysed each unit into its constituent elements. These ranged from specific terms or facts to more complex and abstract ideas, such as concepts and principles ... We have considered these elements as forming a hierarchy of learning tasks ... we have then constructed brief diagnostic-progress tests to determine which of the unit's tasks the student has or has not mastered and what he or she must do to complete his learning unit.

Sfard argues eloquently against polarising traditions such as these: "We have to accept the fact that the metaphors we use while theorising may be good enough to fit small areas, but none of them suffice to cover the entire field" (1998:12), and Cole and Wertsch (2003: 5) and Terwel (1999: 196) observe that in many cases the strength of one theory compliments the weakness of the other.

Other writers have located formative assessment within social constructivist theory alone. Gipps (1994: 27) and Torrance and Pryor (1998: 78) note how Vygotsky's (1978) zone of proximal development [the distinction between assisted and unassisted performance] informs formative assessment. The notion is useful in explaining how teachers can offer effective support to pupils to enable them perform at higher levels, and eventually to operate independently without adult support. While working in the ZDP a teacher can assess the level of development or level of understanding of the learner i.e. what is already in place. The teacher may also be able to assess, therefore, whether the learner is able to learn something in co-operation with a more knowledgeable person. Identifying what a pupil is able to do next with help so that appropriate tasks and support can be provided to him/her is a key to formative assessment (Torrance and Pryor 1998: 15). The process of being able to establish what the pupil is able to do and what remains to be done is not a passive one. It is an interactive process in which the teacher explains and also enquires from the pupils to

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explain or to show what they know. This kind of interaction has the potential to reveal the pupils' mental processes and strategies so as to modify or develop them.

The principle of a ZPD informs Ramaprasad's (1983) and Sadler's (1989) notion of "a gap", which Black and Wiliam (1998a: 20-21) and Weeden et al. (2002: 75-76) suggest is central to formative assessment (Ramaprasad 1983; Sadler 1989). In this context the "gap" refers to the disparity between the pupil's state of learning revealed by feedback and the desired level of achievement. Black and Wiliam (1998a: 20-21) contend that the core of formative assessment lies in the learner's perception of the gap between a desired goal and his or her state of knowledge or understanding, and also in the learner's action to close the gap to reach the desired level of understanding or performance. This links to the idea of an active pupil in the learning and assessment process if the gap is to be closed. Sadler (1989) in Black and Wiliam (1998a: 54) argues that a pupil who merely follows the teacher's prescription without understanding it or interpreting how it relates to the gap does not learn. Thus meta-cognition and self-assessment have to be essential strategies of formative assessment. Pupils should participate actively in closing the gap, such as, by being aware of why a response or performance is undesirable, and also by getting involved in searching for or working out a desirable one. This also makes it essential that the teacher offers feedback to a pupil that has the potential to motivate him or her want to find things out, take risks, or to work independently. As Hargreaves, et al. (2000: 24) state, the more motivated the learner the easier it is to have him/her take control of his/her own learning. Weeden et al. (2002: 112) drawing from Sylva's (1994) research, note that feedback that is strongly linked to performance goals such as grades leads only to short term motivation and does not encourage pupils to learn effectively. Feedback that is focussed on making the pupils recognise the mastery they are achieving they see as having more potential to enhance learning.

Though it is not possible here to do justice to the broader debates within socio-cultural theory, it is evident that the theoretical roots of formative assessment are much wider than Vygotsky alone. Constructivism derives both from Piaget's cognitive developmental and Vygotsky's socio-cultural theories. Within it is the conception of an active construction of knowledge on the part of the learner that unifies internal processes and environmental (social-cultural) processes into new forms of knowledge.

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It is a response to the conception of learning that has been exclusively external, i.e., the view that knowledge is transmitted to the pupils without their active involvement (Moll 2002: 17-18).

Where the emphasis is on the personal, constructivism privileges an internal authority - the pupils' emerging conceptions (Davis 1996: 186). Learning is an internal, personal matter, rather than a social one, in which pupils develop their notions and understandings from the activities in which they participate (Dossey 1992: 44; Davis 1996: 184). Formative assessment draws upon this in that in the classroom the teacher provides the assessment task [which may be authentic - a real life task] and the pupil performs the task independently, such as by hypothesising and experimenting. The teacher only intervenes to guide in case the pupil is going astray (Dossey 1992: 44). There is no direct close interaction between the two: the teacher is a facilitator and the pupil is a performer. Self-assessment plays an important part, that is, if pupils are to take control of their learning, they should be in position to self-assess and self-correct.

Those who stress that all learning is social rather than individual, such as Bakhtin in Wertsch (1991: 52), who contends that "meaning can come into existence only when two or more voices come into contact", contribute to formative assessment that it can aid learning when it takes place through dialogue and cooperation between the teacher and the students (Mellin-Olsen 1992: 154). The teacher works with the student on given assessment tasks by explaining, enquiring, and pushing the student him/herself to explain. Strategies such as collaborative learning and peer-assessment must form part of formative assessment. In this way individual learners collaborate with the teacher or with their peers who are more knowledgeable than they, to enhance their performance. Mediation plays a central role here. ['Mediated learning is the training given to the human organism by an experienced adult who frames, selects, focuses and feeds back an environmental experience in such a way as to create appropriate learning sets' (Feuerstein, 1979:167)].

Where knowledge is seen to be constructed beyond the individual and the social, to include an analysis of the context or the situation (the community level) in which it takes place and the cultural influences upon it, attention in formative assessment is focused on the collective. This draws on research into situated cognition that posits

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that knowledge is situated, that is to say, it is a part and product of the activity, context, and culture in which it is developed and used (Brown et al. 1989; Kirshner and Whitson 1997). It asserts that any account of how knowledge is personally or socially constructed involves an analysis of the individual and the collective (the community, the activity, the culture, the social rules, division of labour) (Cole 1996: 334ff; Engeström and Cole 1997: 304; Wertsch 1998: 109ff). The assumption is that "activities of person and environment are ... parts of a mutually constructed whole" and as such learning is inseparable from the individual and the environment in which it takes place (Bredo 1994: 23). The interest is in what individuals can do independently, and what they may be able to do if they work closely with knowledgeable or experienced people in their community of practice. Assessment is set in meaningful contexts and uses open-ended tasks that allow pupils to demonstrate what they think, what they know, or what they can do (see, for example, Boaler 1997: 16ff). The focus on what happens in a particular social space and the use of activity as a unit of analysis helps in the recognition of how situations and culture impact on formative assessment practices. Teachers bring different cultural experiences to the application in their classrooms. A strategy that is effective in one context, may not be effective in another context. For example, self-assessment and encouraging pupils to take control of their learning may be well suited for classroom contexts that are well-resourced and where the cultural context encourages self assertion. In poorly-resourced classrooms and a patriarchal cultural environment such as in Uganda, teachers rely more on direct instruction and transmission. Furthermore, the idea of an active pupil who is able to critique and to take control of his/her learning may not be readily accepted in classrooms that are situated in conformist societies where children are not supposed to question their elders. Peer-assessment would, however, fit such a context because it allows pupils to critique one another's work and ask for guidance from their peers rather than from their teachers. Similarly, in contexts where grading pupils' work has become almost a cultural practice, moving away from it to giving more mastery and descriptive feedback may demotivate pupils rather than motivate.

There is, thus, no single theoretical thread that informs formative assessment. What all contribute towards is the move away from viewing pupils as passive recipients of teacher-transmitted knowledge to regarding them as active participants in the learning process who are able to self-assess and take control of their learning. Such a change is

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central, yet due to the situated nature of classrooms, each teacher and school, in every context, has to adapt formative assessment in his/her practice in his or her own way.

Formative assessment in the classroom

The literature on formative assessment in the classroom has two complementary strands: empirical work and teacher professional development based upon it.

Much of the empirical research has focussed on feedback and classroom interaction through questioning. These two aspects are well grounded and it is possible to examine them in terms of their theoretical potential for enhancing learning and how they can be made to happen effectively in class. Another area that has been the subject of research attention is self- and peer-assessment.

Feedback is central to the formative use of assessment. However, the research shows that its mere existence does not necessarily lead to improved learning. Its quality is a crucial aspect, as demonstrated beyond doubt in reviews of many studies on the feedback process by Kluger and DeNisi (1996) and Black and Wiliam (1998a).

Tunstall and Gipps (1996) produced a typology of teacher feedback from their study of how young children perceived the feedback they received from their teachers, confirming further that the quality of feedback was crucial. Although their findings were based on what the pupils said rather than on actual classroom practice, they were able to generate two feedback forms from the data: the evaluative type, that had limited formative potential, and the descriptive type that had much more potential to enhance learning (see Diagram 2 overleaf). The evaluative type was limited in the sense that it provided less chance for dialogue, while the descriptive type was more likely to generate discussion between the teacher and the pupil and, therefore, it made it possible to uncover what the pupil was able to do, and where assistance was still needed. This research was followed by a more empirical classroom study, which involved a cross-section of teachers (Gipps et al. 2000). The two feedback types were again noticeable.

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Tunstall and Gipps conceptualised an "evaluative" type of feedback as comprising the following categories: Rewarding, Punishing, Approving, and Disapproving. Categories that underpinned a "descriptive" type were: Specifying attainment, Specifying improvement, Constructing achievement, and Constructing the way forward. Commenting on the two types of feedback, they observed:

> ...feedback changes in style, purpose, meaning and processes as it moves from evaluation to description. At the evaluation end of the continuum, feedback is clearly either positive or negative. At the descriptive end, feedback can no longer be defined in these terms and is achievement or improvement focused. ...within evaluative types of feedback, judgements are made according to explicit or implicit norms; within descriptive types, feedback more clearly relates to actual competence. It is also apparent that the evaluative types of feedback relate much to affective and effort-based aspects of learning than do descriptive types, where the cognitive emphasis predominates (Tunstall and Gipps (1996: 189).

DIAGRAM 2: **Tunstall and Gipps' model of teacher feedback**

EVALUATIVE			**DESCRIPTIVE**		
	A) Rewarding	B) Approving	E) Specifying attainment	F) Constructing achievement	
Positive	Rewards	positive personal expression warm expression of feeling general praise positive non-verbal feedback	specific acknowledgement of attainment use of criteria in relation to work / behaviour; teacher models more specific praise	mutual articulation of achievement additional use of emerging criteria; child role in presentation praise integral to description	***Achievement feedback***
	C) Punishing	D) Disapproving	G) Specifying improvement	H) Constructing the way forward	
Negative	punishments	negative personal expression reprimands; negative generalisations negative non-verbal feedback	correction of errors more practice given; training in self-checking	mutual critical appraisal provision of strategies	***Improvement feedback***

(Tunstall and Gipps 1996: 188)

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Overall, the typology showed that relying solely on one type of feedback, the evaluative in particular, was less likely to result in improved learning. The two types were complementary, that is, evaluative feedback needed to be supplemented with descriptive comments to lead to fundamental learning outcomes.

Later studies such as Torrance and Pryor (1998: 96-99) and Nakabugo (1998:70-71), reported teachers who used the evaluative type almost solely in their classroom practice. They provided feedback in the form of reinforcements, such as extrinsic rewards including statements like "good", "excellent", or physical rewards such as marks, grades, sweets or drawing smiley faces in the pupils' exercise books. Yet extrinsic rewards at best lead to very short-term improvement in learning. Experimental studies, inter alia Lepper and Hodell (1989) and Gardner (1993), have indicated that these kinds of extrinsic rewards have a negative impact on pupils' performance, especially on aspects that are not crucial to the reward and when a critical rather than a factual response is required.

Lepper and Hodell (1989) established that pupils who became used to extrinsic rewards afterwards tended to favour less demanding tasks for which they were assured of attaining the rewards. This finding was confirmed by Black and Wiliam (1998a: 8-9) in their review of the literature on the nature of feedback and its impact on pupils' self-esteem and performance. They noted that in instances

> ...where the classroom culture focuses on rewards..., grades or place-in-the-class ranking, then pupils look for the ways to obtain the best marks rather than at the needs of their learning. One reported consequence is that where they have any choice, pupils avoid difficult tasks. They also spend time and energy looking for the right answer. Many are reluctant to ask questions out of fear of failure. Pupils who encounter difficulties and poor results are led to believe that they lack ability, and this belief leads them to attribute their difficulties to a defect in themselves about which they cannot do a great deal. So they...avoid investing effort in learning which could only lead to disappointment, and try to build up their self-esteem in other ways.

Another condition that results from feedback that reinforces in some pupils a feeling that they cannot learn is what Dweck et al. (1978) in Gipps (1994: 132) called 'learned helplessness'. Pupils who do not usually get rewards begin to believe that

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they are being ignored and, in many cases, attribute it to lack of ability. They, thus, retire frustrated and give up trying again because they are convinced they lack the ability to succeed, unlike their counterparts who receive rewards daily.

A further negative by-product of extrinsic rewards, according to Thomas and Oldfather (1997: 107-121), is that they have the same effect as grades and marks: pupils tend to focus on ego-involved attributions and comparison with peers ("I am better than you") rather than focusing on learning ("What have I learnt?" "What have I achieved?") (Thomas and Oldfather 1997: 107). Moreover, in as far as the grading and rewarding of marks itself is concerned, research findings have established that there is a negative effect even if the grade or mark is accompanied with helpful descriptive comments, as pupils tend to ignore comments when marks are also given (Butler 1988). This was confirmed by a teacher quoted by Black et al. (2002: 8):

> ...Pupils do work on targets and corrections more productively if no grades are given. Clare (King's researcher) observed on several occasions how little time pupils spent reading my comments if there were grades given as well....

Focussing on the grade or mark does not help pupils' learning because it is just a numerical symbol that does not tell pupils how to improve their work, so it has limited formative value.

As a result of these potential limitations of evaluative feedback, some educational researchers including Gardner (1993), Tunstall and Gipps (1996), Thomas and Oldfather (1997), and Torrance and Pryor (1998) recommend the use of intrinsic rewards, that is, feedback in the form of detailed suggestions highlighting where and how the pupil has succeeded in the task and showing possibilities for further learning – the "feedforward" (Bell and Cowie 2001: 130).

Other researchers have suggested that instead of a reward system, an encouragement system should be instituted (Rowe 1974; Martin 1977; Brophy 1981). Encouragement ensures that pupils' focus remains on the task at hand and on achieving their best in learning rather than on attaining the best reward. A populariser of this approach in the classroom, Clarke (2001: 128), suggests, for example, that "when children find something difficult or are stuck, the teacher should use language which shows that

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difficulty enables us to find out what is needed for new learning to take place". In this way, pupils are encouraged to search for difficult tasks in which they are assured of attaining new learning while the reverse is true with rewards – pupils search for easier tasks, for which they can quickly work out the correct answers, to be rewarded (Black and Wiliam 1998a).

Questioning (oral and written) provides a good context within which the quality and effectiveness of feedback can be assessed. Questioning has been found the most commonly used strategy in classroom teaching and assessment (Flanders 1970; Boydell 1974; Stubbs 1976; Torrance and Pryor 1998). However, using it to improve pupils' learning and understanding depends on the intention of the questioner and the feedback that follows.

Mehan (1979), Sinclair (1982), and Edwards and Westgate (1987) observe that questioning might sometimes seem to be a genuine attempt by the teacher to inquire into what the pupil knows yet it is actually being used as a means of recapitulating the day's lesson, and eliciting particular pre-determined responses (factual information) from the pupils so as to be able to proceed to the next unit of learning. This kind of questioning relies heavily on the use of closed questions that focus on the recall of factual information or on simple comprehension where the answers have been provided. In this case, questioning is not used as a means of increasing pupils' learning, but as a way of confirming pupils' ability to respond in a particular way. The pupils have "only very restricted opportunities to participate in the language of the classroom" (Sinclair 1982:6), saying only what is controlled and determined by the teacher's talk. Questions are not asked of the pupil to enhance that pupil's thinking and/or understanding, but to serve the purpose of advancing the whole class lesson to its end and confirming if the pupils, as a class, can say exactly what the teacher wanted them to say during the lesson. Such questions do not only fall short of supporting teaching and learning, they may also not be good for generating summative data for accountability purposes. In this regard, Torrance and Pryor (1998: 50) have noted: "There is no sense in which teachers could treat such questions as 'items' in the sense of examination questions, and explicitly monitor and record the responses to them". This form of questioning can be illustrated in the following episode:

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Teacher:	Where might we use positive and negative numbers? [*He draws a T-chart on the chalkboard, placing a "+" in the upper left and a "-" in the upper right].* First, we call this "positive" [*pointing at the "+" and writing "positive" beneath it].* If you move this way [*walking and pointing forward],* this is positive. What am I doing?
Students:	[*calling out]* Forward, Walking forward; Moving.
Teacher:	Walking forward [*adding "forward" under "positive"].* Okay, if I climb a hill, what am I doing?
Students:	Up; Climbing; Upwards; Climbing up; Ascending; Rising.
Teacher:	Upwards [*adding "upward" to the list*]. Can you think of any other words that mean "positive"? Like temperatures rising *[adding "rising"].* Any other? [Original emphasis] (Davis 1996: 251).

In the above response, questioning is the same as telling. The pupils guess what the teacher is thinking. As Davis analysed it: "The teacher is not listening to the responses; he is clearly selecting those words that he wants to hear from among a chorus of answers" (Davis 1996: 251).

Research findings do not refute the fact that the above kind of questioning is necessary in certain circumstances, for example, when the aim of the teacher is to teach and assess factual knowledge, such as ability to remember place values of numbers or the capital cities of countries (James and Gipps 1998: 288; Oldfather et al. 1999: 21; Selly 1999: 5). However, they suggest that this type of interaction should not be an end in itself, but should lead the teacher and the pupil into critical dialogue seeking to elicit new information rather than 'the answers', already known by both the teacher and the pupil (Torrance and Pryor 1998: 105). Learning is increased when the pupils are engaged in critical talk that is, being asked to question, to predict, to account for their responses and to suggest alternative views to a given set of knowledge other than engaging them in questions of which answers are already known.

Wiliam (1999a: 17), therefore, suggests that the quality of factual questions should be enhanced by accompanying them with more open-ended or probing tasks. The open-ended tasks provide an insight into a pupil's level of understanding and "provide the teachers not just with evidence about what their students can do, but also what the

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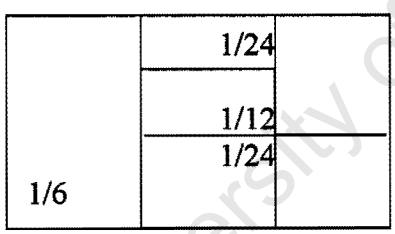
teacher needs to do next, in order to broaden or deepen understanding". Parke and Lane (1996) report that pupils at one school obtained low scores on a question that required them to choose the decimal number with the largest value from the list and to provide an explanation for their answer. The teachers in the project noted that in several scripts pupils had selected the correct answer but did not necessarily understand why. In this case, demanding that pupils explained their answers revealed those pupils who had understood the task at hand and those who had not understood the task and, therefore, still needed help to understand the task. A further example is provided by Davis (1996) where one teacher was able to generate different understandings and interpretations of adding fractions by requesting that pupils explained how they had worked out their answers:

Teacher: Number one [*writing 1/6 + 3/12 + 2/24]*: one sixth plus three twelfths plus two twenty-fourths. How much is that... Elaine?
Elaine: One half.
Teacher: Can you tell us how you got that?
Elaine: I can draw it.
Teacher: [*The teacher holds out the chalk and Elaine comes on the board to draw a picture of her arrangement of the pieces*]
Elaine: [*draws the following picture*]:



[*She explains*] The sixth *[piece]* is as tall as a half *[piece]* and these three pieces *[motioning across her diagram]* are as wide as a half.
Teacher: So they are exactly the same size and shape as a half piece when you lay them out that way. Good. Did anybody get any other answers... Truong?
Truong: Six twelfths.
Teacher: Can you show us how you got that?
Truong: You can use that picture [*referring to Elaine's picture*]. You have three twelfths already; two twenty-fourths together is another twelfths, and the sixth can be cut into two twelfths. That's is twelfths altogether.
Teacher: Okay. Good answer. Any other answers?... Van?
Van: Four eighths.
Teacher: Four eighths? How can you get four eighths using these pieces? [Original emphasis] (Davis 1996: 263, 266).

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In the above classroom discourse the teacher's questions do not seek pre-determined responses, but genuinely try to explore how the pupils interpret the task at hand.

Davis (1996: 252) notes further that the existence of open-ended or probing questions alone as in the above episode does not imply formative assessment. It all depends on how the questions are utilised in the course of teaching and on the attitude of the questioner (the extent to which the questioner is genuinely participating in the question by listening to the actions and responses it provokes). In the above episode, the teacher was listening attentively to the pupils' responses. He or she prompted and encouraged the pupils to demonstrate their understanding unreservedly unlike in the earlier example of positive and negative numbers where the teacher seemed to dominate classroom talk.

Another aspect of questioning that has been found essential to the formative use of assessment is the provision of enough wait time (Wiliam 1999a: 18). Evidence from research reveals that teachers normally pause for less than a second after asking a question before proceeding to ask another question or to answer their own question, if no answer is forthcoming (Rowe 1974). This type of practice encourages superficial dialogue and is only suitable for questions that call for memorised facts, that is, those that can be answered without thought (Black et al. 2002: 5). In cases where the wait time is increased to several seconds, its impact on the quality of pupils' responses and learning in general has been noticed. A teacher observed, for example, that

> ...Given more thinking time students seemed to realise that a more thoughtful answer was required. Now, after many months of changing my style of questioning I have noticed that most students will give an answer and an explanation (where necessary) without additional prompting (Black et al. 2002:5).

Besides teacher questioning, questions asked by pupils during the teaching and learning process have also been found by research to be effective in enhancing formative assessment (Beck and Leishman 1996: 58; Nakabugo 1998: 69; Wiliam 1999a: 18). Permitting pupils to question classroom knowledge not only provides intrinsic motivation to the pupils, but also acts as the teacher's window into the pupils' understanding, thinking and perceptions (Beck and Leishman 1996: 58). As one classroom researcher recalled, a pupil's motivation to learn and to participate in

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classroom activities was increased after that pupil's question was used to form basis for classroom instruction:

> Daniel is a quiet student who does not have a lot of self-confidence. He likes to be on the outskirts of a discussion, and he does not raise his hand to share his questions or wonderings. He usually mumbles them to himself or to a neighbour. After this episode [*when his question was considered for classroom discussion*], I noticed Daniel participating in discussions, choosing to share his thoughts with us rather than dropping comments to no one in particular (Beck and Leishman 1996: 58-9).

Furthermore, involving pupils in their learning through their questions engages them in exploring the subject matter in depth, as well as enabling them to focus on the content and skills that are the objectives of the lesson (Brophy 1983; Dillon 1986). In turn, pupils' questions can enable the teacher to detect and address pupils' weaknesses, and to give further instruction if necessary. For example, after reading a passage entitled: "Ganakwale and the Dragon" to her Grade Four class, a teacher gave the pupils the opportunity to ask questions about the text. The pupils asked several questions, two of which are contained in the following extract:

Learner 1	Did the grandmother know the dragon was going to get smaller?
Teacher	I don't know whether she really knew. What do the rest think?
Volunteer 1	She didn't know.
Teacher	Why do you say she didn't know?
Volunteer 1	Because as the monster started growing bigger, the grandmother started getting more scared.
Teacher	Does anyone say yes, she knew?
Volunteer 2	Yes, me ma'am.
Teacher	Why do you think so?
Volunteer 2	Because may be the Sangoma had already told her.
Teacher	Probably yes.
Learner 2	How did the dragon come into a chameleon?
Teacher	Would that be your question about the text?
Learner 2	Yes.
Teacher	Could you give me the kind of answer you could be looking for?
Learner 2	(No response).
Teacher	The rest of you, how would you answer the question: How did the dragon come into a chameleon?
Volunteer 3	(Narrates what had been given in the text).
Teacher	(Returns to learner 2): Is that the answer you wanted to hear?
Learner 2	Yes ma'am (Nakabugo 1998: 69).

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The ability of the pupils to pose questions about the story enabled the teacher to establish how they comprehended the text and where they still needed assistance to understand it. Formulating a meaningful question (such as the one posed by Learner 1) requires a higher level of comprehension skill, and more thought and insight, than answering one. This may also be used as a strategy to indicate how closely pupils can follow the story line as opposed to simply reading words or looking for factual information (which Learner 2's question calls for).

Pupils' questions can also be a useful avenue through which the teacher can enhance the capacity of the pupils to judge their own work and their ability to take much greater responsibility for their learning (self-assessment). The practice has been found in a number of studies to be crucial to good formative assessment (Fontana and Fernandez 1994: 407; Nabugo 1998:75; Torrance and Pryor 1998:149-50; Gipps et al. 2000: 10; Lines and Lambert 2000: 141-142). It involves metacognition, where pupils cognitively engage with knowledge and reflect on their learning with a view to self-correcting their miscues.

Clarifying the paramount role that self-assessment plays in the formative use of assessment, the Assessment Reform Group (1999: 7) asserted:

> Current thinking about learning acknowledges that learners must ultimately be responsible for their learning since no one else can do it for them. Thus assessment for learning must involve pupils, so as to provide them with information about how well they are doing and guide their subsequent efforts. Much of this information will come as feedback from the teacher, but some will be through their direct involvement in assessing their own work....

Effective self-assessment strategies have included, among others, pupils participating in self-assessing themselves by way of self-correcting rather than waiting for the teacher to provide answers (Nakabugo 1998: 75), and pupils making evaluations of their own learning rather than depending on the teacher to tell them how good or bad a piece of work is (Gipps et al. 2000: 10). It has been noted by the researchers that these self-assessment strategies not only increase pupils' understanding of the task in question, but also enable them to take control of their own learning without the teacher being the sole supplier of correct answers.

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Action researchers have gone further to assert that self-assessment itself is intrinsic to learning and have documented evidence to support their claim. An example is a personal anecdote in Lambert and Lines (2000: 141-142):

> ...we introduced a system which required students to mark each other. Fewer test essays were done: but each one was prepared by a class discussion on possible marking criteria relating to the question. The essay was then written during a following lesson, papers swapped and then marked for homework. A pair of students would be selected to take the lead in a critical discussion in the next lesson, based on the analysis of what had been read. Crucial in this system, we thought, was that the *teacher also wrote the essay and swapped papers with a student* [original emphasis]. The quality of the discussions improved very quickly, moving from general to subject-specific analysis of both questions and alternative answers. ...the students became more active participants in the learning process. Examination results also improved....

The effectiveness of self-assessment depends largely on how it is linked to the learning intentions of a task. Fontana and Fernandez (1994: 407-417), for example, report on a group of mathematics teachers who were trained in the use of self-assessment and implemented the ideas with their pupils. When pupils' achievements were compared with a control group who had not used the self-assessment methods, they showed a much greater gain. The self-assessment methods used included teaching pupils how to understand the learning intentions and assessment criteria for their work, allowing them to choose their learning tasks, and using tasks that allowed them to assess their own progress.

Theorists such as Anderson et al. (2003) implicitly warn that self-assessment, however, may be costly in terms of time and pupil motivation when the search for an answer or meaning is lengthy and unsuccessful. In such a case teacher intervention becomes necessary, that is, if the pupils cannot evaluate the success of their learning, or if they cannot construct meaning for themselves, they need some instruction from the teacher.

Peer-assessment can be seen as an extension of self-assessment. The research evidence shows that if used carefully, it can provide effective formative assessment that does not put much demand on the teacher (Stiggins 1994: 289; Black 1998: 90). It can also free the teacher "to observe and reflect on what is happening and to frame helpful interventions" (Black et al. 2002: 11). It involves pupils assessing one

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another's performance to provide feedback during the process of performance so as to shape the quality of the final product (McTighe 1996: 10-11). This is even more effective in what Malcolm et al. (1999: 42) call the "draft-redraft" process whereby the pupil's final performance is shaped during teaching and learning through teacher's and other pupils' comments:

> ...the final performance can be developed as part of learning. Learners can present an early draft / version of their essay / performance to us or other learners, then refine it in the light of critical comment and imaginative suggestions. This approach properly integrates teaching, learning and assessment. It also echoes the ways in which we learn in the workplace, where experienced workers help novices to develop their competence, on the way to producing a 'final performance' (Malcolm et al. 1999: 42).

However, some research on how teachers use peer assessment to improve pupils' learning has revealed that this form of assessment is often insufficiently utilised. Nakabugo (1998: 72) for instance, describes how some teachers restricted peer assessment to asking pupils to decide whether one pupil's response was correct and provided no opportunity for further comment. Yet, in instances where peer assessment has been used effectively it has proved its worth in enriching classroom instruction and has contributed to pupils' personal and social development (Parke and Lane 1996: 28; Black et al. 2002: 10-11; Weeden et al. 2002: 89). "Individual pupils learn how to communicate with their peers in non-judgemental ways. They soon find that if they want constructive feedback they have to be sensitive about the feedback they give others" (Weeden et al., ibid.).

Much of the enthusiasm for using formative assessment in classrooms apparent in recent years has been firmly based on research such as that discussed above. Clarke (2001:2ff), for example, makes an explicit reference to Black and Wiliam's work (which she describes as "the turning point") at the beginning of her text for teachers. Many of the classroom practices that have now become associated with formative assessment, have, however, relatively less empirical support, and may be regarded rather as "good sense" in assessment. Such approaches share common theoretical origins with the empirical work. They include, for example, marking, using criterion-referencing, authentic and performance assessment, clarifying learning intentions at the planning stage, sharing learning intentions and assessment of prior learning.

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The quality of feedback is often dependent on the marking of pupils' books and providing them with written feedback. Curtis et al. (2000), Lambert and Lines (2000) and others have argued that marking can be the main vehicle to support effective formative assessment because it can guarantee individually tailored feedback.

The nature of the comments given to pupils by teachers when marking their work is a crucial aspect to consider here. One of the key classroom experiences has been that grading every piece of work is counterproductive (Clarke 2001: 55). There is indeed substantial empirical evidence to the effect that pupils tend to neglect marking comments when a grade or symbol is given because the grade becomes the central measure of their ability and achievement (Butler 1988; Thomas and Oldfather 1997: 107). The mere use of ticks or crosses associated with closed tasks accompanied by a grade and brief comments such as 'good work' is more summative than formative, and is "of little use in helping pupils raise their performance or understand their achievement" (Lambert and Lines 2000: 161). Instead:

> The emphasis in marking should be on both successes against the learning intention and improvement needs against the learning intention. Focussed comments should help the child in 'closing the gap' between what they have achieved and what they could have achieved (Clarke 2001: 70).

Some teacher-researchers have attempted to experiment with alternative forms of feedback to grades. Clarke (2001: 60) has for example, experimented with three feedback forms, namely, a reminder prompt, a scaffolded prompt and an example prompt. A reminder prompt reminds pupils of what needs to be improved. A scaffolded prompt can be in form of a question, directive or an unfinished sentence designed to give the pupil a clue of what the task requires. The example prompt involves the teacher in modelling an example of the required response and asking the pupils to model theirs based on the given example. These strategies can be said to build on a notion of apprenticeship (Lave 1988) that derives from research on situated cognition. A teacher (the expert) using a reminder, scaffolded or example prompt, models an acceptable practice to the novice (the pupil), to assist him/her to close the gap existing between his/her current level of performance and the desired performance level.

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Criterion-referencing requires pupils' performance to be assessed against set criteria (Black and Dockrell 1984; Lambert and Lines 2000: 15-17). The teacher makes the criteria explicit to the pupils to ensure that they are aware of what is expected of them, and uses them as a measuring instrument to determine how well the pupils manage the learning tasks. Criterion-referencing is regarded by several educationists, such as Swezey in Lubisi (et al. 1997: 41-47), Pahad (1997: 41), and Black (1998: 58), as having greater potential to facilitate formative assessment than norm-referenced assessment.

Black (1998: 58) provides two statements to distinguish norm-referenced assessment from criterion referenced assessment:

- Is the fourth in the class in arithmetic
- Can add pairs of two digit numbers

The first statement is typical of norm-referenced assessment, where the pupil's performance is compared to the performance of other pupils in the same class. In this case the assessment of learning is competitive and one individual's ability to learn is measured in relation to other pupils' abilities. On the other hand, in the second statement the pupil's ability is assessed in relation to a given criteria and in relation to what he or she can do rather than in relation to what others can do. The purpose of the second statement, it may be said, is to know how capable the pupil is in arithmetic, what he can actually do, and subsequently to plan the way forward.

An emphasis on norm-referencing is seen to limit the use of assessment to improve learning. Assessment information furnished by norm-referencing is too narrow and inefficient to form a basis for diagnosing pupils' learning problems. The two statements provided by Black can be interpreted as follows: "Is the fourth in the class in arithmetic" is only enough to show the pupil's performance in relation to other pupils. It does not reveal what the pupil can do and, therefore, there is no basis to start thinking about the pupil's further learning. "Can add pairs of two digit numbers" shows what the pupil can actually do and provides a starting point to start engaging in dialogue with the pupil about his or her future learning. Hence, the use of criteria to describe performance is crucial if assessment is to be used formatively.

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Criterion-referencing is especially useful in the assessment of authentic or performance assessment tasks, since assessing the quality of these tasks requires explicit criteria against which to assess them. The terms "authentic" and "performance" are used in assessment reform "to convey the idea that assessments must capture real learning activities if they are to avoid distorting instruction" (Shepard 1992: 325). Authentic or performance-based tasks give pupils the opportunity to show what they can do i.e. they participate in real-life activities (Airasian 1991) and teachers the opportunity to assess pupils' performance while the pupils are performing the task (Baxter and Shavelson 1994; Stiggins 1994; Malcolm et al. 1999: 42). Tasks are set in real contexts that connect schoolwork to real world experience (Darling-Hammond et al. 1995: 4; Cuozzo 1996: 34; Wiggins 1996:18: 25). Airasian (1991: 252) notes: "Rather than asking pupils to tell what they would do, authentic and performance assessments require that they show what they can do" and Stiggins (1994: 164) puts it: "...we observe students while they are performing or we examine the products created, and we judge the level of proficiency demonstrated". Since performance and authentic assessment tasks are set in real contexts that connect schoolwork to real world experience, they encourage meaningful learning. This in turn motivates pupils to have a positive attitude towards school knowledge because they know that it is useful to their lives beyond the school. Research has confirmed that when pupils see classroom tasks as meaningful and relevant, they are more likely to have a positive attitude toward them and are more likely to produce the effort required for quality performance (McCombs 1984; Schunk 1990).

The example of a teacher in Delain (1995: 441) illustrates what an authentic assessment might be. She read a text entitled: "West Elementary is planning a visitors' night" to her Grade Four pupils. Afterwards, she asked the pupils to write an invitation to the visitors' night and to write directions or draw a map from their homes to the school. In this way, the text ceased to be a reading task and became a real life activity. If the teacher had been merely assessing factual knowledge, she would have asked questions such as: When was visitors' night? What was the venue? This would have been at the expense of developing the creativity and thinking skills of the pupils.

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Teacher mediation remains important. For example, in Boaler's research teachers sometimes found it necessary first to convey to the pupils a body of mathematical content before they could successfully embark on their authentic projects. She observed:

> ...Sometimes teachers taught the students some mathematical content they thought might be needed before the start of an activity. More commonly, teachers would introduce techniques to individuals or small groups when they encountered a need for them within the particular project on which they were working... (Boaler 1997:16)

Evidence for performance or authentic assessments is gathered through the observation of pupils using explicit criteria while they are engaged in tasks (Brown and Shavelson 1996). Emphasising the importance of using clear criteria while observing and evaluating a pupil's performance on any performance assessment task, Malcolm et al. (1999: 42) note:

> Just as with a written test, we do better at assessing live performances if we have clear assessment criteria and performance indicators, and design the task carefully. One way is to have a checklist, or 'marking sheet' for each learner, and complete the sheet during the performance.

The assessment criteria should inform the pupils of the anticipated performance targets clearly, that is, "how students will demonstrate the intended knowledge, understanding and proficiency" (McTighe 1996:7). When the performance targets are plainly set, pupils tend to shift focus from high marks acquisition, to focussing on high quality performance (Parke and Lane 1996). McTighe (1996:7) has emphasised: "When students have opportunities to examine their work in the light of known criteria and performance standards, they begin to shift their orientation from "What did I get?" to "Now I know what I need to do to improve".

Critics have, however, identified the weaknesses of authentic tasks, in particular that it is difficult to ensure a high degree of reliability because these tasks aim at assessing practical skills, extended thinking, and reasoning capacities that are very subjective in nature (Anderson et al. 2003). However, the high degree of validity implicit in authentic tasks has to be emphasised. For this reason if authentic assessments are used widely in any given assessment system for accountability purposes, it "could not only remove ...pressures for teaching isolated collections of facts and skills but also

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provide a positive stimulus for introducing more extended thinking and reasoning activities in the curriculum" (Resnick and Resnick 1992: 68).

Clarke (2001: 8) and Weeden et al. (2002: 86) have noted that whether it involves an authentic task or any other classroom-based learning, the success of formative assessment depends on the clarity of the learning intention or objective. Clarke (2001: 13) asserts that "with a clear learning intention, children are also clear about what they are really supposed to be learning". In this way, both the teacher and the pupils become focussed on the attainment of the intended learning. However, in order for it to become the focus, a clear distinction should be made between learning activities and learning intentions. She illustrates:

> To understand the effect of banana production on the banana producers is really an activity description. The learning intention should be: 'To understand the effect of production on producers' (Clarke 2001: 13).

She asserts that the pupils will use the example of banana production to start thinking about how any production affects its producer. However, if the learning intention had contained the word 'banana', pupils would have tended to focus on banana production and disregarded any consideration of other kinds of production.

Several researchers inter alia Crooks (1988), Ames and Ames (1984), and Butler (1988) have gone further to infer that even if the learning intention may be very clear, it cannot perform a formative role if it remains a hidden agenda to the pupils. It should also involve the teacher in getting the pupils to talk about it, interpret it or question it in collaboration with him or her. The main reason why this kind of dialogue is necessary is that without it, the learning intention may not be necessarily shared, and at worst it may not be understood by the pupils at all.

Clarke (2001: 20) suggests four ways in which the learning intention can be shared effectively with the pupils:

- The learning intention needs to be clear and unambiguous, so that the teacher can explain it in a way which makes sense to her and the children.
- The task has to match the learning intention for the children to have a chance of fulfilling it.
- The learning intention needs to be the main focus of feedback.

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- The learning intention has the greatest impact on children's understanding of the task and their progress if it includes success criteria as well as the learning intention itself.

The rationale of clarifying the success or assessment criteria in the sharing phase of the learning intention is to make pupils clear about the criteria that the teacher is going to use to judge their work. Clarification of the success or assessment criteria is also based on the view that "in order for the learner to improve she must have a notion of the performance, standard, or goal the teacher has in mind in order to be able to compare her actual performance with the desired performance, and to engage in appropriate action to 'close the gap' between the two" (Gipps et al. 2000: 7).

An example of a learning intention shared with pupils including the success criteria is given below.

> Learning intention in teacher's plan: To be able to use and apply doubling and halving.
>
> Shared with children: We are learning to use doubling and halving in everyday life.
>
> Success criteria: We can show more than one way to double and halve numbers (Clarke (2001: 27).

Classroom experience has also shown that attainment of new learning builds on what the pupils already know, and therefore, assessment of pupils' prior learning and establishing its links with the intended learning should be a starting point (Malcolm et al. 1999: 74; Wiliam 1999a: 18). This permits pupils to understand classroom knowledge while at the same time applying it to their everyday life. This practice is in line with the thinking of theorists such as Sfard (1998: 10) who have argued that if a learner is to construct new meaning in a new situation, he/she is bound to build on notions acquired previously from other related situations.

Malcolm et al. (1999: 74-5) provide two examples to illustrate how at the beginning of a maths topic on word problems and equations a teacher can build on what the pupils already know so as to stretch their thinking beyond it.

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Question 1: Solve for x: $3x + 4 = 10$

Question 2: Amos bought three mangoes and paid for them with a R10 note. The shopkeeper gave him R4 change.

a) What was the price of one mango?

b) How did you work out that? Write down the steps you took, in a way that would explain your method to someone else?

c) Talk about your methods with other learners, in a group. How many different methods has your group come up with? Explain the steps in your methods to each other. Which method does the group like best? Why?

d) See if you can write the problem as an equation, in terms of x. (x stands for a number whose value is the price of a mango in Rand). Your equation needs to relate x, the number of mangoes, the R10 paid, and the R4 change (Malcolm et al. 1999:74-5).

A close analysis of the above two questions reveals that Question 1 targets a particular mathematical technique. Dialogue between the teacher and the pupil (if any) cannot go beyond this particular line of thinking, that is, the pupil either gets the correct answer or not. Question 2, on the other hand, allows formative assessment as it permits the pupils to engage in dialogue with each other and with the teacher. As Malcolm et al. (1999: 74) noted about Question 2:

> Learners can try solving the problem and discuss different strategies... As we help, we pick-up learners' abilities not only in solving formal equations, but also in problem solving, communicating in mathematical language, understanding the meaning of an 'equation', seeing how various mathematical operations come in an equation, manipulating symbols... Finally, the open form of the question serves as a starting point for the topic, linking maths to everyday life and giving learners reasons for wanting the mathematics at all....

The limited scope of the empirical research literature on formative assessment is apparent in the preceding discussion. There is a danger that the popularity of formative assessment will lead to exaggerated claims for it that are not based on research findings. This has been the case in South Africa, for example, where formative assessment has been lauded despite scant understanding of what it involves (see, Nakabugo and Siebörger 2000).

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Formative assessment in mathematics teaching

The view of mathematics as a discipline with a known hierarchical set of rules, principles and skills to be transmitted by the teacher and mastered by the pupils (Steen 1988; Fisher 1990; Dossey 1992) has until recently been the dominant influence in the teaching and assessment of mathematics. In practice, teaching mathematics meant that the teacher transmitted given mathematical facts and information in a given hierarchical order to the pupils. The assessment of mathematics relied on end-of-unit written exercises, tests and examinations and an aggregation of pupils' scores on these tasks into a single score or profile of scores as an indication of what mathematics they know and can do (Webb 1992: 665; Department of Education 2000: 12). These exercises tapped a knowledge of mathematical facts, the "accurate recollection of the facts and the pupils' ability to quickly, precisely and coherently express these facts", in disregard of pupils' thinking processes and strategies (Niss 1993: 16). The tasks also assessed mastery of standard mathematical methods, procedures and techniques to obtain mathematical results, often in standardised contexts (Niss 1993: 16).

Of late, the shift from the view of mathematics as set of rules to be transmitted, to the view of it as a domain of enquiry (Mathematical Sciences Education Board 1990; National Council of Teachers of Mathematics 1989; Webb 1992) has raised the question of whether it is valid to administer tests of recall and to aggregate scores from these tests as an indication of a pupil's knowledge of mathematics, disregarding the thinking that produced the answers to those items (Romberg 1992: 107; Webb 1992: 662). It has led to new learning programmes that integrate assessment with the normal course of teaching and learning (Carpenter and Fennema 1988; Stenmark 1989; Ginsburg et al. 1992). Such programmes, it is held, have the potential of facilitating the assessment of pupils' thinking and understanding. Within mathematics - as - enquiry, end-of-unit written exercises, tests and examinations are only some of the many measures that may be used in the assessment of mathematics. Other assessment strategies that integrate with the normal course of teaching, such as observation, interviewing, and open-ended questions are also important (Ginsburg et al. 1992: 157).

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The focus on assessing understanding rather than the recall of knowledge also necessitates the broadening of assessment strategies, as pupils need to demonstrate their understanding and performance in a variety of contexts and in a variety of ways. Qualitative and quantitative measures need to be employed so as to permit them to show what mathematics they know and can do (Webb 1992: 663). Assessment strategies, such as interviews and observations, have more potential to reveal pupils' understanding and thought processes when they attempt mathematical problems, and how that understanding and thinking can be stretched to higher levels (Webb 1992: 663; Department of Education 2000: 12).

Furthermore, an emphasis on enhancing mathematical understanding demands that not only the correct responses a pupil makes, but the patterns of errors should also be analysed. The argument is that even a wrong answer may result from logical and sensible processes (Ginsburg and Opper 1988: 3; Hiebert and Carpenter 1992: 89). Yet there are also instances in which individuals can perform a given task correctly, but with no understanding. Wiliam (1999a: 16) observes: "Unless the questions used are very rich, there will be a number of students who manage to give all the right responses, while having very different conceptions from those intended".

The two views of teaching and learning mathematics discussed above, mathematics as a set of transmitted rules and procedures and mathematics as an enquiry process in problem-solving contexts, have both been found necessary for meaningful learning in mathematics to take place (Boaler 1997, 2000). For instance, when a teacher conveys a given body of mathematical knowledge, rules and procedures to pupils, it is useful to give more instruction when the pupils are completely stuck and cannot go any further in making meaning of given mathematical tasks. However, until the pupils are permitted to work with the rules and procedures through thinking about them, interpreting them, and adapting them, they will learn them superficially and the learning may not be long lasting (Boaler 1997: 89; 2000: 116). This assertion is in agreement with Piaget's belief that practices that focus only on learning teacher-transmitted views promote learning of a superficial kind that results in hardly any fundamental cognitive change (Piaget in Cole 1996: 87). Fundamental cognitive change is more likely to occur when the teacher transmission is reduced to allow for a

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more equal balance between the views of the teacher and the pupils' personal interpretations.

The implication is that an approach that presents pupils with mathematics tasks that make it possible for them to engage actively with the content through performing, explaining and enquiring with the teacher has more potential to reveal gaps in pupils' understanding and to facilitate formative assessment, than when pupils are only passive recipients of the content.

Conclusion

This chapter has examined the trends in assessment reform and the issues involved in using assessment to aid learning. It has located Uganda's policy of continuous assessment within contemporary debates about assessment and reviewed the theoretical and practical basis for the use of formative assessment.

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CHAPTER 3

CONTEXTUALISING CONTINUOUS ASSESSMENT: Uganda

This chapter describes how the Ugandan attempts to interpret and implement continuous assessment fit the trends described in the previous chapter.

Continuous assessment as interpreted by the Uganda National Examination Board

In 1994, four years after the National Education Policy Review Commission (NEPRC) report was published, the Ministry of Education and Sports gave the Uganda National Examinations Board (UNEB) the task of spearheading the implementation of continuous assessment in primary schools (UNEB 1994).

While the NEPRC had recommended the use of continuous assessment, it did not specify a working definition and a framework within which teachers would implement it. Thus the first task of UNEB was to define continuous assessment and to create the framework within which teachers could carry out the new system of assessment.

UNEB defined continuous assessment in a way that distinguished between continuous assessment used summatively and continuous assessment used formatively, albeit unconsciously.

It defined continuous assessment used summatively as,

> ...the systematic collection of information on pupils over a period of time from the time they enter school to the time they complete their course of study. The information could be in the form of marks from tests, grades, record of observed changes in behaviour, sporting activities, art and crafts pieces, music, etc. When all these are put together, they give us a fairer and true picture of what achievement the pupils have got as a result of being in school (UNEB, nd a: 1).

The above definition emphasises the information that can be accumulated about an individual pupil throughout the course of primary schooling, without considering how that information might be utilised to enhance the learning of the pupil. The focus is on summing up what the pupil has achieved.

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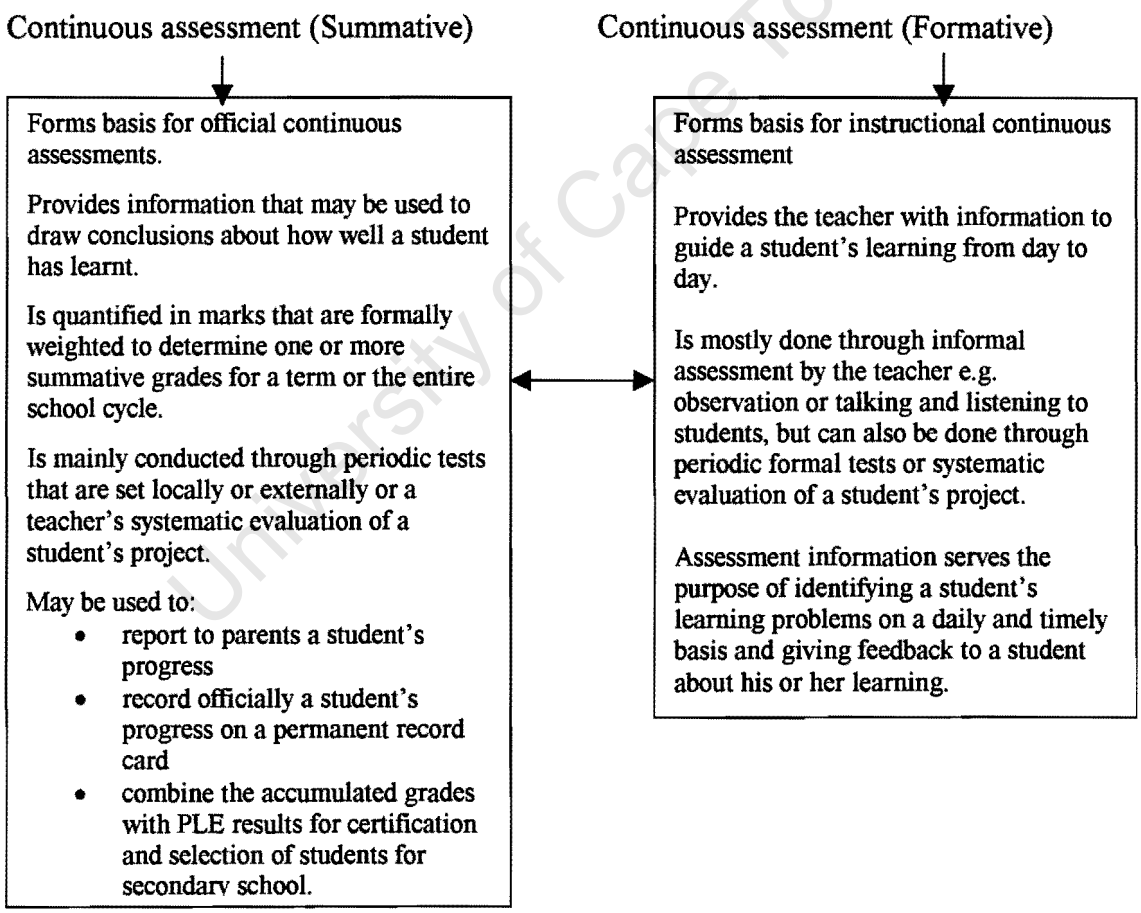
Formatively defined, UNEB states that in continuous assessment "we must constantly find out whether pupils are making progress or not, so that we can know how best to help them learn if they are not learning; or increase their rate if they are learning at all" (UNEB nd a: 1). This definition focuses on using the evidence from assessment to increase the learning of pupils.

Drawing on the above definitions and wanting to make continuous assessment consistent with the aspirations of the NEPRC and Government White Paper (1992), UNEB put in place a framework that distinguished between the two forms of continuous assessment. It is summarised in Diagram 3.

DIAGRAM 3: **UNEB's continuous assessment framework**



(UNEB nd b:1)

Accordingly, continuous assessment for formative purposes became the basis for what UNEB termed "instructional continuous assessments" and continuous

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assessment for summative purposes the basis for "official continuous assessments" (UNEB nd b: 1).

In the framework, continuous assessment for formative purposes provides the teacher with information to guide a pupil's learning from day to day. It consists mostly of informal continuous assessments by the teacher, such as reviewing homework, observing pupils, talking to pupils, and listening to pupils' responses. It may also be carried out through tests and quizzes, as well as systematic evaluation of projects and performances, or term tests set locally by a group of teachers. Information obtained from this kind of continuous assessment serves the purposes of identifying a pupil's learning problems on a daily basis and in a timely way and giving immediate feedback to a pupil about his or her learning (UNEB nd b: 1).

Continuous assessment for summative purposes provides teachers, pupils, parents and school officials with information to draw conclusions about how well a pupil has attained the learning objectives of the official curriculum. Marks are formally weighted and combined according to a prescribed formula to be used to determine one or more continuous assessment grades for a pupil for a given term or for the entire school year. It is mainly conducted through written end-of-topic-tests, quizzes, teachers' systematic evaluation of a pupil's projects and termly tests set locally by a group of teachers. This type of continuous assessment serves several purposes. It should be used in:

- periodically reporting to parents a student's progress;
- officially recording a student's progress in attaining the curriculum's major learning objectives on a permanent record card; and
- combining the summative grades with PLE results for certifying students and selecting students for secondary school (UNEB nd b: 1).

UNEB acknowledges that summative and formative assessment overlap in the holistic assessment of pupils. It recommends that, unlike in the past when the focus was merely on using assessment for grading and recording purposes, in the new framework teachers should also use assessment to aid the learning of pupils. This is reflected in what UNEB has outlined as the purpose of continuous assessment:

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For formative purposes:

> Continuous assessment will keep check on pupils' learning progress. Teachers will no longer teach subjects, but will teach **pupils** [original emphasis]. Pupils' learning problems will be identified early enough so that the teacher will focus on these and help pupils overcome them.
>
> It will help teachers judge their own teaching. If certain problem areas appear, the teachers will re-examine themselves whether it is they who have NOT taught well or pupils who have NOT mastered what has been taught (UNEB nd a: 2).

For summative purposes:

> Continuous assessment will be a fairer way of judging pupils' performance. Different subjects will be judged and put together over a long time to give the true picture of a pupil's performance.
>
> It will help pupils make progress and earn scores [original emphasis] each day (UNEB nd a: 2).

That UNEB's continuous assessment framework makes a distinction between the summative and formative uses of assessment as highlighted above, is largely in line with the aspirations of the NEPRC and Government White Paper as well as with contemporary understandings of continuous assessment. The difference between its emphasis and present trends in continuous assessment is that it makes reference to one-way formative assessment only and no reference at all to two-way formative assessment.

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From policy to practice

Information to teachers regarding continuous assessment

In response to the recommendations on testing in continuous assessment in the White Paper (UG 1992: 52), UNEB produced sample test booklets in the four core subjects of the primary curriculum starting with Primary [years] 5 and 6 (UNEB 1994; Weerhe 2000: interview). These were pre-tested and supplied to primary schools in five or more districts in each region at the beginning of 1998. Short courses (two to three day workshops) were mounted at district and sub-county level to prepare

teachers to use the tests in their teaching (Namubiru 1999; Weerhe 2000: interview). Teachers of P5, 6 and 7 in each school in the district were targeted in the first phase that took place between April-August 1999:

> After distributing these materials we mounted courses nationwide because we wanted to get nearer to the pupils themselves. We chose the sub-county as a unit. We asked our education managers in the districts to convene teachers of P5 to 7 in a selected centre for at least two to three days and then we got officials from Uganda National Examinations Board and from the Ministry of Education Inspectorate and the National Curriculum Development Centre to go and train the teachers. We have not been able to cover all the teachers because we have got approximately 90,000 teachers but at least in Phase 1 that took place in April-August 1999 we were able to cover close to 30,000-40,000 teachers countrywide (Weerhe 2000: interview).

Teachers were expected to start using the sample tests in their teaching in 1999 and they were required to start setting their own tests after gaining experience from using the provided sample tests. The content of the test booklets was what was thought to be useful questions and their solutions, drawn from subject matter in the primary curriculum. The selection of the questions included in the test booklets was implicitly informed by an emphasis on critical thinking, as opposed to rote learning. Thus the questions included higher order cognitive skills to encourage pupils to think critically and apply what they had learnt in varied contexts. It was assumed that teachers would get used to handling such questions and that their teaching would change from teaching pupils to learn by rote and memorise, to teaching pupils to think critically (Achana[6] 2000: formal workshop presentation). Teachers were expected "to use the syllabus, make lesson plans, teach, and after teaching what they thought was substantial to give a test" (Weerhe 2000: interview). The key issue according to Weerhe was for the teachers to use feedback from these tests for improvement of teaching and learning:

> It is not testing per-se, but testing for diagnostic purposes. You have found weaknesses, you must do remedial teaching. You must get the weak learners up to a standard but you mustn't hold back the fast learners. You must give them enrichment to enable them to attempt more and more harder tasks.... It is only then that these tests will be of any use (Weerhe 2000: interview).

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6. Ms Achana is one of the national co-ordinators of continuous assessment and one of the trainers.

Other materials provided to teachers to help them with implementing continuous assessment included a pupils' score record book, cumulative record cards and a users' guide (UNEB nd c: 1).

The score record book was planned to contain all the pupils' marks obtained from each test administered. The book is divided into three sections each with several columns, representing the tests to be recorded in each of the three terms. The book provides for thirty-two tests for each academic year. There is space between each section for the average of the ten or so sets of scores. The average for the term is then interpreted to give the level of performance to be entered on the pupils' cumulative record cards. Not much information is provided to teachers on the use of the score record book, apart from cautioning them to keep it neat: "Care must be taken by teachers when entering the scores in this book. It must be kept **very very neat** [original emphasis]" (UNEB nd c: 1).

> We emphasise care and diligence in handling and keeping this record because the pupils' raw scores will be the basis upon which the academic part of the cumulative record card will be interpreted and then accurately transferred. Besides, the raw scores will indicate which tests were difficult for the pupils and, therefore, areas where remedial teaching must be done (Bukenya in UNEB 1999a: Foreword).

It does not provide for statements of pupils' performances in qualitative terms, such as strengths and / or weaknesses in specific areas. It ends with questions to the teachers to remind them of what they should keep in mind when using the book. The questions clearly have summative assessment in mind. They include:

> Have you recorded the pupils' scores correctly?
> Have you worked out the termly average for each term?
> Have you given the annual average? (UNEB, 1999a: back page).

Though the raw scores indicate how successful pupils have been in the tests, there is no space for any further information regarding pupils' learning strengths and weaknesses.

The cumulative record card is also for purely summative purposes. It is meant to keep an overall record of performance of a pupil throughout the entire period of schooling. Four overall levels of performance are categorised (see Diagram 4). The card works on average marks per term derived from aggregating the test results in the score

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record book. It is these average scores that UNEB intends to combine with PLE results to select pupils for secondary school.

DIAGRAM 4: **Extract from the cumulative record card**

LEVELS OF PERFORMANCE

The four levels of performance are:

	LEVEL	MARK RANGE
1.	POOR/WEAK	0-30
2	FAIR	31-59
3.	GOOD	60-79
4.	V. GOOD / EXCELLENT	80-100

INDICATE PERFORMANCE USING NUMBER 1, 2, 3, 4 ACCORDINGLY

SUBJECT	LEVEL OF PERFORMANCE		
	YEAR 5 TERM 1	YEAR 5 TERM 2	YEAR 5 TERM 3
ENGLISH			
MATHEMATICS			
SOCIAL STUDIES			
SCIENCE			
READING			
WRITING			
ART & CRAFT			
MUSIC			
PHYSICAL EDUCATION			
AREA LANGUAGE TAUGHT			

(UNEB 1999b: 4).

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Schools have been provided with the user's guide as a reminder of what they are expected to do with the provided materials. The guide gives "ideas as to when tests can be administered, how the scores should be entered, when to enter information on the cumulative record cards, what to do after test administration and entering scores" (UNEB nd a: 4).

Therefore, the information provided to the teachers in the form of materials has focussed mainly on continuous summative assessment. There is a tendency to emphasise testing (as evidenced by in the fact that the first materials produced by UNEB were standardised test booklets and the training workshops for teachers

concentrated on how to administer and process these tests), with feedback and re-teaching taking place after marking a given test. Feedback is to be normative ("poor", "fair", "good", "excellent") with no room to disclose any detailed information regarding pupils' learning strengths and weaknesses.

Teacher support services

In-service training for teachers and teacher trainers in the form of short workshops has been conducted by UNEB. These workshops have similarly promoted summative continuous assessment and recording of students' progress. An example of one such intervention was a "Workshop for Centre Co-ordinating Tutors (CCTs) on Continuous Assessment".[7]

Its overall goal was to equip CCTs with tools for monitoring the implementation of continuous assessment and to provide them with skills for supporting practising teachers. The specific objectives provided for the workshop were to:

a) examine and internalise the concept of continuous assessment in the context of assessment reform;
b) review the process of continuous assessment implementation one year after materials had been delivered to schools;
c) equip CCTs with skills of monitoring continuous assessment implementation;
d) lay strategies for CCTs to offer Teacher Support Services to teachers while implementing continuous assessment; and
e) identify opportunities and challenges offered by continuous assessment at this initial stage of implementation, and to devise means and ways of overcoming challenges to enhance systematic implementation of continuous assessment.

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7. The CCTs are part of a reform project funded by the United States Agency for International Development (USAID) in Uganda. The project entitled Teacher Development and Management Systems (TDMS) works with Primary Teacher Training Colleges to offer pre-service and in-service training for all class teachers and headteachers. For the in-service training part of the project, each sub-county is allocated a tutor called the Centre Co-ordinating Tutor (CCT) who supervises and offers support to teachers within that area. The CCTs are in more regular contact with the teachers than UNEB or District Inspectors of Schools. It was this that made UNEB use the services of the CCTs to monitor and offer support to teachers in the use of continuous assessment. The workshop took place on 7-8 June 2000 at Lira in the All Nations Children's Centre.

Some of the content of the workshop included defining continuous assessment and the opportunities it presented, suggestions on how teachers should use the continuous assessment materials, and guidance for school visits for the CCTs to give them hands-on experience of what they were expected to do when they monitored teachers using continuous assessment.

Continuous assessment was defined in several ways that included:

- The systematic recording of the child's performance in a class termly, monthly or weekly.
- Judging a pupil's performance right from the time the child joins school up to the end.
- A method of using more than one tool of assessing the child's performance.
- Monitoring and evaluating the progress of the child continuously.

The opportunities that continuous assessment provided were stated in the following ways:

- It is a fairer means of assessing pupils. In PLE a child who has been in school for seven years sits an examination of two hours at the end of the programme. Not everything can be covered in this short period. Continuous assessment covers wider ground.
- Judgement of pupils is spread over a longer period of time. This reduces bias.
- It helps reporting in a broader way because one has been conducting the tests on a regular basis.
- It gives the teachers the chance to have a say in the overall evaluation of their pupils.
- It helps to identify talents of a pupil better than traditional pencil and paper examinations can do. With continuous assessment, pupils are assessed in and outside the classroom.
- It is child-centred. One teaches the pupil based on what one's observation of what the pupil can or cannot do. With PLE the state of the pupil is not put into account but continuous assessment allows the teacher to observe the pupil's progress at the time of the assessment.

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- It can be used to diagnose problems that pupils are experiencing. It enables the teacher to help the pupil in the areas where the pupil is weak before it is too late.
- It helps the teacher to effectively plan and adapt and revise his or her methods to allow for remedial teaching, for example.

Suggestions on using the continuous assessment materials included telling teachers to set tests from the test booklets after they had covered any given topic, awarding marks and entering the marks into the score record books, computing the average mark for each pupil for each term and entering it onto the pupil's cumulative card.

As part of the workshop visits to schools were undertaken to investigate the number of pupils in P5 and 6, the date when the school had received continuous assessment materials, the storage and retrieval system of the materials in the school, as well as usage and problems encountered with the materials.

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General findings from the visits included:

- Teachers were recording marks on loose sheets in their prep books instead of entering them in the score record books.
- Teachers were only using the test booklets, and not the score record book and cumulative record cards.
- Some teachers gave tests that they did not mark.
- Some tests were marked but the marks were not recorded.
- Most classrooms were overcrowded.
- Most schools received the continuous assessment materials in 1998 and 1999.
- Most teachers stored the materials in their homes because schools lacked storage facilities.
- Not enough materials were supplied to schools.

The workshop facilitators confirmed in conversation that the issues presented in the workshop were more or less the same as those presented at previous workshops. Similar workshops were to be delivered to CCTs and Inspectors of Schools in other parts of the country.

Conclusion

The Ugandan policy framework appears to situate continuous assessment exclusively within a mastery learning approach. This is evidenced by the emphasis that it puts on end-of-unit tests. While the policy framework distinguishes between the summative and formative uses of continuous assessment, and nominally promotes both, the preceding description shows that practical attempts to help teachers utilise continuous assessment in the classroom have focussed almost entirely on the summative requirements alone. It is possibly assumed by UNEB that teachers do not require training in formative assessment, in an apparent belief that they only need help with the technical aspects of summative assessment:

> We have told teachers, 'you have been recording pupils' marks in little exercise books....' So we told the teachers that you have been carrying out continuous assessment and now we are helping you into systematic record keeping other than saying that we are introducing something very new (Kigongo 2000: interview)[8].

The present research investigates the neglected formative aspect of continuous assessment and its relation to the summative requirements. In the next chapter the processes involved in the investigation are described.

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8. Mr Kigongo Musiige is a specialist in education evaluation, mathematics and science and the Acting Head of the Science Department at the National Curriculum Development Centre (NCDC). He worked in conjunction with UNEB in the preparation of teachers for continuous assessment.

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CHAPTER 4

INVESTIGATING THE RESEARCH QUESTIONS: Methodology

This chapter is an account of the methods used and the factors that played a role in the design of the study. It explains the process of data collection and reflects on some of the limitations of the research.

Situating the research within a paradigm

The research is located within the qualitative paradigm, as its main focus is to analyse and provide an account of the ways in which continuous assessment is understood and practised by teachers and its relation to facilitating learning.

Research within a qualitative research paradigm is an inquiry process of understanding a social or human problem, based on building a complex, holistic picture, formed with words and actions of informants, and conducted in a natural setting (Creswell 1994: 1). The word qualitative implies an emphasis on processes and meanings that are not solely examined or measured in terms of quantity, amount, intensity or frequency (Denzin and Lincoln 1994: 4). In common with all qualitative research, the present research is interested in the socially constructed nature of reality, the intimate relationship between the researcher and what is studied, and the situational constraints that shape inquiry. It seeks answers to questions about how the social experience of teachers is created and given meaning.

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The reason for the choice of a qualitative research paradigm for the research is captured well in the following description:

> ...qualitative researchers study things in their natural settings, attempting to make sense of; or interpret, phenomena in terms of the meanings people bring to them. Qualitative research involves the studied use and collection of a variety of empirical materials... that describe routine and problematic moments and meanings in individuals' lives. Accordingly, qualitative researchers deploy a wide range of interconnected methods, hoping always to get a better fix on the subject matter at hand (Denzin and Lincoln 1998: 3).

The "natural setting" is the schools and classrooms where teachers engage in continuous assessment, and the "meanings that people bring" are elicited from

interviews and through observation of the teachers' actions in the classroom. The "wide range of interconnected methods, hoping to get a better fix on the subject matter at hand", includes documentary analysis of materials such as pupils' exercise books and holding workshops with the teachers.

Major studies of assessment in schools such as Torrance and Pryor (1998), Gipps, et al. (2000), Black and Harrison (2001a&b), Clarke (2001) and Black et al. (2002) have been conducted in a largely qualitative manner. These researchers have also relied on detailed observations of classroom life and assessment processes, and have had as their perspective the interpretations and actions of pupils and teachers.

Case study research

For the purposes of the research, a number of cases of teachers located in different schools was selected in order to understand the ways in which they use continuous assessment. The research therefore involves a "collective case study approach" where cases are analysed in terms of their specific and generic properties (Denzin and Lincoln 1998: xiv). The research treats the description, analysis and interpretation of the data from the selected cases in a way that contributes to an understanding of the primary education in Uganda generally.

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The main focus of the research is the teachers, who are the cases, as "it is teachers that are the primary assessors of children" (AMESA 1997: 14,18). The qualitative case study approach is characterised by the main researcher spending substantial time on site, personally in contact with the activities and operations of the case (Denzin and Lincoln 1994: 242). What researchers are unable to observe for themselves is obtained by interviewing people who did see it or by finding documents regarding it.

Fieldwork for this research spanned two periods of six months (June – December 2000 and June – December 2001) during which time visits were made to and meetings held with the teachers and other participants in the study. The processes of sampling and data collection are outlined in the following sections.

Selection of schools and teachers

A purposive sampling approach was employed in the selection of the research sample, to seek out groups, settings and individuals "where the processes being studied are most likely to occur" (Glaser and Strauss 1967: 62-65).

After the permission for the research was granted by the Uganda National Council for Science and Technology (UNCST), contact was made with the Uganda National Examinations Board (UNEB), which is spearheading the implementation of continuous assessment in Uganda. Informal conversations were held with the national co-ordinator of continuous assessment to inquire about how UNEB is preparing teachers for continuous assessment, which districts had been reached so far (and when), who apart from UNEB, was assisting in preparing teachers for continuous assessment, and which teachers had so far been the initial target in the preparation exercise.

On the basis of the information obtained, the following was decided upon:

- A decision was made to conduct the research in four districts, one from each of the four regions in the country. They were: Lira District (Northern Region); Mbarara District (Western Region); Mbale District (Eastern Region) and Mpigi / Wakiso District[9] (Central Region). The four districts were among the first to receive training in continuous assessment and therefore it was hoped that it would be possible to locate schools in those districts that had been engaged in continuous assessment for some time. The selection of districts located in all four geographical regions of the country was based on the view that the research ought to be of national relevance and therefore it was crucial to select a relatively representative sample.[10] See Map 1 for the location of the four districts and how far apart they are from one another.

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9. Mpigi has since been divided into two parts: Mpigi and the new district of Wakiso. The schools selected were located in the part that became Wakiso District.
10. It was also important to have people from different language, cultural and economic backgrounds, to examine how continuous assessment has been adapted to varying contexts, rather than locating the research in the central region that tends to

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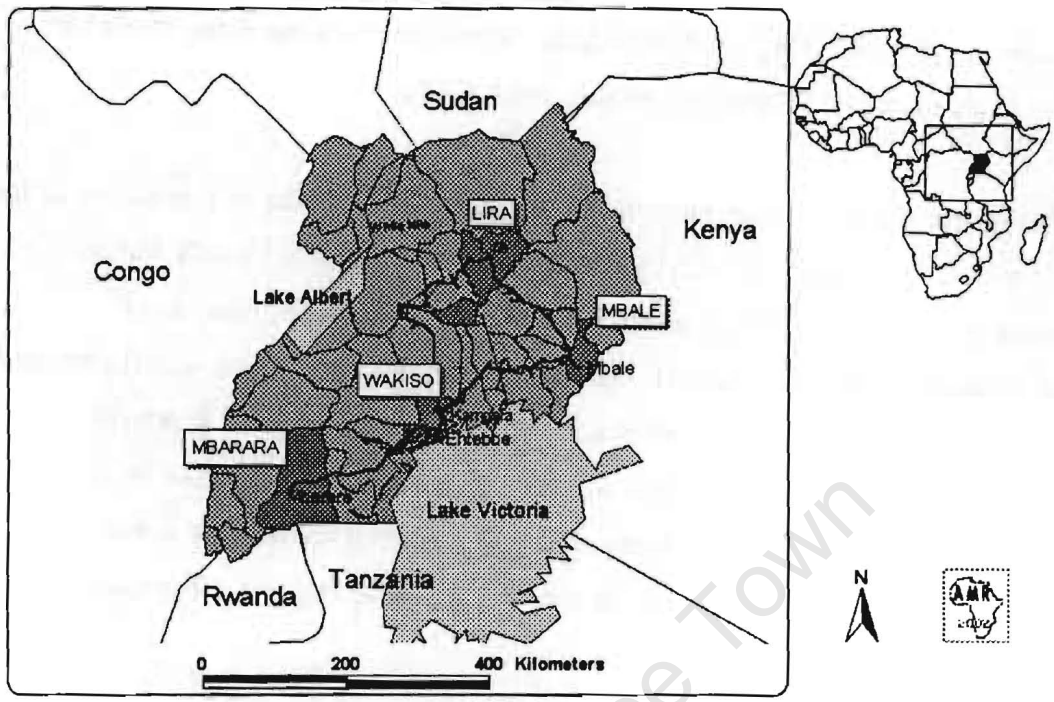
MAP 1: **The districts selected for the study**



- The co-ordinator having disclosed that the initial target in the implementation of continuous assessment was P5 and 6 teachers, it was decided to conduct the research among P5 teachers of mathematics. P5 teachers and pupils were assumed to be relatively free from the pressure of the Primary Leaving Examination (PLE), unlike their P6 counterparts. The PLE is at the end of P7. In most schools preparation of pupils for this examination starts in primary five, but there is more pressure on teachers in primary six and seven. Mathematics teachers were preferred to those of other subjects because mathematics is generally perceived as a difficult subject that needs regular follow-up of pupils and constant interaction between the teacher and the pupil (Niss 1993: 11; UNCST 1999). Moreover, in many countries performance in mathematics serves as a gateway to further education, even for courses that have no mathematical content at all (Niss 1993: 11). Given the high status of mathematics, it was assumed that if teachers were engaging in continuous assessment at all, it would be at least as prevalent in mathematics classrooms as in any other subject.

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dominate society and commerce (where the researcher was based).

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The next task involved the selection of the schools for the cases. Contact was made with the District Education Officers (DEOs) in the four districts. They were each asked to suggest four schools in their districts where the research could be conducted on the basis of how enthusiastically and how well they had started using continuous assessment drawing from recent school inspection reports in the district. In all, four schools in each district (two well-resourced and two poorly-resourced), (a total of 16) were selected. These schools were judged by their respective DEOs to be doing well in as far as using continuous assessment was concerned. Unfortunately, in Mbale District, at critical times in the research process, two of the schools, located in rural areas, were inaccessible due to impassable roads during the rainy season. Later a decision was made to eliminate these from the study, and concentrate on the two schools in this district whose accessibility was assured at all times. There were then fourteen schools.

Introductory visits were made to each of the fourteen schools. The headteachers were approached and briefed on the research. They were requested to grant permission for access to their primary five teachers of mathematics. All headteachers agreed, and in the two schools where there was more than one P5 teacher of mathematics, the headteacher were requested to nominate one of the teachers.

The teachers were then approached individually and briefed on the nature of the research and its usefulness. They were asked whether they were using continuous assessment to assess mathematics, to which they all responded in the affirmative. Their co-operation and participation in the research as key stakeholders and as willing and interested partners was sought and secured.

Each of the teachers was requested to select from his class one "upper ability", one "middle ability" and one "lower ability" [11] mathematics pupil (42 pupils in all). The main intention was to investigate these pupils' perceptions and interpretations of the feedback that their teachers gave them and to analyse the teacher-written feedback in these pupils' exercise books. It was hoped that sampling of pupils of varying abilities

11. The terms "upper ability", "middle ability" and "lower ability" to classify pupils are used by Clarke (2001:123-124).

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would give an overall picture of the nature of the written feedback that the teachers gave pupils when they marked their work.

Description of the cases and schools

All fourteen cases were male teachers teaching mathematics in P5. The gender of the teachers was not a consideration in the research. However, it should be pointed out that in all the sixteen schools that were originally approached for inclusion in the research, mathematics in the upper classes (P5 – 7) was taught by male teachers only. It was later disclosed by all headteachers in these schools, through informal conversations, that as mathematics is perceived as a "tough" subject, most women teachers do not readily accept teaching in the upper classes. This generalisation, though not tested, is probably widespread in Uganda. In one of the schools in the sample the case study teacher was surprised to see a woman researching mathematics. This apart, the relationship between the male teachers and a young woman researcher was good without any noticeable biases. Arguably this might have been because most of them were pursuing further studies and had encountered female mathematics lecturers previously.

For ethical reasons and to safeguard their confidentiality, the teachers have been given pseudonyms chosen from the regions where their schools are located. The names are arranged alphabetically as: Batte, Ddumba, Kato, Lule, Ogwang, Ojok, Oloya, Opoka, Rugasira, Ruhweju, Tuhirirwe, Tukahebwa, Walimbwa and Wandera. The schools where they taught are identified as Schools A, B, C, D, E, F, G, H, I, J, K, L, M and N.

Schools A, C, F, H, K, L and M were poorly-resourced while Schools B, D, E, G, I, J and N were well-resourced. The poorly-resourced schools were characterised by factors such as poor buildings with poor ventilation and mud floors, poor or no desks at all, and insufficient textbooks. While in the schools identified as being well-resourced pupils had good reading desks and it was possible to see a textbook being shared between two pupils, in the poorly-resourced schools most of the pupils sat squashed on the floor and a textbook was shared between five or more pupils. See an

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example of a class from a poorly resourced school and a class from a well-resourced school (Photographs 1 and 2, p. 67-68).

The following is an introduction to the teachers.

Batte taught at School A located in a rural area of Wakiso District in Central Uganda. It is a mixed [i.e. coeducational] day government school with very poor facilities and to say the least, a dilapidated school. It comprised 292 pupils at the time of the research. The classroom walls are not plastered and it is poorly ventilated. A community of peasant people surrounds it, and all the pupils walk to the school from these communities. It relies exclusively on the funds provided by the government under the Universal Primary Education Scheme (UPE). Batte had a Grade Three Certificate of Education[12] and was registered for a Diploma in Primary Education at the time of the research. He had been teaching for five years. He was observed teaching and assessing a class comprised of 45 pupils.

Ddumba taught at the well-resourced School B located in the rural part of Wakiso District. It is a mixed boarding government school of 1 500 pupils. It was started by the Church of Uganda in 1935 as a boys' boarding school, but later the government took it over, and realising that the school needed more pupils, the parents decided to make it coeducational. History has it that it was meant to be a school for the children of the Buganda chiefs. However that may be, even today only rich parents can afford to have their children enrolled at it because of the high school fees. Ddumba had ten years teaching experience and held a Grade Three Certificate of Education. At the time of the research he was completing a Diploma in Primary Education. The class in which he was observed teaching and assessing had 79 pupils.

Kato taught at the rural School C in Wakiso District, which, like School A, has very poor facilities and is surrounded by a community of peasant farmers. It is a mixed day

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12. The Grade Two Certificate of Education was the lowest qualification in Primary Teacher Education in Uganda before the Ministry of Education eliminated it some time back. It was awarded to students who began teacher training after completing the primary schooling (Primary Seven) – the PLE. The Grade Three Certificate of Education is currently the lowest qualification in Teacher Education, being awarded to students who begin teacher training after Ordinary Level (Senior Four).

government school of 392 pupils. Kato had taught for the past five years and held a Grade Three Certificate of Education. At the time of the research he was registered for a Diploma in Primary Education. He was observed teaching and assessing a class of 62 pupils.

Lule taught at the well-resourced School D, in Wakiso District. It is a government boys' boarding primary school, founded by the Catholic Brothers of Christian Instruction. It attracts mainly children from rich families who are able to supplement government funding. For instance, the government pays for 14 teachers, but the school has 15 extra teachers maintained by the parents. Lule is one of the 15 extra teachers. He holds a Diploma in Primary Education, in addition to a Grade Three Certificate of Education, and had seven years teaching experience. He was observed assessing a class of 53 pupils, but he also taught the subject to another P5 stream of 53 pupils.

Ogwang had five years' teaching experience. He holds a Grade Three Certificate of Education and, at the time of the research, was completing a Diploma in Primary Education. He taught in the well-resourced School E, a mixed government primary school catering for both day scholars and boarders, located in the municipality of Lira District in Northern Uganda. The school comprised 1 392 pupils from varying economic backgrounds. He was observed teaching and assessing in a class of 55, but he also taught the subject in two other P5 streams of the same number of pupils.

Ojok taught at the poorly-resourced School F, a mixed day government school found in a rural part of Lira District. The school consisted of 886 pupils. He had sixteen years teaching experience, and held a Diploma in Primary Education, in addition to a Grade Three Certificate of Education. He was observed teaching and assessing a class of 126 pupils. The school had unplastered classrooms with no furniture at all. Apart from pupils who could afford to bring chairs from their homes (which they protected jealously during break times for fear that they would be stolen by their peers), the majority sat squashed on the floor (see Photograph 1).

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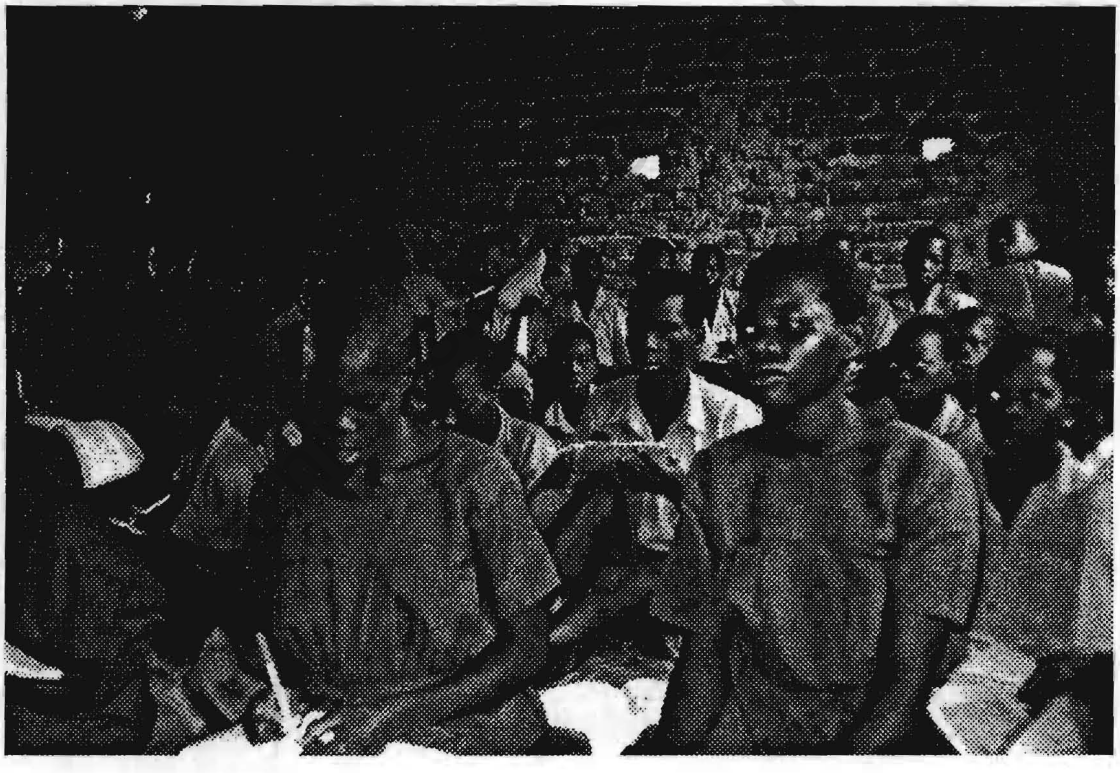
Oloya taught at the well-resourced School G, a privately owned boarding primary school located in the municipality of Lira District. It started operating as a lower primary school in 1972 with a few classes. In 1998 it had its first PLE candidates. It had an excellent record of performance in the PLE and it is for that reason that it had attracted several pupils from rich parents in the municipality. The classrooms were well-ventilated and furnished with good desks (see Photograph 2). It consisted of 972 pupils. Oloya held a Grade Three Certificate of Education and was completing a Diploma in Primary Education. He had twelve years teaching experience. He was observed teaching and assessing in a class of 60 pupils, and he also taught the subject in another stream of 60 pupils.

PHOTOGRAPH 1: **School F, a poorly resourced school: Ojok's class**



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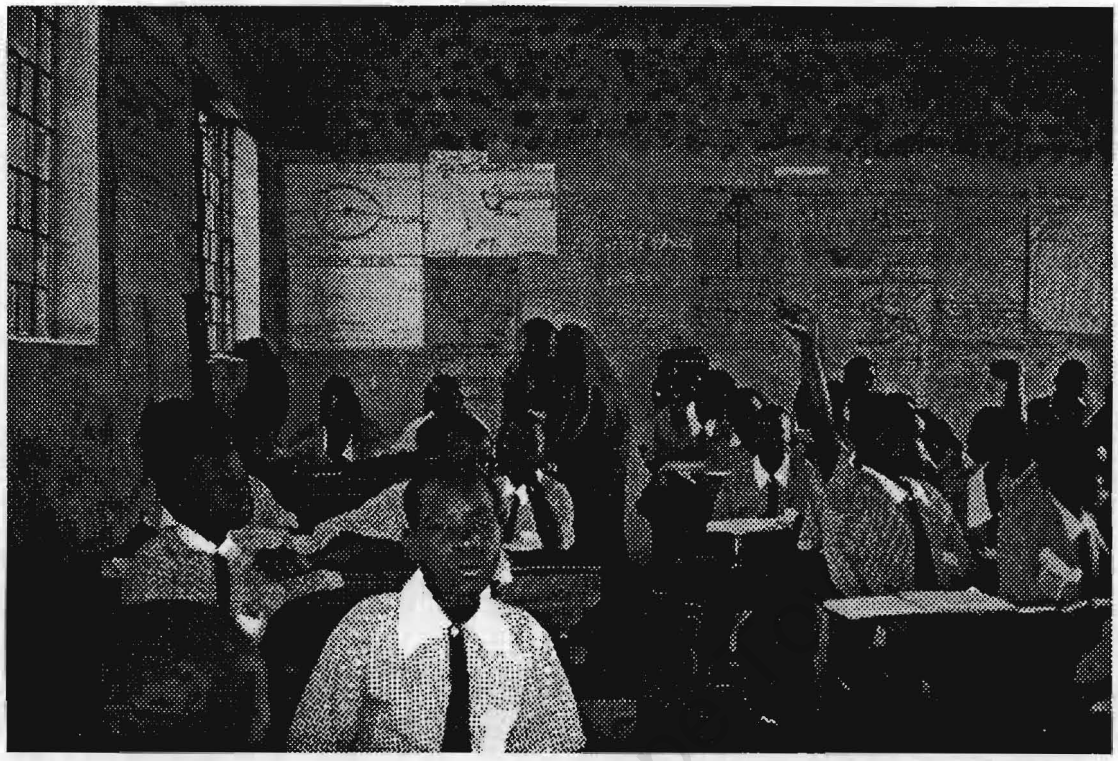
PHOTOGRAPH 2: **School G, a well-resourced school: Oloya's class**



Opoka taught at the poorly-resourced School H, a mixed day government school situated in the Municipality of Lira District. It consisted of 600 pupils. He had a Grade Three Certificate of Education, and had been teaching for two years. He was observed teaching and assessing in a class of 52 pupils. The school had received a grant from the Classroom Construction Unit, Ministry of Education and Sports (MoES), and had just put up permanent structures. The pupils came from the poor communities that surrounded the school and, therefore, it had to rely exclusively on the meagre funds provided by the government.

Rugasira taught at School I in Mbarara District, Western Uganda. It is a mixed day government school of 706 pupils located in an urban part of the district. He had a Diploma in Primary Education, in addition to a Grade Three Certificate of Education. His teaching experience spanned seven years. The class in which he was observed teaching and assessing had 124 pupils in a large classroom. The school had a good track record of performing well in the PLE, and had attracted well-to-do parents who were capable of supplementing the resources provided by the government.

Ruhweju also taught at the well-resourced school, J, a mixed day government school in Mbarara District. The school comprised of 1 542 pupils. Like School I, it had a history of good performance in the PLE and of attracting pupils of well-to-do parents who supplemented government funding. He had three years teaching experience and held a Grade Three Certificate of Education. At the time of conducting the research, he was studying towards a Diploma in Primary Education. He was observed teaching and assessing a class of 77 pupils, and he also taught mathematics in two other P5 streams of 75 pupils.

Tuhirirwe taught at the poorly-resourced School K, a mixed day government school located in the municipality of Mbarara District. The school had 468 pupils. Tuhirirwe held a diploma in primary education and had been teaching for 28 years. He was observed teaching and assessing a class of 42 pupils. The school had relatively good classrooms erected by the Municipal Council, but lacked other basic facilities such as enough desks and textbooks.

Tukahebwa, a holder of a Bachelor of Primary Education degree, also taught at a poorly-resourced school, L, located in Mbarara District municipality. The school had 347 pupils and was a mixed day government school. It had poorly constructed classrooms and lacked several facilities such as a staff room and furniture. Tukahebwa had fourteen years teaching experience and was observed teaching and assessing in a class of 42 pupils.

Walimbwa taught at the poorly-resourced School M, a mixed day government school located in Mbale District. The school consisted of 1 667 pupils. Despite having very poor facilities, it was one of the best schools in the district as far as performance in the PLE was concerned. Walimbwa had a Grade Three Certificate of Education and was studying towards a Diploma in Primary Education. He had five years teaching experience. He was observed teaching and assessing a class of 65 pupils, and he also taught mathematics to three other P5 streams of 65 pupils in each.

Wandera had a Grade Three Certificate of Education and had been teaching for five years. He was completing a Diploma in Primary Education at the time of the research.

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He taught at the well-resourced School N, a government boys' boarding primary school in Mbale District. The school consisted of 700 pupils. It started in 1923 as a Protestant Church school. Although it is supposed to be a school for boys only, daughters of the staff members are also enrolled. It has relatively well-constructed classrooms, but its major problem is that of big classes and lack of sufficient textbooks. The teacher was observed teaching and assessing in a class of 133 pupils and also taught the subject in another P5 stream of 135.

The following table summarises the background information on each teacher.

TABLE 1: **Summary of case information**

Teacher	Highest level of training	Teaching experience	Undertaking further studies?	No. of pupils in the observed class	School	Type of school (Mixed = coeducational)	Total no. of pupils in the school	Location and nature of school	District
Batte	Grade 3 Certificate	5 years	Prim Ed Dip.	45	A	Mixed, Day, Govt	292	Rural, Poorly-resourced	Wakiso
Ddumba	"	10 years	Prim Ed Dip.	79	B	Mixed, Boarding, Govt	1 500	Rural, Well-resourced	"
Kato	"	5 years	Prim Ed Dip.	62	C	Mixed, Day, Govt	392	Rural, Poorly-resourced	"
Lule	Dip in Prim Ed.	7 years	N/a	53	D	Boys', Boarding, Govt	563	Rural, Well-resourced	"
Ogwang	Grade 3 Certificate	5 years	Prim Ed Dip.	55	E	Mixed Day & Boarding, Govt	1 392	Municipal, Well-resourced	Lira
Ojok	Dip in Prim Ed.	16 years	N/a	126	F	Mixed, Day, Govt	886	Rural, Poorly-resourced	"
Oloya	Grade 3 Certificate	12 years	Prim Ed Dip.	60	G	Mixed, Day & Boarding, Private	972	Municipal, Well-resourced	"
Opoka	"	2 years	N/a	52	H	Mixed, Day, Govt	600	Municipal, Poorly-resourced	"
Rugasira	Dip in Prim Ed.	7 years	N/a	124	I	Mixed, Day, Govt	706	Municipal, Well-resourced	Mbarara
Ruhweju	Grade 3 Certificate	3 years	Prim Ed Dip.	77	J	"	1 542	Municipal, Well-resourced	"
Tuhirirwe	Dip in Prim Ed.	28 years	N/a	42	K	"	468	Rural, Poorly-resourced	"
Tukahebwa	Bachelor of Education	14 years	N/a	42	L	"	347	Rural, Poorly-resourced	"
Walimbwa	"	5 years	Prim Ed Dip.	65	M	"	1 667	Municipal, Poorly-resourced	Mbale
Wandera	"	5 years	Prim Ed Dip.	133	N	Boys', Boarding, Govt	700	Rural, Well-resourced	"

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Data collection

A variety of methods was used to gather data for analysis in the research. They included: interviews, observation and video recording of lessons and workshop, document analysis, and field notes. The methods facilitated the triangulation of data and afforded the opportunity to note congruence or contradictions in the data. The following sections provide detail about the methods used in data collection.

Interviews

Semi-structured interviews were conducted with teachers, pupils, headteachers/school administrators and policy makers.

Topics explored in the interviews were chosen in relation to the research questions. The topics were intended to encourage discussion without imposing a rigid interview schedule. Questions were asked on the topics but other information on continuous assessment that arose during the course of an interview was also pursued. Interviews were not piloted because it was usually easy for the researcher to return to ask further questions when needed.

At the beginning of each interview, interviewees were briefed on the content of the interview and requested to grant permission to tape-record the interview. All interviewees accepted being tape-recorded.

Pre-observation interviews with teachers

Pre-observation interviews took place during the course of June – August 2000. Each of the teachers was interviewed before any classroom observation or video recording was done. The interview lasted approximately 45 minutes to an hour. They were asked to talk about their understanding of continuous assessment, the strategies they used when they engaged in continuous assessment of mathematics and the kind of feedback they gave to pupils when they assessed them. The purpose of the interview was to collect information on what the teachers defined as continuous assessment; what they interpreted as the government's intention in making continuous assessment

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official policy; what they said they did when they engaged in continuous assessment; and how they were using continuous assessment in the teaching and learning of mathematics (how they acted on feedback from assessment). See Appendix 1 for the pre-observation interview schedule and Appendix 2 for one of the pre-observation interview transcripts.

Post-observation interviews with teachers

Post-observation interviews with the teachers took place during September-November 2001 after the video-recorded lessons had been transcribed. Two lessons of each teacher were recorded and transcribed. One lesson was recorded during June - December 2000 and the other was recorded during June - October 2001). It was hoped that this data would identify any changes that teachers had made in their assessment practices in the last twelve months.

During the initial analysis of the transcribed lessons, it was possible to identify assessment issues in the lessons that needed clarification with the teachers, for example, to explore in detail the reasons behind the teachers' saying or doing certain things. Hence, it was arranged to view the lessons with the teachers to explore these issues while watching the lessons in which they had occurred.

During the post-observation interview, both lessons were viewed in full with the teachers, and paused when an issue that needed discussion was raised. The issues that needed clarification had been highlighted on the transcribed lessons so it was possible to identify them as soon as they were encountered.

The main purpose of the post-observation interview was to confirm initial responses and interpretations of the teachers' actions and words. It served as a counterpoint to the researcher's personal assessments. It also provided the researcher with the opportunity to probe the teachers' views regarding issues such as feedback strategies other than marks and evaluative comments, as well as their thinking on mathematics assessment tasks. The information from these interviews was used in the interpretation of teachers' actions in assessing in their classrooms [Chapter 6] and in the analysis of teachers' understandings and conceptions [Chapter 7]. (See Appendix

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3 for the post-observation interview schedule and Appendix 4 for a post-observation interview transcript).

Interviews with pupils

The interview with pupils aimed to document their feelings and interpretations of the feedback they received from their teachers. In particular, the interviews investigated how they understood and acted on feedback. Questions included: "What does your teacher say to you when he marks your work"? "What does your teacher say to you when you pass all the work"? "What does your teacher say to you when you fail all or some of the work"? "How do you feel about what the teacher says to you when he marks your work and how do you respond to what he says to you"? "How does what the teacher tells you when he marks your work help you to learn better"?

Pupils' responses were intended to provide confirmation of the feedback that teachers said that they had given when they assessed their work, and also to analyse if the teachers' feedback was having the impact on pupils of different learning abilities desired by the teachers.

Interviews with each of the three pupils selected by the teachers (42 pupils in all) took approximately 25-35 minutes. Pupils were first engaged in general conversations that had nothing to do with the research so as to make them feel at ease. Questions such as "What do you enjoy most at school?" "What is your favourite subject?" "Why is it your favourite subject?" were asked first before embarking on the research issues. It should also be pointed out that by the time the pupils were interviewed, several visits had been made to their classrooms and by that time they were familiar with the researcher. This helped to minimise any feelings of strangeness and nervousness when they were interviewed.

Information from the pupils was used to supplement analyses of teachers' conceptions of feedback [Chapter 7]. See Appendix 5 for a transcript of an interview with one of the pupils.

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Interviews with policy makers and trainers

A range of policy makers and trainers was interviewed at different times during the conduct of the research (see List of interviews). They provided information on facets of the introduction of continuous assessment in schools, its nature and purpose. Questions varied from interviewee to interviewee depending on their role in the continuous assessment policy. Data from these informants was used to contextualise continuous assessment in Uganda. See Appendix 6 for an interview transcript with one of the trainers.

Interviews with school administrators

Individual interviews were conducted with an administrator (for example, the headteacher, a deputy or dean of studies) in each of the fourteen schools. The interviews lasted approximately 20-30 minutes. These administrators were key informants in providing background to the schools. They were probed about the history of the school as well as how the school conducted assessment of pupils. Information collected was used as an introduction to the teachers. See Appendix 7 for a sample of an interview transcript with one of the school administrators.

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Observation of lessons

After the pre-observation interview teachers were requested to allow themselves to be observed and video-recorded while teaching and assessing two mathematics lessons (generally 80 minutes each). The observations and video recordings were aimed at documenting evidence of:

- The strategies of assessment that teachers used in practice and how they used them.
- The verbal feedback that teachers gave to pupils and the extent to which it was utilised to enhance teaching and learning.

The video recording was as unobtrusive as possible so as not to distract the teachers and the pupils. Video recording was one of the principle sources of data as it

facilitated making detailed records of classroom interaction, permitting a more careful, flexible and complex analysis at a later stage. As Foster (1996: 37) notes on the use of video recording in research, "The behaviour under consideration can be seen or heard repeatedly, scrutinised and discussed, and interpretations during analysis can be checked".

A video observation schedule (see Table 2) was designed to facilitate the viewing and analysis of the recorded lessons, as well as to extract meaningful data from the lessons in an organised way. The format and some of the items of the schedule were adapted from a Formative Observation Instrument that was developed and used by the Florida Beginning Teacher Program (1982: 241-246) (See Appendix 8). These items were supplemented with additional items drawn from the literature, in particular the work of Tunstall and Gipps (1996); Nakabugo (1998); Black and Wiliam (1998a); Torrance and Pryor (1998); Gipps, et al. (2000); Lambert and Lines 2000; Clarke (2001) and Weeden et al. (2002).

An initial video observation schedule was designed comprising of ten sections with a range of items in each section. The sections included: Feedback, Clarifying Learning Intentions at the Planning Stage, Sharing Learning Intentions, Teacher Questioning, Authentic / Performance Assessment, Assessment of Prior Learning, Student Questions, Peer Assessment, Self-Assessment by Pupils, and Dealing with Incorrect Responses.

An analysis of the first lesson of each teacher by means of the schedule revealed that aspects such as clarifying the learning intentions at the planning stage, sharing learning intentions, and authentic and performance assessment were missing in most, if not all, the lessons. These were regarded as irrelevant categories and were deleted from the final schedule. In addition, some of the sections were discovered to be repetitive. For example, it was realised that instead of having separate sections for Teacher Questioning and Pupils' Questions, these could be better combined into one general section, "Questioning". "Assessment of prior learning" was also incorporated into this section. Feedback, correction of errors, peer-assessment and self-assessment were all combined into one section entitled: "Feedback and dealing with incorrect responses/errors". The final video observation schedule comprised two parts, each with a range of items, as the following table shows:

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TABLE 2: **Video observation schedule**

Part 1: Questioning

Formative questioning	*f*	**Missed opportunities**	*f*
A. Teacher asks questions aimed at assessing pupils' prior knowledge on the topic so as to build new knowledge upon existing knowledge.		**B.** Teacher does not ask questions to assess pupils' prior knowledge or asks questions targeting the factual knowledge pupils can recall from the previous lesson (fixed principles).	
C. Teacher asks open-ended or thought provoking questions which require extended thinking to respond to them.		**D.** Teacher asks closed questions which call for one specific answer or which require the recall of fixed principles, and therefore, which require lower order thinking skills.	
E. Teacher gives pupils the opportunity to raise questions about what is being taught and uses the questions to mediate further learning.		**F.** Teacher tells pupils to ask questions but is not genuinely looking for their questions. E.g. he just says it in passing and does not provide them with enough time to answer.	
G. Teacher uses pupils' questions as a means of interacting with and stretching pupils' understanding by involving them in finding solutions to their questions.		**H.** Teacher offers answers to pupils' questions straight away or asks other learners to do so without engaging the individuals who asked the questions in finding solutions to their questions.	

Part 2: Feedback and handling of incorrect responses or errors

Formative usage	*f*	**Missed opportunities**	*f*
A. Teacher offers strategies or helpful hints/clues to facilitate self-correction when a pupil errs or fails.		**B.** Teacher provides the answer himself straight away when a pupil errs.	
C. Teacher repeats pupil's response in a neutral tone to permit self-assessment and self-correction of error.		**D.** Teacher asks another pupil(s) to correct the error without providing opportunities for the individual to self-correct.	
E. Teacher notes pupil's error, probes, and provides enough wait-time for the pupil to try again and self-correct.		**F.** Teacher merely disapproves e.g. "That's not correct" without any other comment or provides the desired response without giving the individual the chance to try again and self-correct.	
G. Teacher models an example of the required response and asks the child to model his/her response based on the given example i.e. more practice given.			
H. Teacher uses pupil's response to offer further clarification/explanation.			
I. Peer-assistance: Teacher asks other learners to mediate understanding to their peer(s) or asks pupils to collaborate to find solutions to given problems collaboratively.		**J.** Peer-assistance is restricted to asking other learners to decide whether the response is correct or wrong without requiring them to give any other comment e.g. "Is she correct?"	
K. Specific approval or specific acknowledgement of attainment.		**L.** Non-specific approval of correct response e.g. "That's right", with no further comment.	
		M. Rewards e.g. clapping or thanking without any supplementary comment.	
		N. Uses pupil's response to report achievement e.g. offers positive or negative evaluative comments such as: very good, well tried, well done, poor, … without specifying strengths or weaknesses and the way forward.	

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The video observation schedule identifies and quantifies those moments when the teacher engaged in assessment with the potential to facilitate teaching and learning (the left-hand side of the schedule), and those moments when the teacher missed opportunities to use assessment as a means of facilitating teaching and learning (the right-hand side of the schedule). In total, the two categories of the schedule comprise 11 items (×2).

The transcribed lessons were tabulated in two columns for the purposes of coding, to provide an interpretation of each lesson using the video-observation schedule (see Appendix 9). The researcher's coding identified only what she regarded as an assessment incident. Where incidents reflected more than one item on the schedule they were multiply coded. For example in the appended lesson (Appendix 9), the first incident was coded "question targeting the factual knowledge that pupils can recall from the previous lesson" (1B) and also "closed question" (1D).

The frequency of each identified item was tallied. A mark (x) was placed beside each item identified and it was marked with a slash (/) in the frequency column each time it was observed. The totals for sides A and B of the schedule were recorded for each lesson for each teacher. See Appendix 10 for a completed schedule. The schedule was not tested for inter-coder reliability, but the lessons were scrutinised several times to check the coding.

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Document analysis

Document analysis provided evidence of the nature of the written feedback that the teachers gave to pupils. Permission was sought from the teachers and the pupils to read the pupils' mathematics exercise books. The books of the three pupils (upper ability, middle ability and lower ability) who were selected by each teacher for interviewing were examined. When a record of the feedback received by each of the pupils had been completed by the researcher, teachers were shown it and asked if it was representative of the feedback that they gave to all pupils when they marked their work. All responded affirmatively.

An instrument was designed to facilitate the analysis of the data from the pupils' exercise books. The instrument comprised five levels representing the quality of written feedback from the point of view of formative assessment. Level five represented the highest quality of written feedback for formative assessment purposes. The construction of the instrument was based on research evidence that "feedback focused on identifying specific errors and poor use of strategies, which then gave learners direct advice on how to improve, was far more effective than marking which simply identified 'right' and 'wrong' responses" (Black and Wiliam 1998b: 9). In particular, the research by Butler (1988), who investigated the nature of written feedback that teachers gave to their pupils and how that feedback impacted on pupils' learning gains and interest in learning, was very useful in the designing of the instrument. Butler's sample comprised of 132 low and high ability year seven pupils from 12 classes. The classes were taught by the same teachers, doing the same teaching, having the same aims and doing the same class work. By the use of pre - and post - tests as well as interviews, Butler found that while feedback in form of marks only or marks accompanied with comments, increased the interest of the high ability pupils, it decreased the interest of the low ability pupils. Furthermore, there were no learning gains that were registered for both groups (high and low) when it came to feedback that was in the form of marks or marks with comments. On the other hand, learning gains of 30% were registered for both groups when feedback was in the form of comments alone. Thus, the instrument for examining teacher written feedback (Table 3 overleaf) was designed with the conception that feedback in the form of comments, such as specifying strengths and weaknesses, as well as suggesting ways to improve (Level 5 of the instrument) was more suited to enhance learning than no feedback at all, or feedback that was only in the form of marks and simple evaluative remarks or extrinsic rewards. This is supported by other researchers such as Tunstall and Gipps (1996: 88), Thomas and Oldfather (1997: 107-121), Black and Wiliam (1998a: 8-9), Bell and Cowie (2001: 130), Clarke (2001: 55), Black et al. (2002: 8) regarding the effect of marks and extrinsic rewards on learning.

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TABLE 3: **Instrument for analysing teacher written feedback**

Example:

A teacher gives an exercise of ten numbers and one of the questions requires pupils to expand 468,503 using multiples of ten. One of the pupils who gets an overall score of 4 out of 10 responds as follows:

400,000 × 10
60,000 × 10
8,000 × 10
500 × 10
00 × 10
3 × 10

As feedback:

Level 1	Level 2	Level 3	Level 4	Level 5
The teacher doesn't give any written feedback.	Ticks the correct responses (√) or crosses the incorrect responses (×) and finally writes the overall mark. *The teacher puts a cross against the pupils' working and writes the overall mark as 4/10 without any further comment.*	Ticks the correct responses (√) or crosses the incorrect responses (×) and finally writes the overall mark accompanied with simple evaluative feedback that cannot be acted upon by the teacher and the learner e.g. poor, weak or pull up your socks. *The teacher puts a cross against the pupils' working and writes the overall score as 4/10 and accompanies it with a comment: "Very poor work. Pull up your socks."*	Gives a mark or grade and accompanies it with descriptive feedback. E.g. specifies strengths and/or weaknesses and suggests the way forward *The teacher puts a cross against the pupils' working, writes the overall score as 4/10 but besides the pupils' wrong working on the above number he writes:* *Use your knowledge of place values and try this number again. If the place value of 4 is hundred thousands, how many times are you going to multiply 4 by 10 to come up with four hundred thousand? And if the place value of 6 is ten thousands, how many times are you going to multiply 6 by 10 to come up with sixty thousand? Use this same strategy with the rest of the numbers and do correction. You can also discuss with your friends or refer to the examples I gave you yesterday. Come and show me your revised version after you have finished.*	Gives a descriptive comment only e.g. specifying strengths and/or weaknesses and suggests strategies of overcoming the weaknesses *The teacher writes the following comments besides the pupils' wrong working and he does not write any overall mark in the pupil's book:* *Use your knowledge of place values and try this number again. If the place value of 4 is hundred thousands, how many times are you going to multiply 4 by 10 to come up with four hundred thousand? And if the place value of 6 is ten thousands, how many times are you going to multiply 6 by 10 to come up with sixty thousand? Use this same strategy with the rest of the numbers and do correction. You can also discuss with your friends or refer to the examples I gave you yesterday. Come and show me your revised version after you have finished.* ***OR*** *When you multiply and add up all your numbers, do you come up with the original sum? Why do you think you come up with a bigger sum? Come and talk to me.*

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Level 1 on the instrument represents a situation where the teacher does not give any written feedback to pupils. The teacher does not mark the pupils' work at all.

Level 2 represents feedback that is very limited in terms of helping pupils improve or learn better. The feedback is only in the form of ticks, crosses and a mark, and thus it does not tell the pupil much about his or her current learning and how learning can be developed further.

Level 3 feedback includes an evaluative remark such as 'good' or 'poor', but it does not specify the strengths or weaknesses, and ways to improve. What makes it better than Level 2 is that a teacher who is able to judge if the work is good or poor would, given additional skills in formative assessment, eventually be trained to explain why he says the work is good or poor, and how it can be improved. Thus, Level 3 provides more potential for assisting teachers develop the skills of using assessment formatively than Level 2, but is not useful in aiding pupils' learning.

At Level 4, although the teacher still gives a mark, the comments accompanying the mark supersede the simple evaluative nature of Level 3 and go further to include descriptive comments such as why the work is good, why it is poor and how it could be improved upon.

At Level 5, the mark is no longer important. What is important is a comment that has the potential of encouraging the good learning to be maintained or one that has the potential of improving the current learning reflected in the marked work. Thus, at Level 5 the pupil's focus is on the comment, while at Level 4 the mark might divert the pupil's attention from reading and comprehending the accompanying comment. As discussed in Chapter 2, evidence shows that pupils disregard any written comment when a mark or grade is given (Black et al. 2002: 8).

Instances of feedback in the exercise books were tallied according to the instrument.

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Teacher workshop

A one-day workshop was arranged at the end of the research period in November 2001. The workshop was held to test a model for developing the teachers' conceptual understanding of continuous assessment. The sessions of the workshop were video-recorded.

Analysis of data

Two methods of data analysis were employed in this research. They were the emergent design method (Maykut and Morehouse 1994) and the constant comparative method (Glaser and Strauss 1967).

Emergent design allows for data to be collected and analysed simultaneously (Maykut and Morehouse 1994: 44). The constant comparative method involves a continual process of comparing pieces of data and identifying similarities and differences between them for generating patterns or categories from the data (Glaser and Strauss 1967: 101-115). Comparison allows the researcher to establish the range of categories grounded in the data and the variation within them.

Using emergent design in this research permitted the identification of important leads in the early phases of data analysis that were pursued immediately. For example, by doing the initial analysis of the video recorded lessons, it was possible to identify the issues that needed clarification with the teachers. These were followed up in the post-observation interviews when the video-recorded lessons were viewed with each teacher.

Comparisons were made between teachers regarding their interviews, observed lessons and written feedback in their pupils' exercise books. A descriptive analysis of data was used during these comparisons to understand what notions teachers had built up regarding continuous assessment and whether these were shared between them.

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The comparative method was also used to locate patterns arising from the assessment practices and conceptual understanding of the teachers.

The interviews and lessons were transcribed and the texts were coded to enable constant comparison as a step to identifying common patterns across the cases. The lessons were coded according to the video-observation schedule (refer to Appendices 9 and 10) and the interviews were coded using the same coding as the lessons, for an understanding of the respondents' words in relation to specific questions. For example, the pre-observation interview with the teachers was aimed at answering the following key questions: What are the teachers' understandings of continuous assessment? What strategies do they say they use when they engage in continuous assessment? What kind of feedback do they say they give to pupils when they assess them? These questions became the main themes in the coding of the pre-observation interviews that were used to generate further patterns (child nodes). After each interview had been coded, a list of nodes was made for each interview to facilitate quick comparison of the cases. See Appendix 11 for a transcription of a coded pre-observation interview followed with a node listing.

Limitations of the research

The research was restricted to fourteen cases. It is therefore uncertain to what extent the understandings and practices found can be generalised to a wider population of teachers in Uganda teaching other subjects. In addition, since "the general principles of formative assessment apply across all subjects, and the ways in which they manifest themselves in different subjects may differ" (Black et al. 2002: 16), investigating teachers' assessment practices in mathematics only without considering how they assessed other subjects is a recognised limitation of the research.

The analysis of teachers' classroom assessment practices is restricted to two mathematics lessons per teacher. It is therefore impossible to make definitive comments on each of these teachers' assessment practice. It is acknowledged, too, that the realities of schools and teachers in Uganda may differ significantly, and that this research may only offer a partial insight into the wider picture.

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However, researchers such as Guskey (1994) show that, in focusing the investigation on a small setting the value of the data may be enhanced rather than diminished. The strength of the research design is that a general picture could emerge detailing some common understandings and practices of continuous assessment used in primary schools in Uganda.

While the consent of all participants was obtained, it cannot be claimed that the consent of all participants was 100% freely given. Since it was the District Education Officers (DEOs) who recommended the schools, the headteachers of these schools might have found it hard to refuse the researcher access. Teachers, too, might have found it hard to refuse the researcher access because the headmasters had already given the research approval. It would also have been even more difficult for the pupils to refuse to be interviewed, since they were selected by their teachers. Allowing the headteachers to choose the teachers in the two schools where there was more than one P5 mathematics teacher could have introduced a systematic bias towards a certain type of teacher.

Furthermore, it cannot be ruled out that the teachers may have consciously or unconsciously adapted their ways of teaching and assessment because they were being observed and video recorded. Foster (1996: 14) refers to this limitation as "the problem of reactivity". However, efforts were made to reduce this problem from significantly affecting the research by conducting the video recording of lessons after several classroom visits had been made. During these initial classroom visits, the researcher made as if she was video recording. This was to allow the teachers and their pupils to get accustomed to the presence of the video equipment before actual recording took place. By the time the analysed lessons were recorded, teachers and pupils were generally behaving naturally after having become accustomed to the presence of the researcher and the video equipment.

It is also possible that some relevant information was ignored during data analysis due to the use of the structured instruments (video observation schedule and instrument for analysing written feedback). Structured categories tend to be restrictive and require consistent and accurate classification of the research data prior to analysis.

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Conclusion

The chapter has presented the design for the research, described the criteria for the selection of the cases, the instruments used in the data collection, and the methods of data analysis. Possible limitations of the research have been indicated. Chapters 5, 6 and 7 are devoted to analysis and interpretation.

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CHAPTER 5

THE TEACHERS' PRACTICE OF CONTINUOUS ASSESSMENT: What they said they did

In this chapter data from pre-observation interviews with teachers is used to analyse how teachers said they practised continuous assessment, in light of the recommendations of the 1992 Government White Paper and Uganda National Examination Board policies. Use is also made of teachers' records of the number of times they used various assessment strategies during the course of one academic year to estimate how often they engaged in continuous assessment. The description and the analysis of the findings are presented under headings that reflect the recommendations of the National Educational Policy Review Commission:

- Using multiple assessment strategies
- Assessing continuously

Using multiple assessment strategies

All the teachers claimed to be using continuous assessment in their classrooms. In the pre-observation interview they were asked to describe how they assessed pupils in mathematics using continuous assessment.

An analysis of their responses to the question revealed twenty-one ways in which they said they were carrying out continuous assessment. Some of these ways were forms of assessment while others were merely a description of the time at which assessment took place.

All fourteen teachers said they used *oral questions during the lesson*. The questions were, in most cases, asked of the whole class at points as the lesson progressed, to assess how the pupils were following what was being taught:

> My assessment happens during the lesson. I have to pose and question the pupils whether they have been following. These are oral questions. (Ojok, 3/7/2000)

> I assess them while teaching them. I ask verbal questions. (Oloya, 3/7/2000)

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> When I am teaching, I ask children some oral questions to find out if they know. (Rugasira, 4/10/2000)
>
> Sometimes I ask them oral questions so that they can give the answers orally. (Tukahebwa, 4/10/2000)

The nature of these questions was not investigated during the interviews, as it would become apparent in the lessons observed. Closed questions do not facilitate the formative use of assessment because they hamper dialogue and critical talk. Open questions that can yield alternative answers such as "We have got four pictures and the scale is 150, what can we do with these numbers?" have more formative potential. They "give more children a chance to respond and they often provide a greater challenge to able pupils, who can be asked to think of alternative answers and, in suitable cases, to count all the different possibilities" (Clarke 2001:91).

All the teachers also mentioned that they set *written exercises at the end of lessons*. Typically the teachers said that they would write questions on the blackboard towards the end of the lesson for the pupils to attempt individually in their exercise books. Some of the books of pupils, who finished them before the end of the lesson, would be marked immediately, but in most cases teachers took the books with them and marked them during their free time in the staff room before the next lesson. The written exercises were generally meant to check if the pupils had understood the day's lesson. If not, the teacher would repeat some of the aspects that pupils appeared not to have grasped. Thus, the end-of-lesson written exercises were meant to check if the teacher could move on to the next unit or not:

> I choose five or ten numbers at the end of the lesson and I write them on the blackboard so that the pupils can attempt them in their books. I want to check if they were following. (Batte, 17/7/2000)
>
> In mathematics after every lesson I give a written exercise. It is very rare for a teacher of maths to go out of class after teaching a lesson without giving some written work. They write in their exercise books, then after that I mark and the following day I bring back the books.... It is a way of preparing for the next lesson or unit. I can't go to the next step before pupils have grasped what I have been teaching. The only way to know whether they have grasped is to assess them at the end of the lesson. (Ddumba, 17/7/2000)
>
> At the end of the lesson, I give them an exercise to see whether they have grasped something. If they have not grasped, I repeat for them.... Okay, I

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> have sixty-five pupils but I can get ten or fifteen who can get the exercise right. So I cannot move to another exercise or topic and leave the rest when they have not understood. (Kato, 20/7/2000)
>
> I give them end-of-lesson written exercises to check how they are understanding how I am teaching such that in case they have not understood I revisit the topic immediately. (Lule, 25/7/2000)
>
> I give them a written exercise at the end of the lesson. After marking the exercise you find out whether the lesson has been successful or not and if you find that many of them have not understood, then you go back to the areas where they have been having a problem before you can go to the next lesson. (Wandera, 31/7/2000)

All of the teachers also said that they gave *end-of-term examinations*. It is a policy in all the schools for teachers to hold examinations at the end of term for purposes of reporting pupils' progress to parents. In the case of third term (the last term of the academic year), end of term examinations are used to promote pupils to the next class. In some schools, as was the case where Kato and Opoka taught, these examinations were used additionally to draw parents' attention to the need for extra tuition:

> We give them end-of-term exams to see what we have been teaching whether there is improvement or not.... If we see there has been no improvement, we appeal to the parents to give in more money for extra teaching so that pupils come here every morning and we teach them. Then after 4:00 PM instead of going back home, they enter and we start teaching again. (Kato, 20/7/2000)
>
> When we identify a pupil who has not performed well at the end of the term, we call the parent and tell him about the child, then of course we advise that there is something that can be done about the child. We tell the parent to do something like hiring a teacher to be in charge of that kid. (Opoka, 7/7/2000)

Eleven teachers (Batte, Ddumba, Kato, Lule, Ogwang, Oloya, Opoka, Rugasira, Ruhweju, Walimbwa and Wandera) said they gave *monthly tests*. The monthly tests were sometimes set in school. In other cases the tests were set externally by a group of teachers at district level or the school used papers from another school which it thought was of a better standard. Questions in monthly tests covered a wide range of topics taught in the given class but work that had been covered in lower classes could also be part of the test. Sometimes the monthly tests were given as a way of reporting to parents how their pupils had progressed during the month:

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> At least at the end of every month, we should be able to come up with a report about the learning of pupils for parents to see. So we give pupils monthly tests. (Walimbwa, 1/8/2000)

In some schools monthly tests were seen as a way of making pupils revise for PLE at an early stage:

> We give them monthly tests to prepare them for PLE. We do it because we want to excel at PLE and we are doing it seriously.... (Ddumba, 17/7/2000)

Some teachers gave monthly tests to check if the pupils had managed to memorise what had been taught during the month and to check if they were revising their books at all. [Memorising or cramming implies learning mindlessly and forgetting the content as soon as the test is over].

> We give them monthly tests.... We are looking at the way they cram what we covered. You can also know whether they are revising or they have abandoned each and everything. (Batte, 14/7/2000)

Ten teachers (Batte, Ddumba, Kato, Ogwang, Ojok, Ruhweju, Tuhirirwe, Tukahebwa, Walimbwa and Wandera) mentioned that they gave *blackboard tasks during the lesson*. This involved the teachers setting a question at certain points during the course of the lesson, writing it on the blackboard and seeking individuals to come and work it out as the rest of the class watches. As was the case with the oral questions during the lesson, these tasks were also intended to assess whether the pupils were following the lesson at hand. If not, the teacher would clarify what seemed not to be understood:

> I give them questions on the blackboard, I go back and sit and I choose randomly one pupil to go and work out as I watch. I want to see if they have been following. (Kato, 20/7/2000)

> I put a lesson and then make pupils work out the numbers by explaining the steps on the blackboard. I make various pupils to participate, and from there, if they have not understood, then I would go and repeat for them. (Ojok, 3/7/2000)

> Normally before giving them the written exercise at the end of the lesson, I give them sample questions on the blackboard to test whether they are following and if I find that they are not following then it means to repeat. After finding that they are following, then I go on with the written exercise. (Tukahebwa, 4/10/2000)

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Ten teachers (Batte, Ddumba, Kato, Lule, Ojok, Oloya, Rugasira, Ruhweju, Walimbwa and Wandera) reported that they gave what they termed "*topical tests*". They gave these tests at the end of a given topic to gauge how effective their teaching of the topic had been and to gauge whether to repeat the entire topic or some parts of the topic before moving to a new topic. Some teachers used the topical test questions from UNEB's provided test booklets exclusively but others supplemented the UNEB questions with questions they set themselves or they extracted from textbooks:

> ...Those questions are dealing with topic per topic [referring to questions in UNEB's test booklets] and it means that you teach that topic first and then you give out those questions. (Batte, 14/7/2000)

> If that topic is covered well, then you carry out a topical analysis by picking the questions you feel are suitable for that topic.... (Ddumba, 17/7/2000)

> When I have covered a topic, I give what I feel is the summary of the topic as a test. So I have to look into the UNEB test booklets and also the books which are of the same kind.... So I set a kind of a test and I give it to the pupils to try it out.... (Lule, 25/7/2000)

> After covering a topic, then I give them a test. Then I would be able to check the areas where they have not understood.... Where they have not performed well, then I have to re-teach it. (Oloya, 3/7/2000)

> ...after teaching the whole topic, I tend to prepare some questions and give them a test to see where they have got and where they have not got so that I teach it again.... (Walimbwa, 1/8/2000)

Oloya gave the topical tests as a way of being accountable to parents when they came to school to check on their children:

> When I have marked the topical test, I always record the marks. When the parents come I show them. (Oloya, 3/7/2000)

The rest of the teachers said they gave topical tests because they were required to do so by UNEB.

Seven teachers (Dbumba, Lule, Ogwang, Opoka, Rugasira, Ruhweju and Tuhirirwe) mentioned that they gave *weekly tests*. These tests were most often administered on Fridays with the purpose of summing up work taught during the course of the week and to "know whether they have got right the topic taught during the week" (Ogwang, 6/7/2000).

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Some teachers such as Opoka gave weekly tests as a way of helping pupils get used to test taking in preparation for external tests/examinations:

> I always give them tests weekly. These tests make pupils get used to some kind of test so that may be when the external examination comes, they do not see it as a strange thing. I set the tests in the format of those external ones.... (Opoka, 7/7/2000)

Other purposes for weekly testing included identifying weak pupils and offering them individualised help:

> The weekly test results also help us to know who is weak and who is improving so that we can talk to that particular one. We can give much attention to that child. I always deal with the weak ones individually for some hours. (Opoka, 7/7/2000)

Marks from these weekly tests were usually recorded on a chart or a big sheet of paper and displayed in the class for all individuals to see and compare their performance with the performance of their peers:

> I usually give them weekly tests and I record the marks on a chart and I pin the chart in the classroom. This has brought in the competitive spirit whereby if one who was on top finds this time others have scored highly better than him, he tries to improve.... (Ruhweju, 26/6/2000)

Seven teachers (Batte, Kato, Rugasira, Ruhweju, Tuhirirwe, Tukahebwa and Wandera) said they gave *homework*. The homework comprised questions covering the work that had been taught during the day to give pupils more practice and to assess to what extent the pupils had comprehended the day's work. It was also given as a means of getting parents involved in supervising and helping their children at home.

Five teachers (Ddumba, Lule, Opoka, Ruhweju and Tukahebwa) engaged in *norm-referenced assessment techniques*. They explained that they ranked pupils when their work had been marked, and pinned the results up in class so that individual pupils could compare themselves with the rest of the class so as "to be encouraged to work harder" (Ddumba). Tukahebwa talked of asking various questions as pupils attempted a given exercise as a means of making individuals compare their speed of work with the speed of others so as "to pull up":

> Sometimes if I am giving them an exercise, normally it is better to keep on asking them who has finished because that one will help even the slower ones to know that some people have already finished. So in that case they have to time themselves according to the speed of others. So if you say:

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> "How many have finished?" They will know somebody is actually very sharp and they are also interested in coming first. You're not forcing them to be fast but because they are seeing others are finishing.... (Tukahebwa, 4/10/2000)

Five teachers (Kato, Oloya, Opoka, Tuhirirwe and Tukahebwa) revealed that they *observed* or *watched* pupils at work and *made a mental note*. During the course of the lesson, these teachers observed individual pupils and took note of how an individual participated in various lesson activities. The level of participation of a particular pupil signalled to the teacher understanding or lack of understanding thereof:

> I always look at the way they participate in class and tell whether they are understanding or not. (Oloya, 3/7/2000)

> I observe them during the lesson. I do not observe all the pupils in a day. I can take five a day. I just follow how they have been participating in class activities and judge whether they have been understanding or not. (Opoka, 7/7/2000)

> I can see how the children participate in the lesson and tell if they have understood or not. I also note how happy they are, the way they correct their friends, the way they are fighting to go to the blackboard... The child who has made an error would insist to make it correct and at times he would make it correct... Then I can tell that one has understood or not... Even when they are attempting the written exercise you can see. I give them so many numbers and anybody could rush. Those who rush to accomplish several questions within a short time then you know that they have understood. Those who are slow to finish a sizeable number of questions indicate that they have not understood.... (Tuhirirwe, 3/10/2000)

> I observe the pupils the way they are because I may start teaching when somebody is sick.... So the first operation is to really observe the class first. If you don't observe, some pupils may start playing when you're teaching. Then during the lesson you will see the response when you're teaching... the facial expression.... When you're teaching and somebody is not following you will see the face is miserable. So that is why I even select pupils after seeing their faces. If someone is lost when you're teaching and you're observant, you will notice that somebody is lost even without giving them an exercise.... Even by observing you can see how they are participating....When you're asking questions, they will be responding. So from their response you may see that somebody is getting the idea or somebody is going away from the idea. (Tukahebwa, 4/10/2000)

The teachers also usually watched pupils as they attempted different tasks and took note of the errors they made. For example, Kato disclosed that he usually gave pupils sums on the blackboard while he sat behind and watched them as they solved them:

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> I give them questions on the blackboard, then I go back and sit and I choose randomly one pupil to go and work out as I watch... so that I can note the errors.... (Kato, 20/7/2000)

Oloya alluded to making a general mental note. He looked at a pupil's reaction to a given task as well as the pupil's general performance, and made an estimation of the pupil's strengths or weaknesses and devised means of helping him or her:

> When I assess them, I see their reactions and I know how to improve my teaching and to improve their learning.... When I assess them, I know that such and such a pupil has not performed well, I ask myself why and I try to find solutions to that immediately. (Oloya, 3/7/2000)

Three teachers (Kato, Opoka and Rugasira) mentioned that they gave *written exercises during the course of the lesson*. This involved the teacher writing one or two sums on the blackboard as the lesson progressed and requiring the pupils to attempt them individually in their exercise books. The teacher then offered further explanation to specific individuals or addressed the entire class depending on the general performance on the sums.

Three teachers (Ruhweju, Tuhirirwe and Wandera) stated that they gave *mid-term tests*. These tests were given halfway through the term to assess pupils' progress and to report back to parents their children's progress halfway through the three month term.

Kato, Lule and Opoka said they used *quizzes*. These were mental exercises that pupils attempted orally, not for purposes of formative assessment, but for summative reasons and testing memorisation. They were usually conducted at school assemblies, and therefore formed part of the schools' assessment practice. The teachers set questions from any topic and from any level of primary education. Questions were addressed to the entire group and volunteers were expected to put up their hands to answer them. During the course of the quizzes the teachers said that they took note of pupils who were participating and those who were not participating at all. Quizzes were aimed at giving the teacher a general impression of the pupils' general knowledge:

> ...with quiz, we test what we expect them to know. We don't consider what we have taught only but we consider whatever they know. (Lule, 25/7/200)

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Some teachers / schools gave quizzes as a way of saving time instead of having to give a written exercise that they had to mark.

> In case we see that time of writing and marking is very difficult, we gather pupils and give them quiz while we record. (Opoka, 7/7/2000)

Three teachers (Batte, Oloya and Ruhweju) reported that they engaged in *group assistance*. This involved written exercises given to a selected group of pupils whom the teacher had noted were having difficulties in understanding a particular unit or lesson. The teacher invited the group of pupils to the staff room, or to his home, and offered them further help after which he gave them extra work as a group, but which they attempted individually in their exercise books.

Two teachers (Ojok and Ruhweju) said they gave *mid-unit tests* so that they did not have to wait until the end of the topic to give a formal assessment of the pupils. The teachers said that the intention of these tests was to gauge how the pupils were understanding the topic and to gauge the effectiveness of their teaching so as to devise ways of improving the teaching and learning of the topic before it came to an end:

> ...I give a test in the middle of the unit. I don't have to wait until the end of a topic as UNEB requires. When I find that we have almost carried halfway the unit, I give them a test.... This helps to adjust if the pupils are finding difficulties in understanding the unit.... If I don't assess the pupils this way, I would assume that they have been understanding all along whereas they are not. So this would bring a guess between me and the pupils. I would think that they have understood the entire unit whereas they have not. (Ojok, 3/7/2000)

Two teachers (Lule and Walimbwa) revealed that they gave *early morning extra work*. This was part of the schools' assessment policy and was done at least two hours before the start of the normal school timetable. These were written exercises covering work that had been taught the previous day. The teacher gave a few questions on the blackboard and pupils attempted them individually in their exercise books. The teacher then marked the pupils' books before introducing a new lesson for the day. The main aim was to assess how well the pupils could remember the previous day's work and to decide whether to repeat the lesson or to move on to a new one.

Two teachers (Rugasira and Tukahebwa) reported that they employed a form of *authentic assessment* whereby they gave pupils practical tasks that required them to

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relate or to apply what they had learnt in a given lesson to more complex tasks or to more meaningful contexts:

> At times, mathematics being a practical subject, I see how these children can put maths into practice. For example, I can ask the child how far it is from the class to the gate. If I taught about length, the child would be able to approximate how many metres or how many kilometres are there.... (Rugasira, 4/10/2000)

> I always test them to see if they can apply what we have learnt to other harder tasks. For example, today you saw when I was teaching the rounding-off, I stopped at hundreds. But I was giving them questions concerning thousands so that they can use the idea to solve such problems. I wanted them to use the example of rounding off to the nearest hundreds so that they can use that and apply the same tactic to solve bigger problems.... (Tukahebwa, 4/10/2000)

Two teachers (Lule and Ruhweju) revealed that they gave pupils *impromptu revision exercises*. These were written exercises which these teachers gave to their pupils at random times during the course of the week or month. Questions were taken from various topics that had been covered previously and pupils were free to consult the teacher, their peer, exercise books or relevant textbooks. The purpose of these impromptu exercises was to help the pupils to revise their books and to practice what they had learnt previously. It was a way of "re-awakening their memory" (Ruhweju, 26/6/2000).

Other ways of assessment identified in the analysis included *peer assistance, baseline testing and impromptu tests.* Each of these ways was reported by one teacher in the study.

Tukahebwa reported using *peer assistance*. It was done by having one pupil attempting a task on the blackboard as the rest of the class watched. "So when one goes wrong, even the fellow pupils will say 'no that is wrong'. So the pupils will be assessing their fellow students" (Tukahebwa, 4/10/2000).

Walimbwa spoke of *baseline testing.* He gave a test on the first day he received new pupils at the beginning of the academic year. The test comprised of questions from lower class work. For P5, he would set a paper covering work from P1 to P4. The

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purpose of this test was to gauge the ability of the pupils so as to set them in groups accordingly:

> The first day I receive these pupils, I test them and after that I discover the weak ones and the good ones, then I group them immediately. I group them according to the marks they have scored on the test. (Walimbwa, 1/8/2000)

Finally, Opoka mentioned giving *impromptu tests.* These were tests given to pupils without prior warning. The teacher did this to check if the pupils were revising their books and to control against test absenteeism. He explained that some pupils in his school avoided coming to school on a day it was mentioned they would be doing a test:

> ...I can come in with some numbers without telling the pupils that we are going to do a test. I just come in abruptly to see if they revise their books and also to control against children dodging coming to school as is the case on Fridays when we give them weekly tests. (Opoka, 7/7/2000)

Table 4 (overleaf) summarises the above description.

From the table, thirteen forms of assessment reported by the teachers in the continuous assessment of mathematics can be identified. As indicated earlier, some of the means of assessment reflected in the description and table are a description of the time when assessment took place. Monthly tests implied that testing took place on a monthly basis. The form of assessment involved is *testing.* Table 5 lists the forms of assessment that teachers reported:

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TABLE 4: **Means of assessment reported by teachers when carrying out continuous assessment**

Means of assessment	Number of teachers using it
Oral questions during the lesson	All
Written exercises at the end of the lesson	All
End of term examinations	All
Monthly tests	11 teachers (Batte, Ddumba, Kato, Lule, Ogwang, Oloya, Opoka, Rugasira, Ruhweju, Walimbwa and Wandera)
Blackboard tasks during the lesson	10 teachers (Batte, Ddumba, Kato, Ogwang, Ojok, Ruhweju, Tuhirirwe, Tukahebwa, Walimbwa and Wandera)
Topical tests	10 teachers (Batte, Ddumba, Kato, Lule, Ojok, Oloya, Rugasira, Ruhweju, Walimbwa and Wandera)
Weekly tests	Seven teachers (Ddumba, Lule, Ogwang, Opoka, Rugasira, Ruhweju and Tuhirirwe)
Homework	Seven teachers (Batte, Kato, Rugasira, Ruhweju, Tuhirirwe, Tukahebwa and Wandera)
Norm-referenced assessment techniques	Five teachers (Ddumba, Lule, Opoka, Ruhweju and Tukahebwa)
Observation/watching/making a mental note	Five teachers (Kato, Oloya, Opoka, Tuhirirwe and Tukahebwa)
Written exercises during the course of the lesson	Three teachers (Kato, Opoka and Rugasira)
Mid-term tests	Three teachers (Ruhweju, Tuhirirwe and Wandera)
Quizzes	Three teachers (Kato, Lule and Opoka)
Group assistance	Three teachers (Batte, Oloya and Ruhweju)
Mid-unit tests	Two teachers (Ojok and Ruhweju)
Early morning extra work	Two teachers (Lule and Walimbwa)
Authentic assessment	Two teachers (Rugasira and Tukahebwa)
Impromptu revision exercises	Two teachers (Lule and Ruhweju)
Peer-assistance	One teacher (Tukahebwa)
Baseline testing	One teacher (Walimbwa)
Impromptu tests	One teacher (Opoka)

TABLE 5: **Forms of assessment reported by the teachers in the assessment of mathematics**

1. Oral questions (during the lesson)
2. Written questions (during and at the end of the lesson).
3. Examinations (End-of-term)
4. Tests (monthly, topical, weekly, mid-term, mid-unit, impromptu and baseline)
5. Homework
6. Norm-referenced assessment techniques
7. Observation/watching/making a mental note
8. Quizzes
9. Group assistance
10. Extra-work (early morning)
11. Authentic assessment
12. Revision exercises (impromptu)
13. Peer assistance

The individual teachers used multiple forms of assessment. Table 6 summarises the total number of forms of assessment that were reported as used by each teacher.

TABLE 6: **Number of forms of assessment each teacher reported**

Teachers↓	Number of forms of assessment reported by each teacher									
	1	2	3	4	5	6	7	8	9	10
Batte						√				
Ddumba					√					
Kato							√			
Lule								√		
Ogwang				√						
Ojok				√						
Oloya							√			
Opoka							√			
Rugasira						√				
Ruhweju								√		
Tuhirirwe						√				
Tukahebwa								√		
Walimbwa					√					
Wandera					√					

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The number of forms of assessment used varied from teacher to teacher, with some teachers reporting that they used as many as eight strategies, while others used half of that number. It can generally be accepted that the reported practice of the fourteen teachers fulfilled the NEPRC's recommendation relating to using multiple forms of assessment. The recommendation did not specify how many assessment strategies should be used by each teacher, but required that teachers should not rely exclusively on end of term or end-of-year examinations as the sole form of assessment.

Assessing continuously / frequently

An attempt was made to establish how continuously / frequently the teachers used the reported assessment strategies.

The means of assessment in Table 4 that could be easily counted and documented were investigated. The teachers were requested to count the number of times they had used these methods of assessment over the period of a year (in this case academic year 2000), in their mathematics classes. This information is presented in Table 7. (Note that the categories in Table 7 are different from those in Table 5, as Table 5 summarises all the forms of assessment the teachers reported [such as "testing"], without specifying the frequency of any given form of assessment, for example, weekly, monthly, or baseline testing.)

No attempt was made to test the accuracy of this data. However, by the time the teachers were requested to provide the information, they had accepted the researcher as an independent person who only needed the data for personal academic use and not for purposes of evaluating their performance. They gave the information freely and without any sense of needing to inflate it. After the assessment strategies for each teacher had been documented from the coded pre-observation interviews, each was requested to keep count of the number of times he utilised any given assessment strategy that could be quantified. Samples of assessment tasks for each teacher such as classroom exercises, homework tasks, monthly tests were seen and noted by the researcher, but the counting was done solely by the teachers.

The following is what they documented.

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TABLE 7: **Frequency of assessment as documented by teachers during 2000**

Form of assessment	**Frequency**						
	Batte	Ddumba	Kato	Lule	Ogwang	Ojok	Oloya
Written exercises at the end of the lesson	144	184	149	156	132	137	179
End of term examinations	3	3	3	3	3	3	3
Monthly tests	4	8	7	8	8	-	6
Topical tests	11	10	7	11	-	13	13
Weekly tests	-	14	-	13	23	-	-
Homework	69	-	77	-	-	-	-
Mid-term tests	-	-	-	-	-	-	-
Quizzes	-	-	29	24	-	-	-
Group assistance	9	-	-	-	-	-	15
Mid-unit tests	-	-	-	-	-	13	-
Extra-work (early morning)	-	-	-	106	-	-	-
Impromptu revision exercises	-	-	-	13	-	-	-
Baseline testing	-	-	-	-	-	-	-
Impromptu tests	-	-	-	-	-	-	-
Total	**240**	**219**	**272**	**334**	**166**	**166**	**216**

Form of assessment	**Frequency**						
	Opoka	Rugasira	Ruhweju	Tuhirirwe	Tukahebwa	Walimbwa	Wandera
Written exercises at the end of the lesson	152	183	124	160	183	125	190
End of term examinations	3	3	3	3	3	3	3
Monthly tests	6	7	7	-	-	7	8
Topical tests	-	12	14	-	-	9	11
Weekly tests	13	13	18	12	-	-	-
Homework	-	37	37	95	64	-	117
Mid-term tests	-	3	3	-	-	-	3
Quiz	48	-	-	-	-	-	-
Group assistance	-	-	16	-	-	-	-
Mid-unit tests	-	-	14	-	-	-	-
Extra-work (early morning)	-	-	-	-	-	125	-
Impromptu revision exercises	-	-	16	-	-	-	-
Baseline testing	-	-	-	-	-	1	-
Impromptu tests	10	-	-	-	-	-	-
Total	**232**	**258**	**252**	**270**	**250**	**269**	**332**

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The data documented by the teachers reveals that they assessed their 2000 P5 mathematics pupils frequently by these means, ranging between 166 and 334 instances a year. In the school year of 195 days, on average, these teachers assessed their pupils between once and twice a day. The teachers were, therefore, assessing

well in line with the NEPRC's recommendation for assessment to be continuous, without waiting for the end of term or end of year to assess.

Conclusion

This chapter has reported what the teachers said they did in assessment. It shows that the teachers can be said to have been using continuous assessment routinely. Some assessment was done as part of the schools' assessment policies so that they could report back to the parents (such as monthly, mid-term and end-of-term examinations in some schools). Assessment such as homework was done to get pupils to work at home, and to get parents involved in the education of their children by way of supervising them, or providing them with time at home to do the home work. Some assessment was the teacher's own initiative to counteract the weaknesses in school practices. Opoka's impromptu tests, for example, were effective in countering test absenteeism caused by the school practice of regular Friday tests. Other teachers' individual practices, such as baseline testing, observing and group assistance, were more useful in attending to individuals or groups of pupils with learning problems than the normal school practice was. Several other forms of assessment were used by the teachers on their own to check if their pupils understood what they were being taught so that the teachers could decide whether to repeat what they had taught or to move to the next lesson or topic. On the whole the teachers saw their assessment as directed towards reporting, monitoring their classes to guide the pace of lessons, and practice in the mathematics routines that dominated the curriculum.

Next, the teachers' practice was investigated to try to establish whether they used assessment formatively and gave feedback when they marked and taught.

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CHAPTER 6

THE TEACHERS' PRACTICE OF CONTINUOUS ASSESSMENT: Feedback in writing and verbally in class

The National Education Policy Review Commission's recommendations were that assessment should not only be continuous, but that it should facilitate teaching and learning. This chapter considers what evidence there is that the teachers used continuous assessment to enhance the learning of their pupils.

The analysis is according to the levels and indicators of the two measuring instruments designed from the literature on formative assessment, the instrument for analysing teacher written feedback, and the video observation schedule

The instruments were used to analyse the feedback (written and verbal) that teachers gave to pupils when they assessed them. The literature suggests that feedback, and the form that it takes, is a crucial aspect of assessment to enhance learning (formative assessment). Thus, the analysis was focussed on the nature of the forms of feedback that the teachers used with their pupils to establish whether or not they were using assessment formatively. An attempt was also made to group the teachers according to their assessment practices.

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Analysis of the teachers' written feedback

Written feedback is crucial in ascertaining how teachers use assessment to aid the learning of all pupils because it is received individually, unlike verbal feedback that is only received individually by the few in a large class who have the chance to talk to the teacher during a lesson. As Weeden et al. (2002: 37) note, "assessment of individuals is a powerful tool in understanding them better thereby being able to focus the teaching that they need more effectively". It must, however, be acknowledged that written feedback is limited in nature because it is only one-way feedback (it comes from the teacher without any dialogue involved), and dialogue is important in enabling the teacher "to learn about the pupil, and therefore provides shared meaning" (Lambert and Lines 2000:137).

In order to get access to the teachers' written feedback, pupils' exercise books were examined. Three pupils' mathematics exercise books for the year 2000 (upper ability, middle ability and lower ability pupils) were examined from each of the fourteen teachers' classes, a total of forty-two sets of exercise books. All the teachers selected the pupils on their performance in tests and examinations during the course of the year, choosing the pupil who had the highest average mark (upper ability pupil), one with an average mark (middle ability pupil) and the one with the lowest average mark (lower ability pupil).

The original instrument designed to analyse the written feedback in these exercise books comprised five levels (Table 3). However, after testing the instrument it was realised that Level 1 was irrelevant since all the fourteen teachers gave some form of feedback. Thus, this level was excluded from the final instrument. Table 8 (overleaf) is the modified instrument with the four levels of analysis.

Level 4 has the greatest potential for enhancing learning and represents the highest quality of teacher-written feedback.

Analysis of the teachers' written feedback in the sample exercise books was made using the instrument to gain a picture of how feedback was distributed on the four levels. Little data was generated for interpretation, however.

All fourteen teachers gave feedback in the form of marks and simple evaluative comments (Levels 1 and 2) almost exclusively.

There were a few (Ddumba, Ogwang, Oloya, Rugasira and Ruhweju) who gave marks and some general non-evaluative comments, such as:

1/4 show the working.
0/3 See me.
1/6 follow instructions.
3/10 do corrections.
0/7 get help from a friend.

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TABLE 8: **Modified instrument for analysing teacher written feedback**

Example:

A teacher gives an exercise of ten numbers and one of the questions requires pupils to expand 468,503 using multiples of ten. One of the pupils who gets an overall score of 4 over 10 responds as follows:

400,000 × 10
60,000 × 10
8,000 × 10
500 × 10
00 × 10
3 × 10

As feedback:

Level 1	Level 2	Level 3	Level 4
Ticks the correct responses (√) or crosses the incorrect responses (×) and finally writes the overall mark. *The teacher puts a cross against the pupils' working and writes the overall mark as 4/10 without any further comment.*	Ticks the correct responses (√) or crosses the incorrect responses (×) and finally writes the overall mark accompanied with simple evaluative feedback that cannot be acted upon by the teacher and the learner e.g. poor, weak or pull up your socks. *The teacher puts a cross against the pupils' working and writes the overall score as 4/10 and accompanies it with a comment: "Very poor work. Pull up your socks."*	Gives a mark or grade and accompanies it with descriptive feedback. E.g. specifies strengths and/or weaknesses and suggests the way forward *The teacher puts a cross against the pupils' working, writes the overall score as 4/10 but besides the pupils' wrong working on the above number he writes:* *Use your knowledge of place values and try this number again. If the place value of 4 is hundred thousands, how many times are you going to multiply 4 by 10 to come up with four hundred thousand? And if the place value of 6 is ten thousands, how many times are you going to multiply 6 by 10 to come up with sixty thousand? Use this same strategy with the rest of the numbers and do correction. You can also discuss with your friends or refer to the examples I gave you yesterday. Come and show me your revised version after you have finished.*	Gives a descriptive comment only e.g. specifying strengths and/or weaknesses and suggests strategies of overcoming the weaknesses *The teacher writes the following comments besides the pupils' wrong working and he does not write any overall mark in the pupil's book:* *Use your knowledge of place values and try this number again. If the place value of 4 is hundred thousands, how many times are you going to multiply 4 by 10 to come up with four hundred thousand? And if the place value of 6 is ten thousands, how many times are you going to multiply 6 by 10 to come up with sixty thousand? Use this same strategy with the rest of the numbers and do correction. You can also discuss with your friends or refer to the examples I gave you yesterday. Come and show me your revised version after you have finished.* ***OR*** *When you multiply and add up all your numbers, do you come up with the original sum? Why do you think you come up with a bigger sum? Come and talk to me.*

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Two others (Ogwang and Ruhweju) made similar comments but without marks. Whereas such practices were not at Levels 1 and 2, they also did not fit Levels 3 and 4, as the comments made did not specify 'strengths or weaknesses and suggest ways of overcoming the weaknesses'.

In instances where the teachers wrote 'see me' in the pupils' book, they were inviting them to come for more help during the teachers' free time:

> For slow learners, I give them remedial work. I write in their exercise books: "see me". I do it indirectly so that they don't feel they are being undermined in front of the entire class. When they come to me, I give them five or so numbers to try again with me.... After making them try remedial work, they make some effort to improve.... (Ddumba, 17/7/2000).

Apart from being used to invite pupils for further remedial work and help, the "see me" comment can be used by Ugandan teachers to call pupils for punishment or to reprimand them. It is a comment that pupils do not always take in a positive sense.

A comment such as 'do correction' or 'get help from a friend', urged the pupil to revise the work or consult with the teacher or with peers, to correct the mistakes. The comments as they stand did not have much formative potential, an indication that none made real attempts to 'close the gap' in pupils' written work. Only when the teachers followed them up and talked to the pupils was there potential to enhance learning.

Summarising, all the teachers tended to give feedback in the form of marks or marks accompanied with simple evaluative comments, at the expense of more descriptive comments that could be acted upon to enhance learning. The written feedback, thus, was summative in nature.

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Analysis of the teachers' lessons

The lessons that were video-recorded were analysed using the video observation schedule (Table 2). The schedule was used to identify and quantify the moments when the teachers used assessment formatively and when they appeared to have missed opportunities to assess formatively during the course of the lessons.

While the assessment that took place during the course of teaching was sometimes limited in nature, in that it only involved the few individuals who had a chance to talk or to be marked during the lesson, it provided evidence of the extent to which the teachers used assessment in their classrooms to aid learning. It also made it possible to compare the written feedback, as analysed in the preceding section, with their verbal feedback in lessons, as in Weeden et al.'s words, "feedback given in these interactive situations is just as important as the more considered comments written in pupils' more private books" (Weeden et al. 2002:112). Although verbal feedback is restricted in value in large classes, it has the advantage of allowing teachers to press a few pupils to explore issues they do not understand, enables those pupils to get personal attention from their teachers and gives the rest of the class an opportunity to learn by following the dialogue.

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Part 1 of the video observation schedule

Part 1 of the video observation schedule records how questioning was used to enhance, or to hamper learning. The outcome of the analysis is summarised in Table 9 below.

TABLE 9: **Frequency of questioning**

Formative Questioning	*f*	Teachers	Missed opportunities	*f*
A. Teacher asks questions aimed at assessing pupils' prior knowledge on the topic so as to build new knowledge upon existing knowledge.	-	Batte	**B.** Teacher does not ask questions to assess pupils' prior knowledge or asks questions targeting what factual knowledge pupils can recall from the previous lesson (fixed principles).	02
	-	Ddumba		05
	-	Kato		04
	-	Lule		01
	-	Ogwang		03
	-	Ojok		04
	-	Oloya		03
	-	Opoka		02
	-	Rugasira		03
	-	Ruhweju		02
	-	Tuhirirwe		02
	-	Tukahebwa		02
	-	Walimbwa		03
	-	Wandera		05
C. Teacher asks open-ended or thought provoking questions which require extended thinking to respond to them.	-	Batte	**D.** Teacher asks closed questions which call for one specific answer or which require the recall of fixed principles, and therefore, which require lower order thinking skills.	47
	05	Ddumba		33
	-	Kato		30
	-	Lule		17
	-	Ogwang		17
	-	Ojok		28
	-	Oloya		10
	-	Opoka		13
	-	Rugasira		25
	-	Ruhweju		17
	-	Tuhirirwe		18
	-	Tukahebwa		37
	-	Walimbwa		14
	-	Wandera		11
E. Teacher gives pupils the opportunity to pose questions about what is being taught and uses the questions to mediate further learning.	-	Ojok	**F.** Teacher tells pupils to ask questions but is not genuinely looking for their questions. E.g. he just says it in passing and does not provide them with enough time to ask.	01
	01	Ruhweju		-
	-	Tuhirirwe		01
G. Teacher uses pupils' questions as a means of interacting with and stretching their understanding by involving them in finding solutions to their questions.	-	Ogwang	**H.** Teacher offers answers to pupils' questions straight away or asks other learners to do so without engaging the individuals who asked the questions in finding solutions to their questions.	07
	01	Ruhweju		-

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Table 9 shows that only one teacher, Ddumba, asked open-ended mathematics questions (C). The questions did not call for a specific answer nor did the teacher expect any particular response from pupils. The questions required an understanding of the task at hand and some extended thinking on the part of the pupil to respond

suitably. They provided the teacher with the opportunity to assess the depth of individual pupils' comprehension of the task at hand and to estimate the gap between the pupils' current understanding and the desired understanding of the task. Through estimating the existing gap teachers could mediate further learning to close it. Examples of such open-ended questions included:

Ddumba: Do we have any alternative apart from our friend's contribution?

But remember we have got another way of multiplying this one very fast. Who can give me another method of multiplying this number very fast?

What can we do with this number? We have got four pictures and the scale is 150. What are we going to do? (Ddumba, 7/8/2000: Lesson on pictorial graphs)

Ruhweju alone assessed pupils' understanding by asking them to ask questions regarding what was being taught and using the questions to mediate further learning (E). He also used pupils' questions to interact with the pupils and stretch their understanding to higher levels through involving them in finding solutions to one another's questions (G). In this way he was not transmitting explanations to the pupils, but encouraging them to find possible explanations to each other's questions, as evidenced in the following episode:

Ruhweju: ...is there anyone with any question about all this? Ask before I give you another question....
Pupil 1: What shows that you divide?
Ruhweju: Now this one is asking why we dived 450 by three... who can try to answer that question? Ruth
Pupil: Because you wanted to find the cost of one book and then you multiply it to get the cost of ten books.
Ruhweju: Ten books? You're telling us books and yet we have pencils here?
Pupil 2: To get the cost of ten pencils.
Ruhweju: Now this one is saying, because they gave us the cost for three pencils.... Are you with me?
Class: Yes.
Ruhweju: ...as 450/=. So in order to get the cost of one pencil, you have to get the total money that is spent on three pencils and then you divide it by 3 so that you get.... It is like going to the canteen there and you buy three cakes at 300/=. If they ask you how much does one cake cost, how can you work out that one? There are three cakes, and they cost 300/= and they want you to work out the cost for one cake.

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Pupil 1:	You divide.
Ruhweju:	You divide. So the same thing applies here. Are you with me?
Class:	Yes.
Ruhweju:	So here they gave us the cost of three pencils as 450/= and if they ask the cost of ten, you first get the cost of one pencil and then you multiply with the ten pencils and you get the total amount....
	(Ruhweju, 3/10/2000: Lesson on simple rates and proportion)

In other cases, teachers missed opportunities to use assessment to aid pupils' learning in as far as the assessment of prior knowledge and the handling of teacher and pupil questions were concerned.

All the teachers started their lessons by asking questions about the factual knowledge the pupils could recall from the previous lesson, or embarked on new lessons assuming nothing in terms of prior knowledge or experience in pupils, rather than asking questions that tapped into pupils' prior knowledge to build on it (B). In these instances, as was the case in Kato's lesson on division of fractions by natural numbers, pupils appeared passive recipients of the teacher-transmitted knowledge.

Kato:	This afternoon let us look at division of fractions by natural numbers.... So let's look at this example where there is a fraction and a natural number. Let us take this as our example 1: one over three divided by four (1/3 ÷ 4). One over three divided by...?
Class:	Four.
Kato:	Now when you're given a number like that, first of all we make this natural number (*pointing at 4),* which is a whole number, as a fraction. As a what?
Class:	A fraction.
Kato:	How? (*he immediately answers himself)* We put four over one (*writes 4/1 on the blackboard)*. Over what?
Class:	One.
Kato:	Over one. Are we together?
Class:	Yes.
Kato:	So after making four a fraction (4/1), we have to look for the LCM of three and?
Class:	*(a few pupils shout out)* One.
Kato:	And we have two methods of working out that number. *(He goes ahead to demonstrate the two methods as the pupils watch and listen).*

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(Kato, 3/10/2001: Lesson on division of fractions by natural numbers)

Examples in which teachers started new lessons merely by requiring pupils to recall specific information from previously taught lessons included:

Batte: Now yesterday some of you were around and others were not around. But we talked, we have been talking about fractions. We have been talking about what?
Pupils: Fractions.
Batte: Can you mention some of the types of fractions we talked about?
(Batte, 20/7/2000: Lesson on arranging decimal fractions in ascending and descending order)

Ddumba: Last time we were discussing about graphs and I remember we outlined types of graphs. I want any of you, a girl or boy to remind us the types of graphs.
(Ddumba, 7/8/2000: Lesson on Pictorial graphs)

Kato: Who still remembers what we learnt yesterday? What did we talk about yesterday in maths?
(Kato, 25/7/2000: Lesson on Equations)

Ogwang: Now let us go back to what we learnt yesterday. Who can remember the topic we did yesterday? Winnie:
Pupil: Volume.
Ogwang: Volume. She said volume. What is the formula used to find the volume. Sabera:
Pupil: Volume equals length times width times height ($V = L \times W \times H$).
Ogwang: Good. If you have been asked to find the volume you write
$V = (L \times H \times W)$ cm^3. Now we have been given:
$L = 4$ cm $H = 5$ cm $W = 3$ cm. Now you write:
$V = (L \times H \times W)$ cm. Who can tell us the next step?
Pupil 1: Volume equals brackets four times three times five, brackets, three centimetres cubed i.e. $V = (4 \times 3 \times 5)$ cm^3.
Ogwang: Therefore our volume is going to be…? What is our volume? Gerald:
Pupil: Sixty centimetres squared
Ogwang: Sixty?
Pupil 2: Centimetres cubed.
Ogwang: Sixty centimetres cubed.
(Ogwang, 20/10/2000: Lesson on solving equations)

In the above examples, the teachers assessed how the pupils attempted to recall and master the previously teacher-transmitted knowledge rather than trying to analyse

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pupils' personal interpretations of the mathematics. The focus of the teachers was on particular mathematics concepts and pupils' conceptions of them, and not on how the pupils made personal meaning from the knowledge that had been taught them previously. The teachers' beliefs appeared to be that mathematics was a matter of enabling pupils to acquire particular pre-determined understandings (mathematics as transmitted) and not a personally or socially constructed subject. As long as pupils recalled accurately what had been taught previously, the teacher could proceed to introduce a new unit / lesson (Hiebert and Carpenter 1992:65; Niss 1993:16). These teachers' teaching and assessment approach could best be described as a transmission approach.

Although in some cases teachers appeared to make an effort to assess pupils' prior knowledge, they used closed questions. There were also instances in which pupils provided "yes" or "no" answers to questions that clearly required critical responses, but the teachers did not attempt to probe further. Examples of such cases included the following:

Ddumba:	Okay. I want anyone of you to tell us why Nakku is saying that Buloba has six hundred pupils.
Pupil:	She has multiplied one hundred and fifty by four.
Ddumba:	Why four?
Pupil:	Because in Boloba Demonstration School they have given us four pictures.
Ddumba:	Okay. (*He goes on to explain)* Since in Buloba we have got four pictures and then our scale says (*He writes on the blackboard):*
	1 picture = 150 pupils Then what about four pictures?
	4 pictures = ? x we don't know
	Now what method are we going to use to find x? We want a formula. In mathematics this is very important…
	(Ddumba, 7/8/2000: Lesson on Pictographs)

In the above transcript, Ddumba attempted to introduce new mathematical concepts pertaining to pictorial (picture) graphs by starting from what pupils knew about pictograph. He started with non-mathematical language to be certain that pupils

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comprehended what he was teaching. As his probing was restricted to eliciting brief statements from the pupils without critically engaging them in the subject matter, he cannot be said to have introduced higher levels of dealing with the mathematical task at hand (the use of a mathematical formula in handling tasks related to pictograph), building on what pupils knew.

Walimbwa also began by attempting to assess pupils' everyday or common mathematical knowledge and using it to build complex or real mathematical approaches to solving mathematical tasks. His effectiveness was restricted in the sense that the questions asked were not critical and pupils only provided numerical answers to simple divisions that could not be considered to provide formative feedback:

Walimbwa:	They can give you equations of this kind: 5a = 20. Here they want you to find the value of "a". Who has an idea about that? In other words, they can give you that you have five baskets and these baskets are full of mangoes but you don't know how many mangoes are there in each basket...but when they are added together you get twenty mangoes. But each basket we don't know how many mangoes it's containing. So we can make an equation like this (5a = 20). They can tell you to find the value of "a" representing each basket. Yes Hannah:
Pupil:	Five "a" over five is equal to twenty over five and the answer is four (5a/5 = 20/5. a = 4).
Walimbwa:	So that is her answer. I don't know whether she is right or wrong. How many are agreeing with her that she is right?
Class:	*(some pupils put up their hands)*
Walimbwa:	Some of us we don't know. Isn't it?
Class:	Yes.
Walimbwa:	We don't know how she got four and why she put her work like that. Isn't it?
Class:	Yes.
Walimbwa:	So here if you want to find the value of "a" we have to divide the number of the baskets they have given us, which is five. So this one (5a = 20) is the same as 5 × a = 20 and to remain with "a" we have to get rid of what? Five. And how do we do away with five? ...we shall divide five by five. And as we have already known that with an equation both sides have to balance. So when you divide five by five we need also to divide twenty by what?
Pupil:	Five.

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Walimbwa: Five. So that we balance our equation. So five divide by five is what?
Class: One.
Walimbwa: And one over one is the same as what?
Class: One.
Walimbwa: So we have one "a" (1a) or you just write "a" alone. Twenty divide by five is four and so "a" equals four (a = 4). This is how she came up with four. Is it clear to the whole class?
Class: Yes.

(Walimbwa, 22/11/2000: Lesson on Solving Equations)

By not asking probing questions to assess pupils' prior knowledge, the teachers showed little awareness of the benefit of integrating assessment into teaching to inform and shape the teaching at hand. Assessment of pupils' existing knowledge is crucial if new knowledge is to be mediated to pupils, as Black and Wiliam (1998b: 10) conclude "...new understandings are not simply swallowed and stored in isolation – they have to be assimilated in relation to pre-existing ideas". Hargreaves et al. (2000: 31), too, found that teachers who engaged in assessment practices that aided learning held the view that pupils learnt by building on what they already knew.

All fourteen teachers asked closed questions frequently (D). They had pre-determined answers and could not be used as a means of probing and extending the pupils' knowledge and understanding. Examples of such questions from lesson transcripts include:

How many decimal places does 1.1 have?
What is 0.11 going to be in proper fraction?
(Batte, 20/7/2000: Lesson on arranging decimal fractions in ascending and descending order)

...now what is the formula of finding the area of a square?
...now what if you're asked that "what's the square root of 49? What could the answer be?
7×7 we are getting forty what?
(Batte, 3/7/2001: Lesson on finding the area of a square)

3 + 2 what do we get?
So what is the product of six plus six?
What is the opposite of plus 5?
So what is the product of +5-5?
(Kato, 25/7/2000: Lesson on equations)

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...from one numeral to the next numeral using an hour hand. What is that duration? What is the time between one numeral to the next one using an hour hand?

(Lule, 7/8/2000: Lesson on reading time)

Ojok:	We have 11,12,13,15,16,17,18 and 19. Of these numbers which of them are even numbers?
Pupil 1:	Twelve.
Ojok:	Another one?
Pupil 2:	Sixteen.
Ojok:	Good. Another one?
Pupil 3:	Eighteen.
Ojok:	Eighteen. Then? Okay those are the numbers. ...have you understood?
Class:	Yes.

(Ojok, 5/7/2000: Lesson on diving numbers by two)

The teachers used such questions to assess the computational skills and pupils' ability to spot the correct answer, at the expense of assessing the mental processes that pupils employed to answer the questions. In the search for the "correct answer", the teachers missed the opportunity to ask more open-ended or probing questions that could better ascertain the level of reasoning and understanding of the pupils answering them.

Two teachers (Ojok and Tuhirirwe) appeared to give their pupils an opportunity to ask questions about what was being taught, yet they were not genuinely seeking pupils' questions (F). They were only going through the motions as not enough time was given to the pupils to reflect and to ask meaningful questions, as in the following example:

Ojok: Now, who has not mastered all the concepts? Anyone with a problem? Okay, you get your books and do these numbers for me....

(Ojok, 8/8/2001: Lesson on Word problems)

Ogwang merely offered answers to pupils' questions without engaging the pupils in trying to find solutions to their questions (H). This limited his chances to close the gap in the pupils' knowledge. It was teacher-transmitted knowledge which at best could be memorised by the pupils and reproduced when required without any meaningful understanding of it. In this case, assessment was not used to aid meaningful learning.

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In a nutshell, there were very few instances when teachers used assessment formatively when treating questions posed by themselves and by their pupils. Far more often they missed the opportunity to use assessment formatively. For example, there were five instances in which Ddumba was regarded as having used assessment formatively, and 38 instances in which he was regarded as having missed the opportunity to use assessment formatively. Batte had 49 instances in which he missed opportunities to use assessment formatively and there was no occasion when he did so. There was no teacher who asked questions assessing pupils' prior knowledge in a formative manner. Asking open-ended questions and permitting pupils to ask questions were also weakly developed strategies, with only one teacher assessing formatively in each case. All of the teachers asked many closed questions that scarcely facilitated the formative use of assessment, as they did not permit dialogue with the pupils.

Part 2 of the video observation schedule

Part 2 of the video observation schedule was used to analyse how the teachers gave verbal feedback to pupils and how they dealt with pupils' incorrect responses. The analysis of the quality of teachers' feedback was a key indication of the extent to which the teachers used assessment formatively in the video recorded lessons. How the teachers responded to pupils' errors or incorrect responses was also a central aspect.

Table 10 presents the findings from the analysis of how the teachers gave feedback and how they dealt with incorrect responses in the video recorded lessons.

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TABLE 10: **Feedback and handling of incorrect responses or errors**

Formative usage	*f*	Teachers	Missed opportunities	*f*
A. Teacher offers strategies or helpful hints/clues to facilitate self-correction.	02	Batte	**B.** Teacher provides the answer himself straight away when a pupil errs.	-
	12	Ddumba		-
	-	Kato		01
	-	Lule		01
	-	Ogwang		03
	-	Ojok		06
	03	Oloya		02
	02	Opoka		03
	-	Rugasira		02
	02	Ruhweju		03
	01	Tuhirirwe		05
	04	Tukahebwa		07
	01	Walimbwa		02
	01	Wandera		01
C. Teacher repeats pupil's response in a neutral tone to permit self-assessment and self-correction of error.	01	Batte	**D.** Teacher asks another pupil(s) to correct the error without providing opportunities for the individual to self-correct.	-
	-	Kato		02
	03	Lule		04
	-	Ojok		01
	-	Oloya		03
	-	Opoka		04
	-	Rugasira		01
	-	Ruhweju		06
	-	Tuhirirwe		09
	-	Tukahebwa		16
	01	Walimbwa		05
	-	Wandera		01
E. Teacher notes pupil's error, probes, and provides enough wait-time for the pupil to try again and self-correct.	02	Batte	**F.** Teacher merely disapproves e.g. "That's not correct" without any other comment or provides the desired response without giving the individual the chance to try again and self-correct.	21
	13	Ddumba		08
	02	Kato		04
	05	Lule		05
	-	Ogwang		02
	02	Ojok		-
	01	Oloya		05
	11	Opoka		02
	17	Rugasira		01
	14	Ruhweju		-
	-	Tuhirirwe		08
	07	Tukahebwa		15
	01	Walimbwa		04
	07	Wandera		-
G. Teacher models an example of the required response and asks the child to base his/her response on the given example i.e. more practice given.	01	Ojok		
	05	Tukahebwa		
H. Teacher uses pupil's response to offer further clarification/explanation.	01	Batte		
	02	Ddumba		
	01	Kato		

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	02	Oloya		
	01	Rugasira		
	04	Ruhweju		
	01	Tukahebwa		
	02	Walimbwa		
	02	Wandera		
I. Peer-assistance: Teacher asks other learners to mediate understanding to their peer(s) or asks pupils to collaborate to find solutions to given problems collaboratively.	07	Ddumba	**J.** Peer assistance is restricted to asking other learners to decide whether the response is correct or wrong without requiring them to give any other comment e.g. "Is she correct?"	05
	-	Kato		07
	-	Lule		15
	02	Oloya		03
	-	Opoka		01
	-	Rugasira		01
	05	Ruhweju		05
	-	Tuhirirwe		05
	-	Tukahebwa		09
	01	Walimbwa		09
K. Specific approval of correct response or specific acknowledgement of attainment.	02	Batte	**L.** Non-specific approval of correct response e.g. "That's right", with no further comment.	66
	03	Ddumba		29
	-	Kato		15
	-	Lule		12
	06	Ogwang		09
	-	Ojok		17
	-	Oloya		24
	-	Opoka		08
	-	Rugasira		08
	-	Ruhweju		06
	-	Tuhirirwe		06
	01	Tukahebwa		20
	-	Walimbwa		11
	01	Wandera		-
		Batte	**M.** Rewards e.g. clapping or thanking without any supplementary comment.	21
		Ddumba		18
		Kato		05
		Lule		04
		Ogwang		01
		Oloya		01
		Rugasira		04
		Ruhweju		03
		Tuhirirwe		07
		Tukahebwa		01
		Wandera		09
		Ddumba	**N.** Uses pupil's response to report achievement e.g. offers positive evaluative comments such as: very good, well tried, well done... without specifying strengths or weaknesses and the way forward.	02
		Kato		06
		Lule		02
		Ogwang		06
		Ojok		11
		Oloya		02
		Opoka		04
		Rugasira		15
		Ruhweju		03

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		Tuhirirwe Tukahebwa Wandera		03 25 10

The analysis showed that many of the teachers used pupils' errors as a catalyst for learning on occasion. From Table 10, a majority (twelve teachers) noted pupils' errors, probed and provided enough wait time (waiting patiently for pupils to answer after a question had been asked before re-asking the question or providing an answer themselves (E)) and others (nine teachers) offered strategies or helpful hints/clues to facilitate self-correction when a pupil erred (A). Others (nine of them) used pupils' incorrect responses to offer further clarification/explanation (H), while some (three teachers) repeated pupils' responses in a neutral tone to permit self-assessment and self-correction of error (C) and two teachers modelled an example of the required response and asked the pupil to base his/her response on the given example (G). An illustrative example is provided below for each of these strategies in which teachers used errors to enrich learning.

An instance in which a teacher probed a pupil's incorrect response and provided the pupil with reasonable time to try again and self-correct was in a lesson on reading time.

Lule:	What is wrong with this (11:50)? (*The pupil had written fifty minutes to eleven o'clock).* It should be...? What do you expect this 11:50 to be? Do we say fifty minutes past or fifty minutes to? What is the answer? You put your pen down. Okay, we said, when it gets beyond 30, what do you do? You get your 60 and subtract this time (50) and see what is remaining to the next hour? Okay?
Pupil:	Yes.
Lule:	Now, how many minutes remaining in order to reach twelve?
Pupil:	Ten.
Lule:	Now, how can you write it? What should be the answer since you have got the answer now?
Pupil:	Ten minutes to...
Lule:	Ten minutes... speak loudly
Pupil:	Ten minutes to eleven.
Lule:	This is now already eleven. Okay, use your local language. Don't fear. Okay you think about it. I am coming back.
	(Lule, 7/8/2000: Lesson on Reading time)

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And one in which a teacher offered strategies or helpful hints / clues to enable his pupils to recognise and self-correct their own mistakes / errors included the following:

Question: The area of a square is 169 cm^2, what is the length of one side of the square?

Pupil 1:	12 cm.
Batte:	Speak louder.
Pupil:	12 cm.
Batte:	Is it 12 cm? She says that the answer is 12. That is answer number one. Who can give us a different answer? Francis:
Pupil:	30 cm.
Batte:	The answer is 30 cm. One side is equal to 30 cm?
Pupil 3:	13 cm.
Batte:	This one is giving us 13 cm and this is answer number three. Any other answer?
Pupil 4:	13.
Batte:	You're also saying 13? So now we have said that the area is?
Class:	169.
Batte:	169. So in order to get 169, we multiply the same number to get 169 i.e. ---×--- = 169 cm. So when we multiply 12×12 do we get 169?
Class:	No.
Batte:	And so 12 is wrong, and by the way, what is 12×12?
Class:	144.
Batte:	So when we turn to 30, when we multiply 30×30, do we get 169?
Class:	No.
Batte:	So this is also out. Then when we multiply 13×13, do we get 169?
Class:	Yes.
Batte:	...we get 169. And so one side is?
Class:	13.
Batte:	It's 13. Is it okay now?
Class:	Yes.
	(Batte, 3/7/2001: Lesson on Finding the area of a square)

Oloya provided an instance of a teacher using a pupils' incorrect or undesirable responses to offer further clarification (H):

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Oloya:	...Or horizontal addition. That is what we have been doing when you were in your early primary, ...but when we reach here, we need to arrange these vertically. What's that order? Who can remind us what vertical order is? Ochieng:
Pupil:	By starting with a big number.
Oloya:	She is saying by starting with a big number. Is that correct? Is that true? The vertical arrangement, how do the numbers follow?
Pupil 2:	Straight.
Oloya:	This one says straight. Is that correct?
Pupil 3:	Down.
Oloya:	Someone is saying down.
Pupil 4:	We start arranging the numbers from the biggest to the smallest.
Oloya:	That one says from biggest to smallest. Edmund:
Pupil:	You arrange the big numbers in order to be followed below the small numbers.
Oloya:	And that is straight. You arrange the numbers from top to bottom and I think that is the vertical arrangement we have been talking about...
Oloya:	...So these place values (hundreds, tens and ones) will help you to arrange the above numbers in that order. We can begin with any. We can even start with the smallest, not as one person suggested "that it is the arrangement starting from the biggest to the smallest". We can begin with any as long as you know the what?
Class:	The place values.
	(Oloya, 4/7/2000: Lesson on Place values)

While an example in which a teacher repeated pupils' responses in a neutral tone so as to allow the pupils to recognise their mistakes on their own to permit self-assessment and self-correction to take place, is:

Walimbwa:	So we looked at types of angles and how many were they in number?
Pupil 1:	Three.
Walimbwa:	We looked at?
Class:	Three types.
Walimbwa:	They were only three not four?
Class:	Three types.
Walimbwa:	Okay they are three types as you have said. But you have forgotten one. Isn't it?
Class:	Yes.
Walimbwa:	Who can mention one type?
Pupil 1:	Obtuse angles.
Walimbwa:	Correct. Another one? Yes Opio:
Pupil:	Acute angles.
Walimbwa:	Louder please.
Pupil:	Acute angles.
Walimbwa:	The acute angles. You're right. Yes Byanuma:

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Pupil:	Right angles.
Walimbwa:	Again.
Pupil:	Right angles.
Walimbwa:	Yes. Those are how many you've mentioned so far?
Class	Three.
Walimbwa:	Do we have another one left?
Class:	Yes.
Walimbwa:	What's that one? Brenda:
Pupil:	Reflex angles.
Walimbwa:	Again.
Pupil:	Reflex angles.
Walimbwa:	So we have four types not three.
	(Walimbwa, 22/11/2001: Lesson on drawing angles)

Finally, an instance of a moment in which the teacher modelled an example of the required response and asked the pupil who had failed to answer correctly to revise his or her response based on a given example was:

Ojok:	What is this you have drawn? Don't draw anything. Don't write there anything. You're just going to pick out those numbers which are divisible by two. You should not divide them at the moment. There's no dividing the numbers at the moment. You are just going to pick even numbers which are divisible by two. Okay?
Pupil:	Yes.
Ojok:	As I have done in this example here. You see: I have 0,1,2,3 up to 9 and then my even numbers are 2,4,6,8 as my answer. So that is what you're going to do. Okay?
Pupil:	Yes.
	(Ojok, 5/7/2000: Lesson on dividing numbers by two)

In the above five strategies, the teachers encouraged the pupils to try to find solutions to their errors/incorrect responses rather than providing the correct answers themselves or asking other knowledgeable pupils to. In doing so, the teachers showed evidence of regarding mathematics learning as constructed individually or socially, in that meaningful understanding of it had to involve the individual learner in knowledge construction. Their practice reflects that reported in studies such as Day and Cordon (1993) in Wiliam (1999b: 9), who found that students learnt and retained less when they were given a complete solution as soon as they got stuck. Their counterparts who only got as much help as they needed to make progress (a scaffolded response) learnt more and retained their learning longer. Hargreaves et al. (2000:31) also found that expert teachers, whose teaching aided learning, held the view that pupils learnt by

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discovering for themselves rather than being supplied with the correct answers by other people. Wells (1990) also established that if teachers quickly corrected pupils' miscues immediately, the pupils came to realise that they did not need to do any active checking or thinking to correct their mistakes. In this way their learning was hampered rather than facilitated.

Feedback strategies with a potential to enhance pupils' learning used by teachers included acknowledging a pupil's correct response by way of specifying or highlighting what actually made the response correct (K) and making use of peer-assistance in case of a detected miscue or misunderstanding (I). Strategy K was employed by five of the fourteen teachers while I was used by three teachers.

An instance illustrating a teacher specifying what made a response correct was:

Ddumba:	...can we conclude that this is going to be our final answer?
Class:	No.
Ddumba:	Why are you claiming that it is not our final answer?
Pupil:	Because the number can be reduced .
Ddumba:	Correct. Another answer? Namitala:
Pupil:	They have a common deviser.
Ddumba:	Excellent. They have the same characteristics in common. That is why our friend Namitala has said that they both have a common deviser because 6 and 20 are even numbers they can have the same deviser. (Ddumba, 8/8/2001: Lesson on Division of fractions)

By specifying what made a response desirable, the teachers implicitly encouraged the acceptance of correct responses by the pupils. In the case of peer-assistance in which teachers asked other pupils to mediate understanding to their peer(s) or asked a group of pupils to collaborate and find solutions to given problems, an opportunity was provided to the pupils to learn from their peers. Those who were slow at grasping concepts had the opportunity of getting explanation from their peers.

The preceding description has been of the formative use of pupils' mistakes and the offering of feedback by teachers. On many occasions, however, the teachers missed opportunities to deal with incorrect responses and to offer feedback that would enhance their pupils' learning.

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Almost all the teachers had occasions when they provided the correct answer themselves immediately after their pupils had erred rather than prompting pupils about how to work towards one for themselves (B). For example:

Ogwang:	Let us begin with this one (P4): she has written p + 18 – 18 = 42 + 18. Have you seen the order? So here you get nothing. It's not in order whereby P = 42 + 18, p = 60. Your answer is not correct and even the method. To get the value of P you write 18 + p = 42. This is an equation which has to be balanced. So if it doesn't balance, this means our answer is not correct. P is the unknown number which if its added to eighteen you will get forty-two. So here we write 18, what is the opposite of 18, it is –18. So 18-18 + p = 42 – 18 and so to remain with p alone we have to cancel 18 – 18 and we remain with p where p = 42 – 18. Therefore p equals? What is the value of p?
Pupil:	Twenty-four.
Ogwang:	Therefore our p equals twenty-four. (Ogwang, 20/10/2000: Lesson on solving equations)

In other instances, as in the following illustrations, eleven of the teachers asked fellow pupils to provide the correct response at times, without providing opportunities for the pupils to self-correct (D).

Kato:	Yah. So we shall get one divided by twelve (*writes 1 ÷ 12 on the blackboard).* Now we have one divided by?
Class:	Twelve.
Kato:	Who can tell us the answer? One divided by twelve? Kavuma:
Pupil:	Twelve.
Kato:	Do we get twelve?
Class:	It's impossible.
Kato:	It's impossible?
Class:	Yes
Kato:	Another person. Nagawa:
Pupil:	One over twelve. (Kato, 3/10/2001: Lesson on division of fractions by natural numbers)

Opoka:	…8×8? This is something you should all know.
Pupil:	61.
Opoka:	61? Have you multiplied very well? Let me ask this one here. Jobi:
Pupil:	(*also gives the incorrect response and the teacher asks other pupils until he gets the correct response of 64)*

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Opoka:	Now 8+3?
Pupil 2:	12.
Opoka:	8+3 is 12?
Class:	No.
Opoka:	Everybody put up your hands. This one is going to tell us the answer 8+3.
Pupil 3:	11.
	(Opoka, 17/10/2000: Lesson on multiplying weights)

On all these occasions, the pupils were denied the chance of self-correcting and therefore of learning from their mistakes. Those who merely provided the correct responses or asked other pupils to provide them as soon as a given pupil erred showed that they were only interested in "correct" responses, rather than in enhancing the understanding of those who gave the responses. They moved quickly from a pupil who failed to give the correct response in search of one who could give the required response. Alternatively, the teachers' interest appeared to be on how many pupils talked during the lesson, rather than on focussing on specific individuals at critical moments.

There were times when many of the teachers (eleven) merely disapproved when their pupils made errors (F). Examples included:

Batte:	By the way, who can give us one example of a decimal fraction? Yes Bidandi:
Pupil:	Six over two.
Batte:	Six over two? No thank you.
Pupil 2 :	Two over one.
Batte:	No thank you.
	(Batte, 20/7/2000: Lesson on arranging decimal fractions in ascending and descending order)

Opoka:	...8×8? This is something you should all know.
Pupil:	61.
Opoka:	61? Have you multiplied very well? Let me ask this one here. Jobi:
Pupil:	84.
Opoka:	84? That is very wrong.
	(Opoka, 17/10/2000: Lesson on multiplying weights)

While in such instances the pupils concerned were made aware of their incorrect responses, nothing was done by the teachers to help them to learn from their mistakes or to overcome their errors.

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Furthermore, although ten teachers at times attempted to make use of peer assistance to deal with incorrect responses, this was restricted to asking other pupils to decide whether the response was correct or wrong, without requiring them to give any further comment to enrich the learning of their peer (J):

Lule:	What is a millennium?
Pupil:	A millennium is after ten thousand years.
Lule:	Ten thousand years. Is he right?
Class:	No.
Lule:	They have said no.
	(Lule, 7/8/2000: Lesson on reading time)

As in the preceding instance, teachers made the pupils aware of their errors but there were no steps to use these mistakes as a learning experience.

Teachers missed many other opportunities to give feedback that had the potential to enrich the learning of their pupils. Most teachers (thirteen) merely approved of pupils' correct responses at times without giving any further specification or explanation (L); twelve on occasion responded to pupils' answers by merely reporting achievement to them in form of comments such as: "very good", "well tried" (N) and a significant number of them (eleven) gave feedback in the form of rewards such as thanking and asking the class to clap for those who gave the correct responses (M).

In all these cases, the teachers' assessment practices can be termed "evaluative" (Tunstall and Gipps 1996: 188). The rationale for assessment appeared to be evaluating the correctness of contributions. Important to note is the role of the teacher and the role of the pupils in these instances. The roles are clearly defined: the teacher assesses, the pupils respond and the teacher gives feedback by way of evaluating the correctness of the pupils' responses. What is evident is a one-way form of feedback. This style of evaluative assessment appeared to be informed by the teachers' conception of the subject matter. Approval, giving an evaluative comment, or rewarding the response was usually in response to precise answers and the accurate recitation of mathematical procedures and formulae. This suggests that the teachers regarded mathematics as a field of established set of rules and truths rather than one in which individuals could construct their alternative procedures (Webb 1992: 665). This would also explain why most of them were quick to offer the correct response or ask

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other pupils to suggest it when someone gave an incorrect answer, as they saw their main responsibility to avoid any ambiguity.

As was the case with Part 1 of the video observation schedule, Part 2 revealed that on occasion teachers dealt with incorrect responses and gave feedback in ways that enhanced the learning of their pupils. However, most of the teachers missed many opportunities to deal with incorrect responses and offer feedback in ways that would have facilitated the learning of their pupils. Part 2 also revealed that the teachers used assessment formatively better when giving verbal feedback and in handling pupil responses than they did in questioning (Part 1).

Overall, the analysis afforded by the video observation schedule showed that there were some cases of instances of the formative use of assessment by teachers, but that these were markedly fewer than the instances in which teachers did not use assessment to facilitate the learning of their pupils, as the following graph shows.

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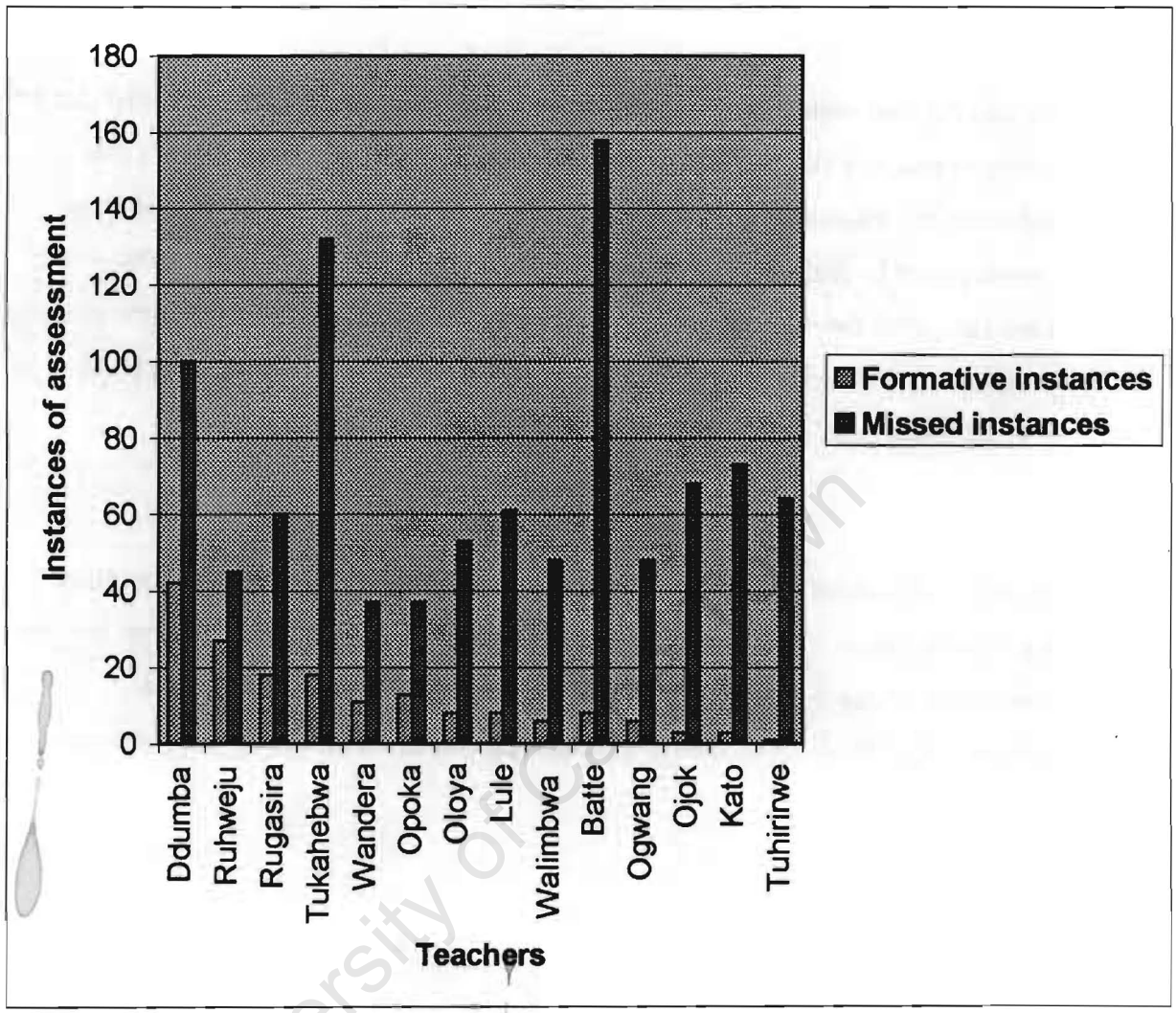
GRAPH 1: **Frequency of formative and missed instances in the lessons analysed**



Interpretation of the analysis

When the teachers were compared on the two parts of the video observation schedule (Table 11) three groupings emerged (depicted in Graph 1 above).

TABLE 11: **Comparison of the results of the two parts of the video observation schedule**

	Part 1		Part 2	
Teachers	**Formative usage**	**Missed opportunities**	**Formative usage**	**Missed opportunities**
Batte	0	49	08	109
Ddumba	5	38	37	62
Kato	0	34	03	40
Lule	0	18	08	43
Ogwang	0	27	06	21
Ojok	0	33	03	35
Oloya	0	13	08	40
Opoka	0	15	13	22
Rugasira	0	28	18	32
Ruhweju	2	19	25	26
Tuhirirwe	0	21	1	43
Tukahebwa	0	39	18	93
Walimbwa	0	17	6	31
Wandera	0	16	11	21

The first is of two teachers who had half as many formative instances of assessment as missed opportunities. Ddumba had 42 instances of formative assessment and 100 occasions in which he missed the opportunity to assess formatively. Ruhweju had 27 instances of formative assessment and 45 times when he missed opportunities to use assessment formatively. These teachers were regarded as using formative assessment fairly regularly but not consistently.

Most of the other teachers (Batte, Lule, Ogwang, Oloya, Opoka, Rugasira, Tukahebwa, Walimbwa and Wandera) used formative assessment occasionally in relation to how often they engaged in non-formative assessment practices. The formative assessment instances in their lessons were much fewer than the instances in which they missed opportunities to use assessment formatively. They were regarded as having showed aspects of formative assessment.

Formative instances in the remaining teachers' lessons (Kato, Ojok and Tuhirirwe) were almost non-existent. They appeared to use summative assessment only. Where there were occasions when they used formative assessment, they did so by chance and it was not a regular part of their teaching.

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The teachers' verbal feedback during lessons was not compared with their practice in written feedback, since they were all interpreted as having given summative written feedback exclusively.

Conclusion

The teachers assessed a great deal. They were committed teachers, hardworking, sufficiently dedicated to do their job faithfully and were concerned about the learning of their pupils. This high level of dedication was a characteristic of all the teachers, with no particular exception, and it showed that there is fertile ground for formative assessment in Ugandan schools.

Teachers used multiple forms of assessment and there was a lot of marking done. However, the marking provided summative information about and to the pupils almost entirely. There was also a tendency by the teachers to focus on pupils' speed and ability to complete as many sums as possible, within the shortest time, at the expense of cultivating deeper understanding of the mathematics involved. (See for example, what Tuhirirwe and Tukahebwa said, pp. 90-91).

It had been assumed that there might be variations between regions, levels of training, teaching experience, class size and urban / rural location (see Table 1) but, in general, no significant variations were found. Those who used formative assessment fairly regularly (Ddumba and Ruhweju) came from different regions and had teaching experience, training and class sizes that were not very different from other teachers. This suggests that factors such as teaching experience and large class sizes may not be a very big obstacle to the use of continuous assessment to facilitate learning but that the real obstacle is "creating a culture for organising large classes in such a manner that learning can be successfully mediated" (Johnson 1998:394). This conclusion differs from that reported by Cowie and Bell (1999:105), where teachers considered prior teaching experience to be very important in the process of formative assessment. They considered formative assessment to be more likely to occur among experienced teachers than the newly qualified.

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It had also been assumed that teachers might assess differently twelve months later, but this was not the case. Assessment practices in their two lessons were largely similar.

One exception was the resource level of the schools. The two teachers who used formative assessment fairly regularly taught in relatively well-resourced schools in comparison with those who only used summative assessment. This might suggest, in agreement with researchers such as Hall (2000: 93), that schools and teachers need to be provided with resources for any effective change at the classroom level to take place. Alternatively, the better resourced schools, which had supplementary funding from well-to-do parents, might have attracted more innovative teachers.

The preceding analysis helps to highlight the complexities involved in teachers using formative assessment. There are instances of the formative use of assessment by individual teachers, but the general picture that has emerged is that of a weakly developed form of assessment. While those spearheading the implementation of continuous assessment assumed that teachers would comfortably adopt this assessment practice, the research has shown that this is not the case. What is required is an identification of the factors constraining the teachers from broadening their understanding and practice and a means to offer them the necessary professional development.

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CHAPTER 7

THE TEACHERS' UNDERSTANDING OF CONTINUOUS ASSESSMENT

The preceding two chapters have analysed what the teachers said they assessed and what they did in practice in assessing pupils' books and in teaching. This chapter analyses how they understood continuous assessment.

The teachers were interviewed about their perceptions of continuous assessment. They were asked what they understood continuous assessment to mean, what they saw as the government's intention in making continuous assessment official policy and what they perceived as the new aspects in continuous assessment in contrast to the previous system of assessment. Teachers were also asked about their understanding of feedback. It was assumed that their responses to the questions would give an indication of what their appreciation of the formative aspects of continuous assessment might be.

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Perception of continuous assessment

The teachers' responses revealed that all but two of the teachers could articulate their understanding of continuous assessment in some depth. The two exceptions are described first, before the description of those who had a clearer idea.

Ogwang and Walimbwa described continuous assessment as:

> A new system of bringing children to understand what is happening nowadays (Ogwang, 6/7/2000), and
>
> A process of assessing children's learning. (Walimbwa, 1/8/ 2000)

While they could not articulate their understanding of continuous assessment in any meaningful way, they were, however, able to say what they felt the government's intention was of making continuous assessment an official policy. Both of them stated that the introduction of continuous assessment had something to do with the improvement to the old system of assessment that emphasised high stakes examinations, the Primary Leaving Examination (PLE) in particular. Ogwang noted

that the government's intention to introduce continuous assessment was to enable teachers to attend to pupils' learning problems before it was too late:

> ...If the pupils have not understood then it will give you time to repeat it before it is too late. (Ogwang, 6/7/2000)

Walimbwa highlighted the government's desire to judge and to promote pupils fairly, based on results accumulated from multiple assessments done during the course of study, rather than basing all judgements on final examinations:

> ...there are some occasions whereby pupils may fail to write final examinations, but now this continuous assessment can help you to judge this pupil whether to promote him or her basing on continuous assessment results. (Walimbwa, 1/8/2000)

Although the two teachers failed to describe their understanding of continuous assessment by providing a definition of it, they implicitly understood continuous assessment to be a form of regular assessment that involved giving immediate feedback to pupils (Ogwang) and accumulating assessment results over a longer period of time, which could be used in the final judgement of the pupil (Walimbwa). Ogwang's understanding of continuous assessment stressed the formative use of assessment conducted by the teacher (one-way feedback), for example, the teacher repeating what the pupils have not understood, while Walimbwa's understanding of continuous assessment focused on the summative use of assessment, for example, using results from regular assessment of the pupil in judging whether or not to promote him or her to the next class.

Both teachers expressed the view that what was new in continuous assessment was that, eventually, continuous assessment results would contribute to the final marks of pupils in PLE. They claimed that they had been doing continuous assessment long before it became official policy. Both teachers regarded the summative aspect of continuous assessment as the "new aspect" of assessment rather than its formative role in teaching. This response was not unique to these two teachers. The majority of the teachers believed that making continuous assessment results contribute to PLE was the chief underlying intention of the government introducing the continuous assessment policy. Ten of the twelve teachers, who could describe their understanding of continuous assessment in some depth, concurred that the new aspect in continuous assessment was indeed that it was going to contribute to the PLE. Only Ojok and

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Wandera regarded the formative use of assessment as the new aspect. They felt that the new policy of continuous assessment required them to give immediate feedback to pupils, and to repeat areas which pupils had not understood before moving on to teach something new. They had not been doing this before continuous assessment became official policy:

> ...In those years we could just move on with day to day terms and whether they have failed or not, whether the majority have got it or have failed it, I would just go to the next unit. But now this system is good. We are told to repeat those topics where pupils have not understood. (Ojok, 3/7/2000)

> Before continuous assessment, we have been setting tests covering several topics at a go. In this way we have not been catering for the needs of individual children. When you give a test covering several topics it becomes a problem when the child might not have understood a particular topic as you were teaching because it is now a bit late to rectify the problem. But now this one has come demanding that per topic you will have to test. In this way you will be able to identify whether the topic has been understood before you go to the next one. In other words, before you move to another topic the child is first helped to understand the topic you have been handling. (Wandera, 31/7/2000)

None of the fourteen teachers used the terms "summative" or "formative" in their descriptions of what they understood as continuous assessment. Most of them talked at length about aspects of continuous assessment such as on-going assessment and "topical" assessment, but did not specifically talk about the summative and formative roles of continuous assessment. Notwithstanding, the analysis of their discussion of continuous assessment reveals descriptions of both purposes.

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Patterns in the teachers' descriptions of continuous assessment

Seven understandings of continuous assessment can be distinguished. In one case the teacher (Tukahebwa) expressed more than one understanding.

Regular testing

Three teachers (Batte, Kato and Opoka) described continuous assessment as the regular testing of pupils' performance and the constant recording of the marks obtained on these tests:

> Continuous assessment is a way of regular testing of the learner's performance... you can give regular tests and then you record his [sic] score or marks. (Batte, 14/7/2000)

> Continuous assessment is where you test regularly and you keep the record of learners according to how they perform. You go on recording the marks they get.... (Kato, 20/7/2000)

> To me continuous assessment is about giving regular tests then the marks are recorded after that. In a term, you're supposed to get the average marks for each child. (Opoka, 7/7/2000)

These comments stress that continuous assessment is not a once-off activity but something that takes place at short, regular intervals. The teachers also emphasised the centrality of regular recording of marks in continuous assessment. They did not specify how regularly this kind of assessment should take place (e.g. daily, every time, weekly, monthly...), or explain why it was important to test and record regularly. Batte and Opoka's responses to what the government's intention of making continuous assessment official policy was, showed that their understanding of the purpose of continuous assessment was summative. Batte said that the government's intention was of making continuous assessment results contribute to the final grading of pupils in PLE. The regular recording of marks is intended to produce marks that can later be used by UNEB in the final grading of pupils in the PLE. Opoka interpreted one of the government's intentions of introducing continuous assessment as one of making pupils accustomed to test situations and questions in order to improve the general performance in examinations, especially the PLE. He noted:

> They wanted to improve the standard of learning and passing examinations so that one is used to what is going on in tests. Like in these regular tests, very many of the numbers can even appear in PLE. So one can just pass. (Opoka, 7/7/2000)

Kato did not know why the government had made continuous assessment an official policy.

On-going process of assessment

Continuous assessment was understood by Ddumba, Lule and Wandera to include the on-going process of assessing pupils, inside and outside class, in academic and extra curricular activities throughout the entire primary school cycle:

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> ...it means gathering information on a child as soon as he/she joins school. ...for the case of primary level it could be better if you start assessing pupils from P1 up to when they complete P7. (Ddumba, 17/7/2000)

> It is something which is an on-going process of finding out how a pupil is progressing.... It is something done daily, every time. Something which is done at whatever time is available to find out how the child is progressing in studies and other things. (Lule, 25/7/2000)

> Continuous assessment means assessing the child as a whole, both in academic subjects and extra-curricular work. (Wandera, 31/7/2000)

The intention of assessing pupils inside and outside class on a daily basis was to supplement final evaluations of pupils at the end of primary school rather than basing them on the Primary Leaving Examination only. Ddumba noted: "It is unfair to judge someone who has taken seven years within two hours that he has failed or passed". The other intention of assessing pupils on whatever they do is to enable teachers to provide pupils with appropriate guidance and counselling. This was seen by Lule who said:

> ...according to continuous assessment it caters for individuals because some pupils can excel in academic and others can excel in non-academic fields. This continuous assessment can reveal what the pupil is likely to be in the future because very many pupils are failing to go to secondary schools because of finance. But if someone has been doing right from P1 for example music, he can go to the field and carry on with life. (Lule, 25/7/2000)

Additional assessment beyond scheduled tests

Oloya and Tukahebwa included in their responses the idea that continuous assessment meant either giving an exercise, or a test after covering any given topic (as opposed to giving weekly, monthly or termly tests in which one would be setting questions on a number of topics). They remarked:

> Continuous assessment is a way of checking when you go topic by topic, giving pupils exercises to check whether they have understood it. When you cover a topic, then in the end you give them some work to check if they have got it right. (Oloya, 3/7/2000)

> What I think continuous assessment is, is to give them work for only one topic. After finishing a topic, if it is rounding-off, let them get a test on rounding-off only. If it is about area, let it be an exam on area alone so that after every topic you give them a test and check whether what you have taught has been understood. (Tukahebwa, 4/10/2001)

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Oloya noted that testing pupils "topic per topic" helps "to check whether they have understood the topic or not and to reveal if teaching and learning have taken place effectively". If the teacher finds out that pupils have not understood the topic, he can devise a means of helping them to understand it before moving on to the next unit. In this case, continuous assessment is understood and used formatively. Tukahebwa saw topical testing as helping to make things easy for pupils that is, not overloading them, rather than using it to facilitate their understanding of the topic. He based this argument on his experience as an undergraduate teacher trainee:

> The way I studied from the Institute of Teacher Education, I found continuous assessment the easiest way because it corresponds with the semester system. With semester system, you study something within that semester, get the exam and then finish that, other than studying the whole year and get exams for the whole year... That is what I call continuous assessment. Studying something, after that get an exam on it or test, then finish that one, then move to another stage.... (Tukahebwa, 4/10/2001)

In this case the topical testing was used summatively - teaching a topic, testing and moving on to the next unit without using the evidence obtained from assessing the previous topic to diagnose learning weaknesses.

Assessing while teaching

For Tuhirirwe and Tukahebwa continuous assessment meant that assessment is integrated into the normal course of teaching and learning. They said:

> Continuous assessment means assessing the child as you teach. As you teach, you give work, as you teach, you evaluate other than giving a test at the end of the term or year. (Tuhirirwe, 3/10/2000)

> With continuous assessment for me I take it to mean assessing the child from day to day, not examining the child at the end of the term. If this chap can do this chapter very well and may be the next chapter badly then you should not conclude that this chap does not know the subject. You should also move with that chap from chapter to chapter, chapter to chapter then at the end you make a general conclusion. (Tukahebwa, 4/10/2001)

This understanding of continuous assessment was driven by the desire of the teachers for a fair overall judgement of pupils' performance based on results from a wide range of tasks done over a long period of time, rather than basing it on a once-off end-of-term or end-of-year examination. These teachers saw the need for continuous

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assessment to be regular for fairness in the overall evaluation of pupils (summative assessment) and not for purposes of enhancing pupils' learning (formative assessment) from day to day.

Regular checking

Rugasira understood continuous assessment to mean regular checking to find out what pupils had achieved. He noted: "Continuous assessment is the method of assessing pupils from time to time to find out what they have achieved" (4/10/2000). His understanding focussed on what pupils had achieved and not on what was in the process of being achieved. The focus was summative.

Drilling for mastery

Ruhweju regarded continuous assessment as regular practice that is provided for pupils from time to time to enable them to master and retain what was taught and to help them recall the concepts when required in a test or an examination. He defined continuous assessment as:

> ...something that comes at the end of teaching and learning to ascertain whether the concept has been mastered by the child.... It is an activity which is given to children from time to time so that they master the concepts taught. (Ruhweju, 26/6/2000)

In this regard, his description of continuous assessment tended to focus mainly on what the pupil had mastered (summative assessment), at the expense of what was in the process of being mastered. More so, the teacher tended to focus more on the mastery of knowledge than on more meaningful learning such as critical thinking and application of knowledge to meaningful contexts.

Assessing to diagnose and attend to weaknesses

Finally, two teachers, Ojok and Tukahebwa, perceived continuous assessment as the process of assessing pupils during the course of teaching and learning to diagnose weaknesses and attend to them.

> Continuous assessment is work given by the class teacher during teaching and learning to see whether the pupils are following correctly what he is

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> teaching and also to find where there are some weaknesses and attend to them.... It is sort of a reminder to the teacher and pupils because if the teacher has not assessed the pupils to know whether they have understood or not, then he will not be able to know how successful he has been in teaching that subject matter. (Ojok, 3/7/2000)
>
> ...It also means assessing pupils as you teach so that you can help them before it is too late. ...when you're assessing pupils as you teach, it is very easy to notice the weak ones and you help them quickly when it is not too late. But if you compile: on this chap, this is chapter one, chapter two, chapter three, chapter four, and so on, then you will notice that at the end of the term it may be too late to help that child. But if the child is helped at an early stage, then may be the child can improve. (Tukahebwa, 4/10/2000)

They alone showed an understanding of continuous assessment that pointed directly to the formative use of assessment. The only difference between them was that Ojok held a single view of continuous assessment, the formative aspect. Tukahebwa, as indicated above (pp. 135-137), had multiple perceptions of continuous assessment, which included both its formative and summative uses. He was the only teacher whose description fitted more than one category and whose view combined formative and summative assessment.[13]

It is possible to identify which of the teachers held a predominantly summative view of continuous assessment, and which did not, from the descriptions of their understanding of continuous assessment above.

Batte, Ddumba, Kato, Lule, Opoka, Rugasira, Ruhweju, Tuhirirwe and Wandera's understanding of continuous assessment focussed only on its summative use. They had a partial understanding of continuous assessment, rooted in measuring and quantifying learning only. Ojok and Oloya's perception of continuous assessment focussed only on its formative role. While their understanding veered towards supporting and enhancing learning through assessment, they did not acknowledge that summative and formative aspects were both involved in continuous assessment. Tukahebwa was the only teacher who appeared to have comprehended that both

13. Perhaps Tukahebwa's broad comprehension of continuous assessment had something to do with his level of training. He was the only teacher with a degree in primary education.

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summative and formative assessment were important, because they fulfil different purposes.

Table 12 summarises the above in relation to the teachers' assessment practices that were identified in Chapter 6.

TABLE 12: **Teachers' perception of continuous assessment in relation to their practice**

Teachers	Understanding of continuous assessment	Classification of the understanding	Teacher's assessment practice in Chapter 6
Batte	Regular testing.	Summative	Showed some aspects of formative use of assessment
Ddumba	On-going process of assessment.	Summative	Used assessment formatively fairly regularly but not consistently
Kato	Regular testing.	Summative	Used assessment summatively only
Lule	On-going process of assessment.	Summative	Showed some aspects of formative use of assessment
Ogwang	A new system of bringing children to understand what is happening nowadays.	Vague	Showed some aspects of formative use of assessment
Ojok	Assessing to diagnose and attend to weaknesses.	Formative	Used assessment summatively only
Oloya	Additional assessment beyond scheduled tests.	Formative	Used assessment formatively fairly regularly but not consistently
Opoka	Regular testing.	Summative	Showed some aspects of formative use of assessment
Rugasira	Regular checking.	Summative	Showed some aspects of formative use of assessment
Ruhweju	Drilling for mastery.	Summative	Used assessment formatively fairly regularly but not consistently
Tuhirirwe	Assessing while teaching.	Summative	Used assessment summatively only
Tukahebwa	Additional assessment beyond scheduled tests; Assessing while teaching; Assessing to diagnose and attend to weaknesses.	Formative and summative	Showed some aspects of formative use of assessment
Walimbwa	A process of assessing children's learning.	Vague	Showed some aspects of formative use of assessment
Wandera	On-going process of assessment.	Summative	Showed some aspects of formative use of assessment

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Perception of feedback

As was the case with defining the formative and summative aspects of continuous assessment, many of the teachers had little idea of what counted as effective feedback. This helps in part to explain why they gave pupils feedback that was limited in terms of its potential to enhance learning. Another explanation for this is that the feedback

they provided was typically the feedback they would have received themselves as school pupils and college students).

When they were asked to suggest ways in which they could offer alternative feedback that could be more useful in terms of enhancing pupils' learning, most of them (nine out of fourteen) agreed on one thing: that feedback in the form of marks with evaluative comments was the most effective. They saw this kind of feedback as the best way in which pupils could be rewarded or encouraged, and thereby be motivated to learn better. This thinking is captured in the following extracts:

> Giving them marks and comments is very useful. That one who has performed better such as one who gets 65% you give him 'good'; one who has done very well (e.g. 75 and above) you give 'very good'; that one who has performed on average, (50-55) you give him 'fair'; those ones who are weak (35-45) you give them 'weak' and the rest (below 35) you give them 'poor'. ...You can praise that one who has organised the work very well and show the rest that this one has organised the work in the way which can earn him/her the best marks. And those who have performed very poor arrangement you can also pick some of their books and show to the rest... So the children can compare marks and comments with one another and this can motivate them to also work hard and improve. (Batte, 14/7/2001)

> These comments are always encouraging. Sometimes you can even ask the class to clap for those who have done very well. Then the rest also say: 'If next time a test comes, I should work hard so that they also clap for me....' (Opoka, 7/7/2001)

> Comments like 'well tried', 'keep it up', 'good'... are very encouraging to pupils. We don't want to discourage children. (Rugasira, 11/8/2001)

Five of the teachers, Ddumba, Lule, Ogwang, Oloya and Ruhweju, however, suggested that marks and evaluative comments should be avoided, especially with the lower ability pupils, and that focus should instead shift to giving them detailed feedback that had the potential to help them improve their learning. Their suggestions included:

> Slow learners should not be intimidated or scared by giving them low marks and poor comments. They should be given comments such as: "Come for more help". Comments such as 'very poor' should be avoided because the children can lose morale. Slow learners should instead be given remedial work. You can say: "So and so you have to come for 5 numbers". You do it indirectly so that they don't know that you're undermining them. (Ddumba, 19/7/2001)

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> Those whose work is not good should be told to improve on special methods, the methods they have not followed properly... Where you find that they missed a step, you should indicate it there on the script". (Ruhweju, 16/6/2001)

The teachers' views were in keeping with the pupils' comments regarding alternative forms of feedback. Pupils were asked to suggest other ways in which teachers could provide feedback to them. Twenty-nine of the forty-two who were interviewed, like their teachers, were satisfied with feedback in the form of marks with evaluative comments and saw it as reward and encouragement. Thirteen pupils, however, [not all in the five teachers' classes], felt that feedback such as giving focussed help should be used to supplement the marks and evaluative remarks. Their suggestions included:

> I would like him to write what I have not understood so that I can learn it. When I fail a number I want him to put 'poor', 'fair', 'do correction', or 'weak' and also to show me how that number is supposed to be done. (Upper ability pupil from Kato's class)

> ...things like he can tell you the number which you do not know after you have done it wrongly. He should repeat and show you how to do it instead of writing marks. (Middle ability pupil from Lule's class)

> He should mark my work and show me how to do things. (Lower ability pupil from Tukahebwa's class)

Despite the potential of such focussed feedback for improving pupils' understanding, no teachers used it much in practice [as the findings in Chapters 5 and 6 indicated], not even the five teachers who were aware of it. Those who claimed to use it occasionally, however, confirmed that it was useful in improving pupils' performance:

> ...When they come to me I explain to them that with mathematics you have to work systematically. Once you jump a step then you get the wrong answer. You have to follow step by step, if you're to begin with the formula, begin with it. It will lead you to the correct answer... Once we have done the work together, tomorrow he [sic] is not going to fail all questions. At least he is going to get half of the questions because of the feedback I gave him. (Ogwang, 6/7/2001)

The teachers were asked to say how their pupils responded to the feedback they had received, and how feedback helped them to learn more. The majority of the responses pointed to the pupils' endeavours to obtain the best marks and the most positive comments rather than improved learning. Most teachers (10 out of 14) mistook

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pupils' efforts to obtain extrinsic rewards for improved learning. Their comments included:

> These positive comments are very helpful to them because you can easily hear them saying: 'I have got a good, what have you got'? A child who has got a "fair" tries as much as possible to get a "good" next time. (Batte, 16/7/2001)

> They like the marks and the comments very much. For example, if someone has scored 10 out of 10 and you don't put the very good or excellent, a pupil can come to you and complain.... As for the slow learners, after not receiving positive comments, they make some effort also to score next time. (Ddumba, 17/7/2001)

> They respond positively. You see them wanting to know the marks their friends have got to see how they can also improve or work even harder the next time to get the same or better marks. (Wandera, 31/7/2001)

Indeed, the pupils' responses to a similar question that required them to say how they interpreted the teachers' feedback and how they acted on it, gave the impression that the pupils strove to work for the best rewards and not for the best learning. The pupils also indicated how the teachers' comments boosted or dropped their morale ("feeling good" or "feeling bad") without referring to actual learning gains. Pupils' responses included statements such as:

> ...when the teacher says 'Pull up your socks', I feel like crying. Then if I am working out the test and I remember that comment I feel like getting more marks then he can tell me a good comment. (Lower ability pupil from Ddumba's class)

> I feel good and I read more when he says good things. When it is a poor comment I am unhappy and I read hard to get more marks. (Upper ability pupil from Ogwang's class)

> If your father or mother looks in your book or paper he or she can find only good marks and give you a present. It helps me in that if you're checking my book you can say that this man works very hard, then you can give me something. (Upper ability pupil from Lule's class)

> I like only very good comments but the 'weak' or 'fair' comments demoralise me. (Lower ability pupil from Walimbwa's class)

> If he says good things I feel happy and try to work harder. If it is a bad comment or when he refuses to mark my book I am demoralised and I lose interest in the subject. (Lower ability pupil from Tukahebwa's class)

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Only four pupils of the forty-two interviewed considered that the feedback that they received from their teachers helped them to improve or want to learn or know more.

> Sometimes when it is 'weak', I feel that may be there are certain parts that I didn't understand and so I go and ask the teacher to explain to me. (Lower ability pupil from Opoka's class)

> If it is a poor comment I feel uncomfortable and I ask the teacher to help me to perform well next time. (Upper ability pupil from Rugasira's class)

> I like it when he tells me to do correction because I can forget if he doesn't tell me. (Middle ability pupil from Ruhweju's class)

> These comments add me a lot of effort. When I have failed quite a number of questions then I go to the teacher and ask him. (Middle ability pupil from Wandera's class)

While feedback in the form of evaluative comments or rewards has the potential to motivate the pupils extrinsically, its limitations are also pointed out, such as making pupils resort to "learned helplessness" as Dweck et al. (1978) termed it. Indeed some teachers in this research such as Kato, Ojok and Oloya also noted that marks and evaluative comments only motivated the good pupils who always got high marks and positive remarks. Those who always got lower marks and poor evaluative comments came to accept their position as being permanently weak and became so accustomed to such comments and they no longer were bothered by them:

> The good ones feel okay but for the poor ones, they are reluctant. They just come and sit in the class comfortably so even if they get poor results they don't mind. (Kato, 2/7/2001)

> Some of them who get high marks and good comments, they are pleased with themselves. The kind of remarks just encourage them. They always strive to get higher marks. The poor ones don't usually respond. (Ojok, 3/7/2001)

> Some of them try to take it seriously. When I give them the same exercise you find that they try to improve. But some try to hide from me may be when they see that they have scored low marks, they are embarrassed. They don't want to show the rest. (Oloya, 3/7/2001)

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Conclusion

The preceding discussion suggests that the teachers had little understanding and appreciation of the formative purpose of continuous assessment. They understood continuous assessment mainly in terms of its summative value, and they also demonstrated very limited understanding of what counted as effective feedback to enhance learning. Apart from the few who suggested alternative forms of feedback to supplement marks and evaluative comments, the teachers did not appreciate that "feedback that focused on identifying specific errors and poor use of strategies, which then gave learners direct advice on how to improve, was far more effective than marking which simply identified 'right' and 'wrong' responses" (Black and Wiliam 1998b: 9). The fact that the five teachers who indicated some understanding of alternative feedback did not actually use it in practice implied that there are other factors besides a lack of understanding that constrain teachers from making use of such feedback. Such factors would also need to be identified and addressed if formative assessment is to become a part of the teachers' practice. They may have something to do with the teachers' conceptions of teaching, learning and assessment, as well as with what the national policy demands.

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CHAPTER 8

MODEL FOR MEDIATING TEACHERS' UNDERSTANDING OF CONTINUOUS ASSESSMENT

The findings from the previous chapter gave rise to a practical concern of not wanting to leave the teachers at that point in their understanding. The researcher felt it would be inappropriate (both professionally and within the context of formative assessment) if the research stopped at documenting the teachers' lack of understanding without taking steps to give them a better view. It was therefore decided to develop a model for professional development. The purpose was to mediate better conceptual understanding of continuous assessment to the teachers.

The training model was constructed from relevant theories of learning and the findings of the research.

The theory

The model is based on two principles of Vygotsky's theory of cognitive development (Vygotsky 1978). The first is that the most effective learning takes place within the learner's zone of proximal development and the second that learning is a socially mediated activity within the ZPD.

Mediation involves far more than the teacher or a person with more knowledge showing, modelling or demonstrating something to a less knowledgeable person. It involves the knowledgeable person in negotiating meaning and understanding to a learner by inviting the learner to try and articulate what he or she knows. Through this kind of interrogation, the knowledgeable person is able to identify what the learner knows independently and what the learner cannot know without being assisted (Dixon-Krauss 1996: 20; Allal and Ducrey 2000: 146). Having identified what the

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learner knows independently (prior knowledge), the teacher or more knowledgeable person can then decide on how much, or what type of support, the learner needs to achieve the intended full knowledge and understanding. Vygotsky (1978: 57) argued that less knowledgeable people's understanding can benefit from interaction with more knowledgeable individuals if that interaction takes place within the gap between what the less knowledgeable people know or can do independently, and what they can know or do with assistance from more knowledgeable individuals.

Interviewing the teachers on their understanding of continuous assessment had revealed their prior knowledge and the zones of proximal development (the gaps) where mediation could take place. Ogwang and Walimbwa had vague understandings; Batte, Ddumba, Kato, Lule, Opoka, Rugasira, Ruhweju, Tuhirirwe and Wandera had knowledge that focussed on the summative; and Ojok and Oloya had understandings that focussed only on the formative role of continuous assessment. The type of support that the teachers needed was mediating an understanding of continuous assessment to them that acknowledged the summative and formative roles of continuous assessment as fulfilling different, parallel purposes. This was based on the assumption that it was unlikely that teachers would gain deep understanding of the role of formative assessment in facilitating learning without having an understanding of the limitations of the contrasting role.

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Having identified the teachers' zones of proximal development, the next step was to try to devise means of mediating understanding to them collectively within their respective ZPDs.

Gallimore and Tharp (1991) suggest six means of mediating learning in the ZPD, namely, modelling, contingency management, feedback, instruction, cognitive structuring and questioning. For purposes of the model, modelling, cognitive structuring and questioning were considered.

Modelling involves the teacher demonstrating suitable learning actions for the learners to imitate. Cognitive structuring requires that the teacher provides the learners with the structure for thinking, such as giving them structured information that they can consult. Questioning enables the learners to incorporate the modelled

knowledge and structured information into their metacognitive faculties, that is, it enables them to self-regulate.

Bruner (1996) identified four views of learning that match Gallimore and Tharp's views. These included learning by being shown, learning by being told, learning by constructing meaning and learning by being part of a knowledge-generating community (Watkins 2000:74).

Learning by being shown and *learning by being told* assume that the learner merely acquires and commits to memory what has been transmitted by the knower. In this case, *learning by being shown* implies a notion of imitation, and *learning by being told* relates to teaching as instruction or transmission of knowledge (Watkins 2000:74).

Learning by constructing meaning and *learning by being part of a knowledge-generating community* are constructivist views and they fit well with Gallimore and Tharp's category of questioning.

Learning by constructing meaning refers to the process whereby a more knowledgeable person supports a less knowledgeable one in constructing meaning. A principal aspect of this view of learning is building new variations on existing conceptions (prior knowledge) rather than introducing something completely new. The more knowledgeable person supports the less knowledgeable to articulate and explain to him / herself the experiences met. The less knowledgeable person is made to participate in his or her own meaning making and learning, expanding possibilities and adding variations to them, thereby integrating these into his or her own metacognitive perspectives (Watkins 2000:77). Teaching that builds on what people already know has been shown to be an effective way of learning (Chi et al. 1994; Marton and Booth 1997).

Learning by being part of a knowledge-generating community points to peer collaboration and interaction as a means of learning; peers interact, exchange views, produce and receive feedback from one another. It is based on "building a community of learners engaged in the generation and evaluation of knowledge" (Watkins

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2000:77). Peer interaction is an effective way of learning and of enhancing understanding and good practice (Hawskey 1995; Chi 1996; Featherstone et al. 1997; Watkins 2000; Weeden et al. 2002).

The theory in practice

A workshop with the teachers was arranged to apply the model. All 14 teachers attended, having been invited to meet each other and participate in in-service education.

The workshop provided the opportunity for the researcher to work with the teachers collaboratively as partners for the first time and to give something back to them. It also offered a chance for peer interaction amongst the teachers, who were brought together in Kampala. The workshop was video-recorded and a research assistant took notes. No schedule was used to analyse these videos. Transcripts of the video record and notes made by a research assistant were used as evidence.

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TABLE 13: **A model for mediating teachers' understanding of continuous assessment**

Theory	**Theory put into practice**
Learning by being shown Learning by being told	Teachers are given structured information on assessment.
Learning by constructing meaning Learning by being part of a knowledge generating community	Teachers, in small groups, reflect on their own definitions by relating them to the given structured information. Teachers apply the structured information and their reflections in practice by observing a video-recorded lesson and identifying instances of formative assessment. Teachers refine their previous understanding of continuous assessment by creating new definitions.

The first part of the workshop mirrored showing and telling. The teachers were given a presentation on the contemporary understanding and practice of continuous assessment. This aimed to give them structured information (the theory) that they could use later to start analysing their own understandings.

The rest of the workshop was based on the views of *learning as constructing meaning* and *learning by being part of a knowledge generating community*.

Having given the teachers information on the three forms in which continuous assessment was understood and used, that is, summative, formative (one-way feedback) and formative (two-way feedback), they were involved in activities to enhance their meaning construction and knowledge generating skills through group interaction.

First, they were divided in four groups and given a list of nine anonymous definitions of continuous assessment paraphrased from the original initial interviews with them. The definitions included the following:

> *Giving a test or observing and recording the score obtained by the learner.* [Batte]
>
> *Systematic generation of information on a child for the entire primary education cycle.* [Ddumba]
>
> *Regular recording of marks that pupils' score on any given assessment task.* [Kato]
>
> *Keeping track of the learner's progress from time to time.* [Lule and Rugasira]
>
> *Appraisal of teaching and learning to diagnose teaching and learning weaknesses.* [Ojok]
>
> *Topical testing to check whether the pupils have understood and to check if teaching and learning have been effective.* [Oloya]
>
> *Giving various classroom exercises and recording the marks.* [Opoka]
>
> *Supervision of the learner in whatever he or she does.* [Wandera]

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> *Giving practice to the pupils at the end of teaching and learning to check if they have mastered the work that has been taught.* [Ruhweju]
>
> [The sources of the definitions were not given to the teachers.]

The tasks were:

- Group 1: From the given definitions, identify those that imply continuous assessment that is used summatively and give reasons for your choice.
- Group 2: Identify definitions that imply continuous assessment that is used formatively (one-way feedback) and give reasons for your choice.
- Group 3: Identify definitions that imply continuous assessment that is used formatively (two-way feedback) and give reasons for your choice.
- Group 4: Identify definitions that do not imply any of the three forms of continuous assessment and explain your choice.

Assigning the teachers group activities was a conscious attempt to break away from the traditional transmission style of teaching that most of them knew no alternative to in their classrooms. Collaboration in groups made it possible to mediate learning to each individual through peer interaction without the researcher having to bear the pressure of knowing it all and doing it all. Instead, individuals drew from the provided structured information and discussed amongst themselves to make sense and construct meaning collaboratively. The quality of the presentations of each group at the end of this activity showed the usefulness of the discussion that had taken place in groups.

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Group 1 had been asked to identify definitions that implied continuous assessment used summatively. Their presentation revealed that they had succeeded in doing so. They chose the following definitions:

> *Giving a test or observing and recording the score obtained by the learner.*
>
> Reason:
> The teacher just records the marks but we are not told how he interprets the marks so as to give help to weak pupils.
>
> *Topical testing to check whether the pupils have understood and to check if teaching and learning have been effective.*
>
> Reason:

The teacher is just checking, but we are not told whether he intervenes to correct mistakes.

Giving various classroom exercises and recording the marks.

Reason:
He just records the marks, but we are not told how he uses the marks to help weak pupils.

Giving practice to the pupils at the end of teaching and learning to check if they have mastered the work that has been taught.

Reason:
He is just checking but he is not helping them if they have not mastered.

Group 2 had the task of identifying definitions that implied assessment used formatively (one-way feedback). Their presentation indicated that they had not yet comprehended well the difference between the summative use of assessment and formative (one-way). They had not yet understood that summative assessment only involved summing up achievement without giving any further help while formative (one-way) involved only the teacher in giving help to a passive pupil. This was pointed out to them at the end of their presentation. Their choice of definitions included:

Giving a test or observing and recording the score obtained by the learner.

Reason:
The teacher sets the tests and the learner is not involved. It is not clear if the teacher will go back to help the weak learners.

Regular recording of marks that pupils score on any given assessment tasks.

Reason:
It involves the teacher recording the marks and the learner is not involved.

Keeping track of the learner's progress from time to time.

Reason:
It doesn't indicate whether if the teacher finds the pupils are not doing well, he intervenes to help them improve. The teacher observes but it doesn't indicate that the pupil is involved in this process, in what the teacher is trying to find out.

Topical testing to check whether the pupils have understood and to check if teaching and learning have been effective.

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Reason:
The teacher minds much when he has finished the topic and not in the teaching and learning situation. The teacher is the only one who checks. It is the teacher who draws the programme. He may not intervene before the topic comes to an end even if he has seen a problem.

Group 3's task was to identify the definitions that implied formative (two-way). This group considered all the various definitions by allocating them to the various uses of continuous assessment so as to justify why they had chosen some definitions to imply formative (two-way). Their allocation of definitions to the various descriptions of assessment was convincing.

Giving a test or observing and recording the score obtained by the learner.

This is summative because pupils are not given feedback. It is the examiner who benefits.

Systematic generation of information on a child for the entire primary education cycle.

This is formative (one-way). There is continuous observation but we are not told whether the pupil knows that he or she is being observed. The teacher gets the information but the pupil is not getting feedback.

Regular recording of marks that pupils score on any given assessment tasks.

This is summative. The teacher is recording marks only without any intervention. No guidance, the teacher only records the marks.

Keeping track of the learner's progress from time to time;

appraisal of teaching and learning to diagnose teaching and learning weaknesses; and

topical testing to check whether the pupils have understood and to check if teaching and learning have been effective.

These three definitions imply formative (two-way). If you test at the end of every topic then it helps you as the teacher to determine if pupils understood the present topic before you move to the next one. How do you know that teaching and learning was effective? By asking the pupils. There is interaction between the teacher and the pupils.

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Giving regular exercises and recording.

This is also formative (two-way). Pupils get enough practice and the teacher looking at the records can gauge the progress being made and intervenes if necessary.

Supervision of the learner in whatever he or she does.

This is formative (one-way). It is from time to time. What is not clear is whether the learner is aware that he or she is being supervised.

Giving practice to the pupils at the end of teaching and learning to check if they have mastered the work that has been taught.

This is formative (two-way). You're giving practice and the pupils are involved. You have to check by for example, asking questions. To check for mastery you must make sure that before you move to the next topic you must check whether they have mastered. How do you check? You involve the pupils.

Finally, Group 4 was to identify definitions that implied neither the summative nor the formative use of assessment. The group chose the definition *Supervision of the learner in whatever he or she does*. The reasoning was that supervision implies that there is no interaction involved, such as in a situation where someone supervises pupils writing an examination. This was a suitable choice because "supervision" does not have a direct relationship to assessment.

In the second activity the teachers were asked to watch one of their colleague's lessons and comment on it in light of the three different ways in which continuous assessment can be utilised. The teacher (Opoka) whose lesson was viewed had previously agreed to this. He was one of the most confident and articulate teachers amongst the sample. The transcript of the lesson is appended in Appendix 12.

Although not every teacher had the chance to comment on the lesson, those who spoke indicated that they had started analysing and debating assessment matters in depth and with confidence. The comments included:

> Instead of the teacher doing the example himself he should have let one child do it so as to assess prior knowledge. (Ruhweju)

> The teacher is using assessment formatively but interaction is lacking. Children are asked to give short responses but they could have

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> participated by performing on the blackboard to show what they knew. (Tuhirirwe)
>
> The teacher tried to involve pupils in the lesson but he involved many concepts at the same time: multiplying and dividing. If children are to understand better, you must focus on one concept at a go. (Ddumba, Walimbwa and Tukahebwa)
>
> Two concepts can be taught and assessed in one lesson. Understanding one concept can help the pupil understand how the other concept works. (Ojok and Wandera)

In the final activity of the workshop the teachers were asked to present their understandings of continuous assessment in a mind-map (knowledge-generating activity). They attempted this task individually. The purpose of the activity was to enable them to shift from constructing meaning with the assistance of peers to personal constructions that made the learning real to each of them. The mind mapping provided each individual with the opportunity to create new ideas or recombine existing ideas without being assisted (self-regulation). Another purpose was to try to compare their understandings of continuous assessment by the end of the workshop with their views expressed in the pre-observation interview. The mind maps were interpreted critically in relation to the research findings and the purpose of the training. A schedule was not used.

Insights that were gained from the mind-mapping activity indicated that small interventions, like the one-day workshop, could have an immediate impact on how teachers perceived assessment. For example, Ogwang and Walimbwa, who were described as having had a vague understanding of continuous assessment (Table 14), were able to include statements on the formative and summative uses of assessment on their mind-maps. The same applied to teachers who had been described as having an understanding of continuous assessment that focussed only on the summative use of assessment (Batte, Ddumba, Kato, Lule, Opoka, Wandera, Rugasira, Ruhweju and Tuhirirwe). At the end of the workshop, these teachers, too, wrote statements that referred to the two forms of continuous assessment.

The preceding training model compares well with that of Joyce and Showers (1995:110). Theirs is a model with multiple components, most of which relate closely

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to aspects of this model. Their suggested training components include: exploration of theory through discussions, readings, lectures, etc.; the demonstration or modeling of skill; practice of skill under simulated conditions; and peer coaching or collaboration. Giving the teachers structured information in the present model (the theory) is similar to Joyce and Shower's components of exploration of theory and demonstration or modeling a skill, and the engagement of the teachers in group work activities to make sense of their own definitions is similar to Joyce and Shower's peer coaching. The workshop did not incorporate Joyce and Shower's component of "practice of skill under simulated conditions" because of the limited time. Engaging the teachers in interpreting a colleague's video-recorded lesson approached this purpose. Were the model to be developed further, attention should be given to this aspect.

The combination of multiple training components strengthens the training model. Bennett (1987) in Joyce and Showers (1995:111) found that a combination of components in a given training programme yielded increased benefits. The findings were to the effect that "Information or theory-only treatments increased knowledge by an effect size of about .50, whereas theory combined with demonstrations, practice and feedback resulted in an effect size of 1.31 for knowledge, compared with about .63 if presentations alone were employed." Unlike Joyce and Showers' training components which can be regarded as non-specific suggestions, this model was embedded in the research findings. For example, it had been noted in the teachers' lessons that most of them knew only about transmission teaching approaches. The model was therefore designed in such a way that it demonstrated how transmission approaches could be effectively complemented with elements of a social constructivist approach.

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Conclusion

The application of the newly acquired understanding of assessment to actual classroom practice was not evaluated as part of the research. However, the model used showed that it was possible to change and/or broaden teachers' cognitive understanding about assessment within a short workshop. This, in the researcher's view, represents an important starting point for in-service teacher education in assessment in Uganda. However, the researcher also acknowledges that how teachers

might best be helped to understand and engage in high quality assessment will involve more than good quality in-service training. It would, for example, require an understanding on the part of policy makers and those in key positions of influence of the significance of formative assessment for learning. This poses a challenge to academics and researchers to communicate successfully with policy makers. Furthermore, it will involve an identification of the other factors that inhibit teachers from utilising the potential of formative assessment to enhance learning. The next chapter is a consideration of these factors.

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CHAPTER 9

CONCLUSIONS: Pre-conditions for the full utilisation of continuous and formative assessment in Uganda

Previous research into the application of continuous assessment in general in primary schools in Africa has identified several factors that hamper its successful practice. Most factors are physical and technical in nature. For example, based on the Nigerian experience, Ogunniyi (1984: 114) identified factors such as:

- Teachers must be well trained in the operation of continuous assessment strategies;
- continuous assessment is costly in terms of materials, time and energy;
- it requires co-operation and co-ordination at school, district and national levels;
- it requires the development of many types of tests and survey instruments;
- there is the problem of comparing schools when the teachers, the learning conditions, the standards of students and assessment procedures are different, and
- the teacher being the authority, he or she has an important say in who passes and who does not. Therefore it is not free from teacher bias.

Ramsuran (1999: 105-107) identified more or less the same factors to be affecting the successful use of continuous assessment in South African schools. She highlighted a lack of resources, large classes, increased workload and lack of adequate training of teachers as the key factors hampering it. Glover and Thomas (1999: 118) also identified factors such as timetables with squeezed periods of 30 minutes, language difficulties due to multilingual schools and teachers who have only known from old pedagogy of "incremental progress via the acquisition of small items of syllabus knowledge that is much easier to assess".

In the Ugandan context, a baseline study of the factors influencing effectiveness in primary schools (Carasco et al. 1996) identified a number of factors which indicated that implementing continuous assessment in the existing primary school environment would not be without problems. These included a demanding syllabus; variations in resource levels among schools, from poorly resourced to well resourced schools;

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teachers' workload and large classes resulting from the implementation of the Universal Primary Education (UPE) policy. In 1999 Namubiru (1999: 72-73) indeed found that most of these factors had affected the successful implementation of continuous assessment in primary schools in Mukono district, in the Central Region. She identified issues such as high pupil-teacher ratios, the lack of adequate teacher training programmes, inadequate supply of materials on continuous assessment and inadequate preparation of pupils for the practice to be the most serious challenges in the implementation of continuous assessment.

This research has identified factors that are pedagogical in nature, affecting the successful use of continuous assessment for improvement of teaching and learning irrespective of the presence or absence of the physical factors such as large classes. Even if teachers were provided with the most sophisticated resources and taught the smallest of classes, they might still not exploit the formative use of continuous assessment in their classroom practice. In addition to the need for conceptual understanding, two other factors were identified as necessary pre-conditions for the full utilisation of formative assessment in the Ugandan education system. They involve teaching approaches and policy.

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Teaching approach

The research revealed, consistent with many studies including those documented by Black and Wiliam (1998a) (and the researcher's previous work (Nakabugo 1998)), that teaching approach and formative assessment are inextricably intertwined. Teaching approaches that go beyond transmitting knowledge to incorporating the view of teaching as a social activity in which the teacher and pupils participate actively, facilitate the formative use of assessment better than teaching that relies exclusively on a transmission model. Teachers in this study who showed evidence of going beyond the mere transmission of knowledge to include viewing teaching as a social activity in which they talked but also "listen[ed] carefully, to the talking [and] the actions through which pupils develop[ed] and display[ed] their understanding" (Black and Wiliam 1998b: 11) were the teachers who provided much evidence of

engaging in formative assessment.[14] Teachers who exclusively taught as if transmitting knowledge to passive pupils, seeking pre-determined correct responses, or essentially completing the syllabus, lacked ways to utilise formative assessment in their classrooms. These teachers were identified as exclusive summative assessors.[15]

The implication to be drawn is that the assessment reform envisaged in the Ugandan continuous assessment policy of using assessment to enhance learning, will not take place independently of shifts in teachers' conceptions of teaching. As Black and Wiliam (1998b: 10) noted, shifts in teaching and formative assessment go hand in hand. For formative assessment to be realised in Ugandan classrooms, dialogue between pupils and teacher should become a feature of all teachers' teaching, "for this will initiate the interaction whereby formative assessment aids learning" (Black and Wiliam, 1998b: 11). The dialogue that is required is not one that should only seek specific responses but one that should, to borrow the words of Black and Wiliam (1998b: 12), also be "...thoughtful, reflective, focused to evoke and explore understanding, and conducted so that pupils have an opportunity to think and to express their ideas". In other words, there is a need for "a partnership in assessment" (Weeden et al. 2002: 75), with teachers and pupils contributing information that may be used to close the gap in pupils' understanding / learning.

Before other reforms in the Ugandan education system such as narrowing the pupil-teacher ratio can be realised, changes within teachers' mindsets, such as moving the focus from the quantity of material to cover to the quality of teaching, are needed. For example, focusing on small groups of pupils in each lesson and focusing on exploring a few questions in depth would benefit learning. All the teachers in the sample asked questions in their lessons, but few of these questions were open enough in nature to elicit thoughtful responses from the pupils. Furthermore, all teachers did a great deal of marking, but most of the feedback on the marking was solely summative and could hardly be acted on to improve learning. There is need for the teachers to appreciate

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14. See for example, extracts from the lesson transcripts of Ddumba and Ruhweju in Appendix 13.
15. See Appendix 14 for extracts from the lesson transcripts of Kato, Ojok and Tuhirirwe.

the fact that "it is the quality, not the quantity of feedback that merits closest attention" (Sadler 1998: 83).

The dominant conformist transmission approach to teaching (teaching pupils to conform and not to question or think critically) still present in many African education systems, Uganda included (Hawes 1979: 25-26; Mamdani 1996: 75-76; Ssekamwa 1997: 165), is not conducive for the formative use of assessment. Formative assessment is not a conformist practice. Pupils are expected to be actively involved in the assessment process if their learning and understanding is to be stretched to higher levels. They should participate in self-assessment, for example.

Therefore, if one wants teachers to use assessment formatively the approach needs to move gradually from a conformist one. Formative assessment may also be a catalyst for this change; it could help African education systems to move away from conformist education, as the effective use of formative assessment would necessarily require teachers to encourage pupils' participation in teaching, learning and assessment activities. As Lambert and Lines (2000:110,124) and Weeden et al. (2002:28) have noted, formative assessment is synonymous with effective teaching and learning, so it would effect changes in the teaching and learning process if well utilised.

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Policy

If teachers are expected to engage in the formative use of assessment, there must be commitment in policy to this practice at all levels (Assessment Reform Group 1999; Clarke 2001). The picture that emerges from the present research is that policy commitment to the formative use of assessment is lacking in Uganda. It exists on paper only, that is, at recommendation level. If it had been committed to formative assessment, the first focus of UNEB ought to have been to train teachers to use formative assessment *before* requiring them to accumulate test results for the PLE. Improved PLE results are not synonymous with improved learning.

On the contrary, the pressure to improve PLE results is likely to lessen the possibility of pupils developing good learning qualities such as those cited by Davies (1999: 2): communicating and listening, making flexible and intelligent use of their knowledge and skills, and working effectively with others. Formative assessment is driven by the "need to understand the learners as individuals, and to ensure that they also have growing awareness of themselves as learners" (Lambert and Lines 2000: 193) and, therefore, provides the possibility of improving learning. Furthermore, evidence suggests that attaching high stakes to assessment procedures, such as selection, can have a negative impact on teaching and learning (Sebatane 1998: 124). This is likely to happen with continuous assessment in Uganda. The pressure for improved PLE results may encourage surface learning at the expense of deeper thinking, teaching to the test, emphasis on the final score, memorisation and repetitive practicing, and revision of certain techniques (Lambert and Lines 2000: 194). This was observed during the course of this research. Teachers revised test papers without focusing on those aspects which some pupils had failed. While performance in tests and examinations may improve in the short run because of this practice, it would not necessarily be an indication of improved learning. There is evidence to support this argument. For example, the LEARN project in England (Weeden and Winter 1999) found that despite achieving higher standards in formal tests pupils were no better empowered as independent learners than before. There was an increased obsession with doing well in formal tests such as Standard Assessment Tasks (SATs). While pupils were better prepared to pass tests, they were not necessarily better equipped to apply this knowledge and the skills effectively in other contexts.

In the Ugandan context, it is up to the policy makers and schools to consider whether to focus on superficially improved PLE results at the expense of genuinely improved learning in the classroom. The present research has shown that there is fertile ground in Ugandan schools for formative assessment, and therefore for improved learning, to take place in the classroom. The teachers are dedicated and there is good evidence to suggest that some are already incorporating elements of it, although not consistently. Policy commitment is crucial if it is to be utilised fully by all teachers. Conceptual understanding and shifts in teaching approaches are very unlikely to take place if the

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policy emphasises something else. Sebatane et al. (1992) have also concluded that, although teachers may sometimes have the theory, they may do something different in practice when the stakes are high (Sebatane 1998: 125). In the United Kingdom, for example, studies such as Black (1994), Pollard et al. (1994) and Gipps et al. (1995) found that the pressure to produce reliable judgements for the National Curriculum, made teachers more concerned with summative than formative assessment. Although Firestone et al. (2000: 34) have argued that it is difficult for policy to influence practice, policy commitment is a necessary catalyst. Even if the policy aim is to improve performance in PLE, there is research evidence to show that concentrating on formative assessment is the best way to improve test scores and exam results (Black and Wiliam 1998b: 33). "The bonus is that it also leads to better quality learning" (Wiliam 2000: 22). There is, therefore, a need for policy makers to view summative and formative assessment as complimentary uses of assessment, and accord them equal emphasis. But, "as long as summative and formative assessments are in conflict, the summative function will overpower the formative function and the goals of education will be reduced to the outputs measured by standardized tests and learning will continue to suffer" (Black et al. 2003: 15).

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CHAPTER 10

CONCLUSIONS: Summary, recommendations and reflections

The research investigated the implementation of continuous assessment in primary education in Uganda with a view to analysing how teachers perceived and used it. Data was gathered from fourteen Primary 5 teachers of mathematics from a sample of fourteen schools situated in the four regions of Uganda. The research questions were how teachers accustomed to the old system of assessment were using continuous assessment, what their understanding of continuous assessment was and how it could be improved, and what factors facilitated and / or hampered their adopting assessment practices that exploited the formative use of continuous assessment.

To gain an understanding of how teachers comprehended and used continuous assessment formatively, the following were analysed:

- The teachers' written feedback in pupils' exercise books.
- Pupils' comments on their teachers' feedback.
- The teachers' verbal feedback in video recorded lessons.
- The teachers' conceptual understanding of continuous assessment.

The findings were presented in four parts: what the teachers said they did (in pre-observation interviews); what the teachers did in class and wrote in pupils' books; teachers' understanding of continuous assessment; and pre-conditions to the full utilisation of continuous assessment by the teachers.

In the pre-observation interviews, all the teachers said that they used continuous assessment. They reported that they used several strategies, including, among others, oral questioning, testing (weekly, monthly, termly, topical), class exercises, quizzes and homework exercises. The teachers saw the purpose of their assessment as reporting, monitoring classes (to guide the pace of the lesson), and practice in the kinds of routine mathematics tasks that dominate the curriculum.

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The findings from the examination of pupils' exercise books showed that the teachers marked pupils' books extensively. However, their written feedback was almost always summative and judgmental – ticks, crosses, marks and evaluative comments such as "good", "poor". The small number of teachers who added comments seldom added diagnostic comments – the most usual were "see me", or "do correction". There was no pattern in feedback provided to pupils of different ability.

Evidence from the teachers' classroom practice in video-recorded lessons showed that most of them (but not all) used questioning extensively, usually to monitor the class overall. The great majority of their questions were closed, to check knowledge (of facts and procedures). Sometimes feedback was provided that encouraged pupils to think further, perhaps offering clues to effective strategies so that the pupils could self-correct their mistakes. But overall, teachers' feedback was usually one-way and evaluative, centred on the correctness of answers. The teachers did not usually follow up on formative opportunities that arose in the class. Apart from a slight variation of teacher behaviour relative to resource levels, there were no patterns related to region or years of experience and neither was there any significant change the following year.

An examination of teachers' understanding of continuous assessment revealed that in the main they saw it as a way to increase the fairness of terminal assessment (once-off tests and examinations). This usually meant more frequent testing, coupled with classroom and homework exercises. Only two teachers talked about assessment's formative purposes (beyond the need to re-teach). Some of the teachers who talked about assessment only in summative terms practiced formative assessment in the classroom, and of the two who talked about formative aspects, only one practiced them in class.

Teachers discussed their use of feedback mostly in terms of one-way, summative judgments that they expected their pupils to respond to. They saw the greatest value of such feedback as a reward or encouragement. Five of the teachers talked of the need for diagnostic and individual work with pupils who were struggling, but did not do this extensively in their practice. While some pupils commented that they would like detailed comments and individual help, most, like their teachers, saw assessment

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in summative terms, as rewards or encouragements – and weaker pupils saw them as discouragements.

Overall, while the teachers assessed a great deal, they did not have a good grasp of formative assessment and only utilised this form of continuous assessment in their practice to a limited extent. Various factors were identified in the research as factors that might have inhibited the teachers from utilising formative assessment. These included the teachers' conceptions of teaching and learning, lack of a conceptual understanding of continuous assessment, and the problem in practice of satisfying the demands of the national policy in relation to the twin imperatives of assessment for accountability (system accountability) on the one hand, and assessment for learning on the other (accountability to the learner more directly).

The implications are that changes in teachers' assessment practice are not primarily about resources or class sizes, but views of learning and assessment, and hence feedback. Teacher education (pre- and in-service) and policy need to address this in ways that present alternative possibilities. The model developed for mediating an understanding of formative assessment offers a direction for future INSET, and the potential for future study of formative assessment by involving teachers in action research.

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The findings in relation to previous research

Previous research into the formative use of assessment has also revealed that it is a poorly developed teacher practice. For example, the comprehensive literature review of Black and Wiliam (1998a: 20) concluded that albeit formative assessment had great potential for raising educational standards, it was not well understood by teachers and was not well practiced. The review showed that most classroom assessment tended to emphasise the quantity rather than the quality of learning, marking and grading, rather than providing advice for improvement. Feedback to pupils only served managerial and social purposes at the expense of using it to help pupils learn more effectively (Assessment Reform Group 1999: 5)

However, while most of the research on the implementation of formative assessment has previously been carried out in the developed world, this research was situated in a developing context, characterised by large classes and a lack of resources such as textbooks. The dearth of such studies in the developing world is not surprising given that interest in formative assessment has had its origins largely in the United States and the United Kingdom.

Continuous assessment has been introduced in Uganda at a time when the primary education system confronts many problems. The introduction of Universal Primary Education (UPE) in 1996, for example, led to a rise in the number of primary school going children from 2.9 million in 1996 to 5.7 million in 1997. Although this was followed by a slight increase in the numbers of teachers and classrooms, the average pupil-to-teacher ratio is almost 80:1. The shortage of teaching materials became acute, with only one textbook available for every six children (Uganda Government 1996: 84; Watkins 1998: 75). This situation has not changed much to date, as is evidenced in the sample schools. Class size ranged from 42 to 133 pupils per class (see Table 1). This contrasts starkly with the English class of 28 pupils referred to in Black and Harrison (2001a: 6), for example.

Tracking the implementation of formative assessment in a developing context, such as Uganda, helps to determine the extent to which formative assessment can be regarded as being universal. Little (1990: 36) has observed that there are differences among countries concerning the significance of assessment and cites the issue of class size as a would-be major limitation of teachers in developing countries conducting worthwhile formative assessment. Sebatane (1998: 126) cites several situations that may hinder the formative use of assessment in the developing countries of Africa. They include:

> ...multi-grade schools (where one teacher is responsible for teaching many grades); children of varying ages within the same grade (due to education not being compulsory); the language of instruction and assessment being different from the language spoken at home; lack of resources and materials; a high percentage of unqualified teachers; poor management and supervision; high drop-out and repetition rates; and lack of parental involvement in the instructional activities of their children.

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Sebatane (1998:126) suggested that it would be a good idea to test out theories such as formative assessment in these contexts. The present research has done so and has shown that formative assessment can be appropriate in an African developing context (exemplified by the instances of formative assessment exhibited by some teachers), but that there are specific pre-conditions that are necessary if it is to be fully utilised. Some of these conditions were discussed earlier in Chapter 9.

Furthermore, while it is recognised that conceptual understanding is important in the successful practice of formative assessment, little past research has studied the development of the conceptual understanding of formative assessment in practitioners or devised a means to enhance this understanding. Among the key findings of Black and Wiliam (1998a: 20) were that formative assessment was not well understood by teachers, and they therefore recommended that its implementation called for "deep changes both in teachers' perceptions of their role in relation to their pupils and their classroom practice". Recent research on formative assessment has, however, tended to focus more on the practice (what teachers say they do and / or what they actually do) (e.g. Tunstall and Gipps 1996; Gipps et al. 1996; Hall et al. 1997; Gipps et al. 2000) and less on what they understand it to be. Current research on formative assessment in contexts such as the United Kingdom is taking place in circumstances where a policy of formative assessment is already in operation, and its focus is now more on helping teachers to develop and implement specific formative assessment strategies, rather than on developing their conceptual understanding (Clarke 1998; Clarke 2001; Black et al. 2002). The rationale is that "formative assessment has at last become a term known to most educators in the UK" and what is still at stake is putting it into actual classroom practice (Clarke 2001: 139). Torrance and Pryor (1998: 21-43) probed conceptual understanding of formative assessment of practitioners but did not go as far as suggesting ways in which the conceptual understanding of teachers could be enhanced, despite findings that most teachers lacked good understanding of it. The present research has led to the development of a model of mediating this understanding that should be of practical use in contexts where formative assessment is in the initial stages of implementation and teachers are not expected to grasp on their own its implications for the significant change in their practice that it holds.

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Also, there is relatively little research on formative assessment in mathematics, and a widely held view that formative assessment is less useful in mathematics teaching and learning where it is presumed there is one right answer to any given task (Wiliam 2000:22). This research compliments the few studies in this area such as those in Torrance and Pryor (1998), Clarke (2001), Gipps et al. (2000) and Black et al. (2002). The examples of formative assessment instances in the context of mathematics teaching displayed by some of the teachers in this research strengthen Wiliam's view that formative assessment is possible and useful in mathematics (2000:22). Such examples can be used in the pre-service and in-service training of teachers in the use of formative assessment in mathematics. They can also be drawn on by those interested in engaging in action research in a bid to improve the teaching and learning of their pupils through better formative assessment.

Recommendations

The following recommendations can be drawn from the present research:

Teacher professional development

In-service teacher education should help to develop teachers' conceptual understanding of formative assessment. Thereafter, teachers should be supported to apply their conceptual understanding to classroom practice. Teachers need to be helped "to clarify for themselves what they understand by 'formative assessment', for example, and to decide how they can make initial (small) changes to their practice that will help pupils actively engage in their own learning, help them be clear about their current performance and decide what they need to do next" (Weeden et al. 2002: 28). Most teachers in this research showed that they lacked the comprehension of what constituted formative assessment, and those who demonstrated some understanding of the concept did not fully put this knowledge into practice because they lacked a theoretical grounding.

It is also important that teachers are helped to understand how children learn effectively if they are to comprehend and make use of the potential of formative assessment in enhancing the learning of their pupils. In Sutton's words: "Information

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and investigations about theories of learning and motivation may seem a long way from assessment but they are entirely pertinent and can be a very productive place to start" (1995: 157). Constructivist theories of cognitive development present the most advanced and sophisticated models available to approximate how children and adults really do learn (Moll 2002: 6) and teachers should incorporate some constructivist perspectives in their teaching if they are to engage effectively in formative assessment. A lesson can be learnt from teachers participating in the KMOFAP[16] project (Black et al. 2002). Teachers in the project were able to engage in formative assessment practices after gaining an understanding of how children learnt. "As the teachers came to listen more attentively to the pupils' responses, they began to appreciate more fully that learning was not [merely] a process of passive reception of knowledge, but one in which the learners were [also] active in creating their own understanding" (Black et al. 2002: 14-15). The teachers in this research who were identified as using formative assessment fairly regularly but not consistently, appeared to have a reasonable understanding of teaching and learning as a social activity. Their lessons were more interactive than their counterparts who appeared to use assessment summatively only and whose teaching methods were situated almost exclusively in the theory of teaching as transmission and learning as the acquisition of knowledge.

Furthermore, shifting teachers' focus from an over-reliance on awarding marks and rewarding pupils with simple positive evaluative comments to focusing on giving helpful feedback and advice on how to improve (closing the gap), is an area that needs immediate attention by the Ministry of Education and UNEB if Ugandan teachers are to improve their assessment practices and the learning of their pupils. Pupils who are accustomed to getting rewards tend to "look for ways to obtain the best marks rather than at the needs of their learning which these marks ought to reflect" (Black and Wiliam 1998b: 9). If the main aim of the Ugandan assessment reform of continuous assessment is to improve the learning of pupils, then the pupils should be encouraged

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16. The King's-Medway-Oxfordshire Formative Assessment Project (KMOFAP) is a project in which a group of researchers is working with 24 teachers (12 science teachers and 12 mathematics teachers) in six schools to experiment how ideas about effective formative assessment synthesized from the research literature can be incorporated into day-to-day classroom practice (Wiliam 2000:21; Black et al. 2002:2; King's Assessment for Learning Group 2003).

to focus on, and be interested in meaningful learning, other than focusing on other aspects that are not central to learning. The quality of the feedback that pupils receive on their work is crucial if they are to be encouraged to focus on aspects that are central to their learning. The advice by Black and Wiliam (1998b: 9) is informative for Ugandan teachers who are still grappling with comprehending and applying the formative use of assessment in their classroom practice:

> Feedback to any pupil should be about the particular qualities of his or her work, with advice on what he or she can do to improve, and should avoid comparisons with other pupils... Pupils can accept and work with such messages, provided that they are not clouded by overtones about ability, competition, and comparison with others.

Teachers need to gain an understanding of and practice in what counts as effective feedback in facilitating pupils' learning to shift their focus from marking to offering constructive feedback. Such feedback highlights what pupils have achieved, their weaknesses that can most easily be remedied and what they can do to 'close the gap' within their ZPDs. The analysis of teachers' understanding of feedback revealed that few had any knowledge of what would be effective alternative feedback to marks and simple evaluative comments. Teachers can be helped by drawing on models of good feedback such as those experimented by Clarke (2001: 60), namely, a reminder prompt, a scaffolded prompt and an example prompt. A reminder prompt reminds pupils of what needs to be improved. For example, as feedback to a pupil who writes

400,000 × 10
60,000 × 10
8,000 × 10
500 × 10
00 × 10
3 × 10

in response to a question that requires him or her to expand 468,503 using multiples of ten, the teacher can say: "Use your knowledge of place values and try this number again. For example, if the place value of 4 is hundred thousands, try to find how many times you will need to multiply it by 10 to come up with four hundred thousand..." A scaffolded prompt can be in form of a question, directive or an unfinished sentence. In the case of the above pupil failing the task of expanding 468,503 using multiples of ten, the teacher might ask: "When you multiply and add up all your numbers, do you come up with the original sum? Why do you think you come up with a bigger sum...?" The example prompt involves the teacher in modelling an example of the

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required response and asking the pupils to base theirs on the example. In the illustration above, the teacher can give the pupil some examples and require the pupil to complete the rest. The teacher can write (on the board if need be):

"The answer to 468,503 expanded using multiples of ten is

$4 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10$
$6 \times 10 \times 10 \times 10 \times 10 \times 10$
$8 \times$ .....
$5 \times$ .....
$0 \times$ .....
$3 \times$ ....."

This advice may not sound plausible to Ugandan teachers whose classrooms are overcrowded with so many pupils and who are themselves not motivated to work because of poor working conditions and low salaries. However, without a comprehension of what counts as effective feedback they will not be better at formative assessment even in the best of conditions. The examples of teachers in this research who had fewer pupils than their counterparts supports this argument. One might have expected Tuhirirwe, who had one of the smallest classes in the sample (42 pupils), to find more time to use assessment formatively than his peers who had double or more the number of pupils. This was not the case. He was in the category of teachers who appeared to use assessment summatively only. His counterparts who used assessment formatively fairly regularly, had bigger classes. Ddumba had a class of 79 and Ruhweju had a class of 77. Also despite having large classes, teachers mentioned using assessment practices such as observation appeared to be doing well in enhancing the learning of their pupils.

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There is no doubt that teachers would need smaller classes, good working conditions, training, resources and time to engage fully in the formative use of assessment. As Hall (2000:93) has observed, "there can be no effective change at the level of the classroom without schools and teachers being provided with the necessary training and resources". Formative assessment takes more time than summative assessment and requires much more teaching skill and resources. For example, probing one pupil's understanding by an open-ended question takes more time than asking closed questions that seek for specific responses only. Likewise, giving a comprehensive written comment on a pupil's work takes much more time and thought than merely awarding a mark or writing a simple evaluative comment. Teachers need to be

convinced that such time is worth investing as a means of promoting understanding. Mere delivery and coverage of the syllabus is not adequate. Lambert and Lines (2000: 110,124) have noted:

> ...the claim that...teachers have 'no time' to engage seriously with formative assessment practices...would be tantamount to saying they have no time to teach effectively! ...you cannot claim to be teaching without undertaking forms of assessment and by implication, this assessment activity helps ensure the quality of what is taught and learned. ...formative assessment is no 'add on' to teaching: it is a part of teaching and cannot be planned in a way that imagines it as existing outside day-to-day classroom life.

The Ministry of Education and Sports can play a crucial role here. If it emphasises syllabus coverage, teachers will also focus on completing the syllabus rather than on the quality of learning. However, if the Ministry's focus is on the quality and coverage of what is covered in the classroom then teachers will also shift focus from coverage to cultivating understanding and meaningful learning in the classroom.

Finally, while helping teachers to develop formative assessment skills, UNEB should stress the importance of written feedback given the present situation in Ugandan classrooms. Written feedback is the most weakly developed aspect of teachers' assessment. Yet as a result of the big pupil-teacher ratios, it is inconceivable that teachers can give regular verbal feedback personally to all pupils. Despite the large classes, teachers still require much written work of pupils and find time to mark these exercises. Clarke (2001: 32) refers to this as "distance marking". If teachers do mark pupils' individual work on a regular basis, as the teachers in the sample did most diligently, it is important to investigate ways in which they can give helpful written feedback to pupils. Feedback strategies such as the reminder prompt, scaffolded prompt and example prompt that Clarke (2001) has used widely with teachers, could be explored for their potential by Ugandan teachers. A teacher can use the same comment for a cross-section of pupils failing similar tasks. Encouraging self-assessment for routine work will also release teacher time.

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Policy commitment

The Ministry of Education and Sports and Uganda National Examinations Board need to commit themselves to improving classroom teaching and learning. While the policy

documents emphasise the importance of formative assessment, UNEB has had no strategy to develop the use of formative assessment by teachers. In training courses it has emphasised that teachers should arrange for remedial teaching after marking a given test. This is a form of formative assessment because it acts on the assessment evidence to organise for further teaching. However, no attempt has been made to demonstrate to teachers how this remedial teaching can be conducted. As argued previously, the opportunities for formative assessment provided by tests alone are also very limited in nature.

Studies of the implementation of the United Kingdom's educational reforms (inter alia Russell et al. (1995) found that formative assessment was seriously in need of development. However, later research studies (such as Gipps et al. 1996; Gipps et al. 2000 and Black et al. 2002) found that after some concerted effort to invest in formative assessment by in-service teacher development, an improvement in formative practice in primary schools was registered. One teacher who improved his questioning strategy after attending formative training reported:

> I certainly did not spend sufficient time developing questions prior to commencing my formative training... Not until you analyse your own questioning do you realise how poor it can be. I found myself using questions to fill time and asking questions which required little thought from the students. When talking to students, particularly those who are experiencing difficulties, it is important to ask questions which get them thinking about the topic and will allow them to make the next step in the learning process (Derek, in Black et al. 2002: 20).

Gaining skills of open-questioning, as the United Kingdom experience shows, requires training and time to practice. Ugandan teachers will need similar training and support in this area.

Examples of formative assessment (such as good questioning) that have been documented in this research, and those which abound in the literature, can be used in pre-service and in-service teacher training as exemplars of good practice. Fundamental educational change such as that which formative assessment requires, will only be achieved slowly, through programmes of professional development that build on existing good practice (Fullan 1991: 80). This will help form a firm foundation on which to build good practice in many classrooms in Uganda.

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Closing the gap? Reflections

The three aspects of continuous assessment described at the end of Chapter 1 permit reflection on the research conducted and directions for possible future research.

The instruments designed to analyse how the teachers used continuous assessment to close the gap in pupils' learning were used only in the context of mathematics teaching. They were limited to four main aspects of formative assessment: written feedback, questioning, verbal feedback and handling pupils' errors. The instruments were further limited in the sense that they were essentially scoring tools – providing frequencies of different teaching behaviours. Such research tends to miss the qualitative dimensions of the teaching-learning that occurred. However, the qualitative aspects of the lesson transcripts go some way to preventing this from being too prominent. Future research could examine how teachers assess in other subjects, such as language. The format of the instruments can be broadened to capture more qualitative data, and adapted for other aspects of formative assessment and for research in other subjects. Furthermore, the instruments can be used to develop exemplars of what counts as effective use of formative assessment and can be used in the design of in-service and pre-service teacher education programmes in this field of education. They could also serve as measurements for evaluation to assess the improvement of the quality of teachers' practices resulting from the implementation of such programmes.

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Whilst the model for closing the gap in teachers' understanding of continuous assessment was applied in the last stages of the research fieldwork and was based on limited data, it provided evidence that it was possible to change and to broaden teachers' cognitive understanding of assessment within a short workshop. The model can be used in further in-service teacher training in understanding assessment, and future research could examine the application of the understanding which it mediates into actual classroom practice. The findings of the research highlighted the need to develop aspects such as questioning and the giving of written feedback among Ugandan teachers. Future research could examine how teachers could be helped in these areas, using the mediation model as a starting point. Research could then

examine how the teachers might be assisted to improve their questioning and written feedback over time.

Finally, as it was evident from the theoretical and empirical literature that formative assessment was much more likely to happen in classroom contexts that encouraged active pupils in the learning process, rather than a rote learning environment, the research instruments were designed with this in mind. However, the research data revealed that teachers in Uganda rely more on a transmission and rote learning approach than on a participation model. Future research should investigate what form of formative assessment suits best the Ugandan model of teaching, and how teachers can be assisted to incorporate a view that relies less on transmission in their practice.

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LIST OF INTERVIEWS

Policy makers and trainers

Name	Institution and position held	Role in the implementation of continuous assessment	Date of interview
Achoda C.	Mbale District Education Office: Inspector of schools	Inspector	21/6/2000
Kigongo M.	National Curriculum Development Centre: Curriculum specialist (Educational Evaluation)	Trainer	15/6/2000
Magara S.	Mbarara District Education Office: Municipal Inspector of Schools	Inspector and trainer	26/6/2000
Mugerwa C.	Ministry of Education and Sports (Inspectorate): Inspector of schools	Trainer	2/6/2000
Muhwezi J.	Uganda Martyrs Coordinating Centre –Mbarara: CCT	Trainer and supervisor	3/10/2000
Namirembe-Bitamazire	Ministry of Education and Sports: Minister of State for Primary Education	Policy maker	5/9/2000
Ogwang J.	Adyel Coordinating Centre – Lira: CCT	Trainer and supervisor	19/10/2000
Oketcho W.	Mbale District Education Office: Acting Chief Inspector of Schools	Inspector	21/6/2000
Senteza-Kajubi	National Education Policy Review Commission: Chairman	Policy maker	6/11/2001
Weerhe D.	Uganda National Examinations Board: National Coordinator of continuous assessment	Coordinator and trainer	13/1/2000

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APPENDICES

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Appendix 1: Schedule for pre-observation interviews with teachers

Theme: Understanding of continuous assessment

What is your understanding of continuous assessment?

Where does this understanding come from: personal or derived from the national policy on continuous assessment?

What do you perceive the government's intention to be in making continuous assessment official policy?

What is new in continuous assessment and what is not new?

PROBE

Theme: Doing continuous assessment (strategies)

How do you put continuous assessment into practice in relation to the following:

National policy requirements

School requirements

How do you yourself prefer to assess children

PROBE

Theme: Making use of assessment evidence

How do you make use of assessment evidence? For example, after giving a test (as per the national policy requirement) what do you do with what has been written?

PROBE

Theme: Feedback strategies

What do you write in the pupils' books / on papers when you mark their work?

PROBE [e.g. Why does he write what he writes?]

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Appendix 2: Transcript of a pre-observation interview with a teacher

TEACHER: BATTE
DATE: 14/07/2000

It is a Friday afternoon and we are seated in one of the vacant lower classrooms.
R = Researcher
T= Teacher
Italics = Description of the scene

R: (*The researcher is seated on the same desk with the teacher. After greeting each other, the researcher introduces the interview. She requests the teacher to permit her to tape record and the teacher accepts. The tape recorder is placed on top of the desk somewhere in the middle).* Mr Batte, I am happy to see you again. Last time I briefed you about my study and I once again thank you for having accepted to participate in it.

T: You're welcome. (*Mr Batte is attentive and he keeps nodding his head. He looks quite relaxed).*

R: As I mentioned it to you last time, I am carrying out the research as part of my PhD studies. I am here to learn from you and I will appreciate all the information that you can give.

T: Mm.

R: You told me that you use continuous assessment in your teaching?

T: Yes.

R: Today I have comeback to explore in depth your understanding of this concept of continuous assessment and how you actually practice it. Many people talk about continuous assessment, but it could mean different things to different people. In your case, what does it mean to you?

T: Continuous assessment is a way of regular testing of the learner's performance. You can give a test today or in the morning and then you give another one in the evening. It is something, when you teach you can decide to give a test within every after two days. So that is what I can define as continuous assessment. You can give regular tests and then you record his score or marks.

R: So to you continuous assessment means giving regular tests?

T: Yes, but what I wanted to mean was that with continuous assessment you can give a test, or you can observe a child in a particular activity and then you record his score or marks, then after sometime you also give him a test and you also record. That is continuous assessment.

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R: I understand now. Where does this understanding of continuous assessment come from? I mean how did you come to know continuous assessment in this way?

T: I get it from the national policy.

R: Is that so?

T: Yes.

R: What do you perceive as the intention of the national policy on continuous assessment?

T: They want teachers to be in position to know how the child is performing and also to make it contribute to the final results of children in P.7. I understand continuous assessment is going to contribute twenty percent to the final results of PLE.

R: ...To know how the child is performing? In your case how do you go about that? What is it that you do to know how the child is performing?

T: We have been giving them tests and marks to know how the child has performed.

R: What kind of tests do you give?

T: We give them monthly and termly tests. We are looking at the way the children cram what we covered. You can also know whether they are revising or they have abandoned each and everything.

R: When you talk of "we", what are you exactly referring to?

T: That is what my school requires. That every after four weeks, you can say after a month we give a test and also at the end of every term.

R: So that's your school's policy of continuous assessment?

T: Yes.

R: Is there anything else that your school requires that you do in the continuous assessment of the pupils?

T: Homework.

R: What is the policy on homework like? Does every teacher give homework everyday?

T: Every teacher is supposed to give homework everyday but really it is very difficult. So for me I am giving homework three times a week.

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R: What is the purpose of giving pupils homework?

T: The parents are supposed to supervise them or to give them time so that they can accomplish that work.

R: So the purpose is that of getting parents involved in the supervision of their children?

T: Yes.

R: How do you know that the parents do the supervision?

T: But they are not doing it.

R: How do you know that they are not doing it?

T: Pupils come with uncompleted work which means that they are not supervising them and they are not giving them time.

R: Isn't there any other reason for giving pupils homework besides the parents' supervision aspect?

T: We also decided to make it that way because of the way how our pupils are performing. They are very weak so they need to revise at that very particular portion they have learnt a day. So that is why we are giving some five numbers or three numbers per day so that they can go back and look at the work and revise it.

R: What about the national policy of continuous assessment? How do you and your school put it into practice?

T: This one of UNEB is very good because after completing a topic you give a test. We were given test booklets with tests covering each topic in each subject. We teach a given topic and then we give out tests, then we find that some of these numbers are difficult then you squeeze some time and go back to those numbers. Normally we go through all the numbers in the paper. We solve those numbers on the blackboard with the pupils so that they can make corrections where they failed.

R: You said the UNEB system of testing per topic is very good. What makes it a good system?

T: ...In the sense that one is able to set a question on everything that has been taught in a topic. But if you wait to test at the end of the month, a test cannot cover everything that was taught in a month.

R: You have said that you do corrections at the end of every topical test given, is there anything else that you do with the test results?

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T: These marks are recorded in the cumulative record cards, and then they are saying that after giving a reasonable number of tests you work out the average. Apart from recording, the test results give me a chance to know where they are weak then we can go back and revisit that part which they have done poorly. We are actually supposed to arrange for remedial teaching after every test, but this is very difficult to follow because of time. You can see that we are not teaching in more than two subjects. You have to organise this class, then this subject, because you move from this class to another... Otherwise after marking we give out those papers to the children. Nothing much is done except that we go through the numbers. Those who failed the numbers try as much as possible to see to it that they catch up.

R: Now you have told me about your school's system of assessment and the national policy of topical testing. What do you see as the new aspect in the national policy of continuous assessment in relation to what your school has been doing?

T: The only thing which is new to me is to use those cumulative cards and keep the card, if the child is now in P5 that we are supposed to keep that card up to P7 to see how the child is progressing from P5 to P7 and that card is to contribute about 20% to PLE.

R: So the only new thing in the national policy is that of recording, recording on a card that is provided by UNEB and also calculating a percentage that would contribute to the child's PLE mark?

T: Yes.

R: Now we have talked a lot about the national policy of continuous assessment and what your school requires, but we haven't yet explored how you yourself like to assess the children in class. Please tell me about your own ways of assessment. How do you assess your children in class without being told by the school or being pushed by the national policy? For example what do you do in mathematics?

T: I give them some numbers every after a lesson, from there I can easily tell that this one is now coming up, this one has been following, this one has been off. I give them written exercises and they write individually.

R: Is there anything else that you do as a means of assessing your pupils before a given mathematics lesson comes to an end? I mean, before you give a written exercise at the end of the lesson?

T: First of all during the time of teaching that is when I start trying to find out whether they are moving together with me. I keep on asking them oral questions as I teach to see if they are understanding what I am teaching. Then at the end of the lesson I give them a written exercise. I keep moving and looking at the way they are calculating the numbers during the written exercise. Then after there I give some numbers after I have completed the topic.

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R: Now you have talked about asking them oral questions during the lesson, giving them a written exercise at the end of the lesson and assessing them after you have completed the topic. Is there any other strategy that you use to assess the pupils?

T: I do give them homework.

R: How often do you do this?

T: For me I give them homework three times a week.

R: Any other strategy of assessment that you use?

T: I give them tests at every end of the month and term as the school requires.

R: Is that all?

T: Yes. ...*(After a long silence)* Oh yes, I also sometimes give them group work.

R: What is your intention of giving them group work?

T: To find out whether the children can work co-operatively with others to solve a problem.

R: How is the group work arranged?

T: I select a group of pupils, mainly those who failed a certain task and I give them a few numbers to go and discuss as a group. When they have finished discussing, each one attempts the numbers on a sheet of paper and then I mark them individually.

R: Oh I see... They discuss in a group but they attempt the numbers individually and they are marked individually?

T: Yes.

R: Talking of marking, what is it that you do when you mark pupils' written work?

T: *(Silence)*

R: I mean what is it that you write in pupils' books when you mark their work?

T: For me I only tick the correct answers and cross the wrong ones. Then after I have finished all the work, I count the correct answers. If for example I gave ten numbers and the pupil has failed four numbers out of the ten, I write there six out of ten. I also write some comments such as "excellent" or "very good" in case one gets all the numbers correct or "poor" if one fails all or most of the numbers.

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R: Isn't there anything else that you write in the pupils' books, say for those who have failed the work?

T: Nothing else.

R: I wonder why you write the marks there and the said comments?

T: To encourage the pupils. If one sees he has ten out of ten and has been given excellent, he is encouraged to work even harder. Those who get one out of ten and see they have "very poor" are also encouraged to work harder next time to get a good mark and a good comment like their friends.

R: Mr Batte I think we have now talked about most of the things that I wanted to learn from you regarding your understanding of continuous assessment and how you go about implementing it. I thank you very much for having been generous with the information and for having given me this much time.

T: Not at all. I also thank you for having chosen to learn from me *(laughter)* and I hope you find the information useful.

R: Oh yes, it will be very useful. And I look forward to your continued cooperation and support in the remaining period of the research.

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Appendix 3 Post-observation interview schedule

Questions to the teacher about incidents during the lesson.

Why did he do it?

Any suggestions on how else he might have done it?

In the teacher's view what is a good mathematics assessment task? Why?

What should it assess?

PROBE

Any views regarding alternative forms of feedback besides what was viewed in the lessons and in pupils' exercise books?

PROBE

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Appendix 4 Transcript of a post-observation interview with a teacher

TEACHER: KATO
Date: 23/07/2001

R = Researcher
T= Teacher
Italics = Description of the scene

R: Mr Kato *(not his real name)* today I would like us to talk about the lessons in which I observed you and video recorded you teaching. I really enjoyed them very much! But nevertheless there are a few issues where I need your clarification in order to understand well.

T: Yes

R: I played the lessons on the video several times and in the process I noted down some points that I would like to explore with you in more depth.

T: Alright.

R: What I am suggesting to do is that let us watch the lessons together and then I will be posing to ask you some questions whenever we shall reach a point where I need your clarification.

T: It's okay.

The researcher switches on the video and starts playing back one of Kato's lessons. The teacher seems to be anxious about having to view himself on the video but the researcher reaffirms him that the lessons were very interesting and that he will also enjoy watching himself! Apparently this was the first time he was seeing himself videoed. The following is the documentary of what took place during the course of viewing the first lesson on Equations that was recorded on 25/7/2000. Part of the post-observation interview was not tape-recorded but the researcher took notes as much as possible.

R: *(The teacher begins the lesson by asking pupils: "What did we talk about yesterday"?)* Why did you begin the lesson by asking that question?

T:

- To review the previous lesson
- To check whether they still remembered what had been taught in the previous lesson
- It would enable me either to repeat the lesson or to go ahead. If I asked them and they couldn't recall what we had learnt, that would imply that they did not understand.

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R: *(When one of the pupil's gives the answer to the above question as "Substitution", the teacher asks the rest of the class to repeat the answer several times)* Why did you do that?

T: To assess if they could give the proper pronunciation of the word.

R: *(Teacher gives the alternative word for substitution as "to replace" and goes ahead to cite an example that involves substitution i.e. Y = 3 Z = 2 rather than assessing if the learners could give an example as means of assessing their prior understanding of the concept of "substitution")* Why did you do that?

T:

- I wanted to simplify the concept to make it easy that is why I gave them the alternative concept "to replace". I wanted to help those who could not understand the first concept.
- I gave the alternative word and went ahead to cite an example considering the level of my learners. I knew I could not get the first example from them. I just wanted to give them the starting point. Most of my learners are very dull. They couldn't match that standard of giving an example. It was easy to get them started by writing the example on the chalkboard.
- They could not also cite an example because of the language barrier. They could not express themselves in English.

R: Why not ask them to express themselves in their first language?

T:

- Normally when we give those pupils revision tests, if you give them chance to express themselves in the mother tongue while teaching, they have also a tendency to answer test questions in Luganda yet it is not allowed for one to express him/herself in vernacular when it comes to tests and PLE. I wanted them to learn to express themselves in the language of instruction.
- When you give them chance to express themselves orally in vernacular you cannot assess them properly. They may give you the impression that they have understood but when they can't express their understanding in writing in the acceptable language of instruction (English).

R: *(Following the example Y = 3 and Z = 2, the teacher asks learners to give the next step in trying to solve the equation in as far as finding the value of y and z is concerned. When the learner gives 3 + 2 as being the next step, the teacher doesn't probe further to find out how the learner comes up with that answer)* Why?

T:

- Since we had already talked about that part and we were just reviewing, I thought it would be a waste of time to probe the learner. The mere fact that he gave me the correct answer was an indication that he had understood.

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(The teacher's interest in the correct answer rather than the process of reaching the answer is apparent in this incident).

R: (*Although the above example was intended at assessing the pupils' understanding of the concept of substitution as was taught to them in the previous lesson, the teacher solved the entire problem almost all by himself).* Why?

T:

- When I was marking the books of the pupils I found that some pupils failed to substitute so although I was reviewing I was at the same time helping those who had failed to do the exercise.
- The example was one of the questions that I had given to the pupils in the exercise on substitution. So by giving them the answers I wanted them to do correction.

R: *(The teacher introduces the new lesson on "equations". He begins by asking the pupils to give the meaning of equations but he doesn't give them enough time within which to respond).* Why?

T:

- I wanted to get their understanding of the meaning of the word equation... *(But the teacher just gave them a second in which to articulate their understanding. As soon as there was no response the teacher just went ahead to give its meaning (the definition). Asked if he could have used another strategy to help the learners to get to the meaning of the concept without him supplying the answer, he responded:* "Yes. For example I would have given them leading questions but in this case time was the consideration. And their language is poor so they would take a long time to explain.

R: Do you know of any other strategy of teaching new concepts besides you giving the definitions?

T:

- Yes. In the case of teaching them the meaning of equation, I would have used objects. E.g. If I have four mangoes and I have two girls: Alice and Sarah. If I give one mango to Alice, how many mangoes will I have to give to Sarah to balance the equation of four mangoes? *While the teacher knew that using real objects would have been more effective in teaching pupils the concept of equation, he didn't consider using it in this lesson because of time and over load:* If I was only teaching P 5 mathematics, I would have employed several strategies of teaching and assessment. For example, instead of using verbal definitions to explain mathematical concepts, I would have used real life examples.

R: *(During the time when the pupils are attempting some tasks on the blackboard)* Why not let one pupil to accomplish a given task on the B/B? i.e. one pupil would accomplish one step and then you would choose another learner to accomplish the next step. Why did you do that?

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T:

- Trying to find out whether others are following. That is why I was picking different pupils at different stages.
- To keep everybody alert because it is a whole-class lesson.
- For motivation: If the first pupil gets the correct response and is praised the next pupil will also strive to give the correct response so as to be praised.

R: What was the purpose of the tasks that were solved on the B/B?

T: This was intended at teaching pupils the methods and procedures of solving equations.

R: *Teacher writes one question and asks pupils to attempt it individually in their exercise books*, Why?

T:

- This was intended at sharing the experience acquired in the previous phase.
- I wanted to find out whether they had learnt how to solve the equations by following the examples I had given them.
- So that I could know the most difficult part for the learner to solve equations. To identify individual and general problems.

R: (*During the time when the teacher is marking pupils' books)* If the task is: p + 3 = 10 but the pupil writes n instead of p, the answer is marked incorrect. Why?

T: In PLE there is no room for that. One has to be accurate.

As the lesson comes to the end, the researcher shifts focus to probe the teacher's conception of a good mathematics assessment task and alternative feedback. This part is tape-recorded (the teacher accepts to be tape-recorded) because it takes place when the video has been switched off).

R: ...So accuracy is one of those things that you assess?

T: Yes.

R: If I may ask you, what do you call a good assessment task in mathematics? What should it assess? For example last time you were teaching about fractions, if you were to assess those children on fractions, and you wanted a question which was appropriate in assessing their understanding, what would that question entail? What kind of learning should the task require the learner to demonstrate...?

T: It should not be sub-standard. It must be at least hard to give them a task to think such that if you give an exercise or a test, let say 20 numbers, and all the pupils get 20 out of 20, then it was nothing, you didn't test anything. So the task must be at least hard such that it can push them to think.

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R: What makes a number hard or tough?

T: As far as our pupils here are concerned, if you set a number in a wordy form, they will find it a problem to interpret it. But when you give it in figures it will just be a walkover.

R: So the words are eliminating the slow learners from the fast learners?

T: Yes.

R: Now as we watched the lesson you for example told me that the exercise that you gave at the end of the lesson was intended at assessing the learners – to what extent they could use the methods that you taught them to solve equations. So in that case the tasks were good in letting pupils show the methods and procedures you had taught them. Is there anything else that a good task should assess besides assessing the methods that you have given?

T: No.

R: So you don't have situations for example, whereby you give children numbers in the sense that they don't really have to use the methods that you have given them but they can think of their own methods?

T: It is not common but there are certain numbers which pupils can work using their own way.

R: But usually it is not your intention to assess that?

T: No.

R: So the immediate intention is for you to assess whether they have mastered and can use the methods that you have taught them?

T: Yes.

R: What about when you mark the pupils, what is it that you're interested in when you mark their work?

T: I want to see if they can remember the methods we used and the steps they are following to calculate the number, whether they are correct steps.

R: Anything else that you're looking for?

T: May be neatness and accuracy.

R: And what do you mean by accuracy?

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T: If the task would be 3 + 4 and the child gives 10 so when actually the answer is supposed to be 7 so that accuracy also is important. One has to compute accurately.

R: Of all these things: methods, accuracy and neatness, what do you regard as the most important to assess?

T: Methods

R: Why is this the most important?

T: In mathematics when the child knows the methods of working out a certain number, that one sticks in his/her brain. So if he gets the methods I think he can even pass mathematics because they mark step by step.

R: What about the least important to assess?

T: Neatness because there is no mark for neatness. Someone just appreciates but doesn't award any mark for this.

R: And by the way, talking of marks, I have seen you marking pupils' books and giving marks and brief comments such as "poor". It's the same feedback that I observed in your three pupils' books that I examined. Is there any other alternative feedback that you would give to pupils on their work that you consider effective in enhancing their understanding and learning?

T: It is good to put marks and accompany them with a comment such as "tried", "keep it up". I just put general comments without specifying where their work is good. For the poor ones, I show them by reading out the names of those who did not get the marks I wanted. I also write in their papers: "wake up and work harder", "please stop relaxing".

R: So you consider marks and those comments to be the only effective form of feedback to help pupils learn?

T: Yes.

R: What is it that this kind of feedback does to the pupils to help them learn better?

T: The good ones feel okay but the poor ones, they are reluctant. They just come and sit in the class comfortably so even if they get poor results they don't mind.

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Appendix 5 Transcript of an interview with a higher ability pupil

R= Researcher
P= Pupil

R: Which subject do you enjoy most at school?

P: English and mathematics

R: Why these two?

P: English teaches me how to read and speak English while mathematics teaches me how to count.

T: What has been your highest and lowest mark in mathematics this year?

P: 62 has been my highest and lowest 43.

R: What makes you get high marks sometimes and lower marks at other times?

P: Being attentive to what the teacher has to say and being intelligent helps me to perform well. When I am playful in class I don't perform well and also being obedient to teachers helps me to perform well.

R: How does the teacher help you to improve?

P: He explains clearly and I understand and if I have not understood, I ask him and he re-explains.

R: Oh, that is very nice! What about when he marks your work, what is it that he tells you or writes in your book?

P: He marks my work and writes the marks I have got.

R: Is there anything else that he writes?

P: Good work, very good.

R: How does what the teacher writes in your book assist you to learn better?

P: It helps me to understand what he is telling me.

R: Would you rather suggest that the teacher writes more comments besides what you have mentioned?

P: Yes. I would like him to write what I have not understood so that I can learn it.

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R: What about if you have failed a number, what do you want him to write in your book?

P: Poor or fair, do correction, weak… and also to show me how that number is supposed to be solved.

R: When you have performed well, what does the teacher tell you?

P: He writes in my book 'good work' so that I know that my work is good.

R: How do you feel when the teacher writes such a comment?

P: I feel happy because I have performed well.

R: How does it assist your learning?

P: It motivates me to even work harder.

R: What about if you have not performed so well, what does the teacher tell you?

P: He writes 'poor' so that I know that my work is not good.

R: How do you feel when such a comment is made?

P: I feel bad but I try to work harder after this.

R: What do you want him to write in your book when your work is not well done?

P: If I have failed I want him to write 'poor' so that I know that my work is not correct so that I can do correction.

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Appendix 6 Transcript of an interview with a trainer

R: Researcher
Tr: Trainer

Date: 15/6/2000

Note: The respondent is a curriculum specialist (Educational Evaluation) in the National Curriculum Development Centre and he was one of the trainers of teachers in continuous assessment. He made it clear to the researcher that the interview should not take more than 10 minutes.

R: *(After the respondent has been briefed again about the research, the researcher goes ahead to pose questions).* ...I thought it was important to talk to people who have been engaged in the training of teachers in continuous assessment to know more about what this continuous assessment is about, its nature and purposes. So Mr Kigongo if I may ask what exactly is continuous assessment all about?

Tr: It is a new policy, actually a policy just ushered into the system, but we can't say that it has not been there. It depends on what the teachers understand it to be. Essentially these teachers have been doing continuous assessment and continue to do it because essentially teachers teach, give exercises and at times projects etc., they determine, allocate marks, they interpret whatever they have accumulated. These build-ups or cumulative records leave them to say this student or this learner is better than the other or this versus a stated criteria. Even in the usual school systems where teachers give termly tests, to me this is a form of continuous assessment. These tests are given in short periods of three months, ten weeks. But if you think of the duration of a school year which is about three terms, the equivalent of thirty weeks, then each term's assessment could be called a form of continuous assessment. Then at the end of the year, you get an examination which one gives to promote learners to the next level of learning...

R: If you say that continuous assessment has always been part of the teachers' practice, then what is new about it?

Tr: You see I have been working with UNEB. I have served about 3-4 districts to help teachers get to know how to use the continuous assessment materials. One of the questions they ask – but you see now you're asking us to do this, is there going to be a remuneration for implementing continuous assessment? My answer has always been: "You have been giving these except there is some tendency of uniformity or call it standardisation". We design standardised items, try them, improve upon them and give them to teachers to use. We have told teachers, you have been recording pupils' marks in little exercise books and even in some schools say, okay, end of term two: Kafeero's mark in examination is this, and in coursework is this. Even comments sometimes are comparative in nature. That the examination does not reflect your normal work or daily work... So we told the teachers that you have been carrying out continuous assessment and now we are helping you

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into systematic record keeping other than saying we are introducing something very new... Actually if you found a school teacher who is teaching and his children have no exercise book in which they do work as he continues to teach, the I don't know how the teacher finds out how much has been achieved in terms of learning outcomes.

R: So if I comfortably say that one of the main driving forces for making continuous assessment a national policy is to help the teachers record systematically, what could be the other driving force?

Tr: It is essentially to improve upon the teachers' view of the learner. Is the learner progressing? And how will you do that if you wait for the end of the term, how do you identify general learning problems if you did not do it as you continued to teach? You wait for the end of the term and you give a test of say fifty items, then analysing these items you find that everyone failed item no. 35. So, will you go back and teach that item at the beginning of the following term?

R: Why is much emphasis is being place on standardised testing in the national policy of continuous assessment?

Tr: This brings in the idea of national assessment of progress. If you're going to rely on the teacher in Kabira PS to say my children are progressing well and then the other one in Arua tells you the same, do we have a standard yardstick to measure this, or we shall take the teacher's word as final? But if something was uniform then I think we would be more objective than subjective.

R: One other recommendation that UNEB makes is that teachers should use tests for improvement of teaching and learning, what strategies have been put in place to ensure that teachers are using the tests in this way?

Tr: Well, they had courses, they used to have courses in Measurement and Evaluation. I was lecturing to them in Measurement and Evaluation. During the course of teaching this course, I emphasised to teachers the purpose of assessment as being the diagnosing of learning weaknesses...

R: How was it demonstrated to the teachers on how to go about diagnosing pupils' learning weaknesses?

Tr: This was not provided for in the training but we expect teachers to know how to go about it. They have been teaching and if they find pupils have not understood or have failed a given exercise then they are supposed to go back to that work.

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Appendix 7 Transcript of an interview with a school administrator

School D

R= Researcher
D= Deputy
Italics= Scene description

Note: The interview is the Deputy Headmaster at School D.

R: Mr Deputy *(His real name was used)* I thank you very much for having given me this opportunity to talk to you. Most of all I am very grateful to your school for having granted me permission to conduct my research here. Just to remind you about what my research is all about, I am investigating teachers' understandings and approaches to continuous assessment and what might improve their understanding and approach. But first I would like to get an idea of the context in which the teachers are working as well how their schools conduct assessment.

D: That's good.

R: So Mr Deputy can you please tell me briefly about your school, for example in terms of it's history?

D: The school was founded by the Catholic Brothers of Christian Instruction and is a boys' boarding school. It is as old as 40 years. It is called preparatory school because formally it was from P1 to P4 then for P5, pupils could be sent to Savio. Previously it was a junior school then later it became a preparatory school up to 1984 then we got a P5 class and Savio got a P1 class, we got a P6 class and Savio got a P2 class. When we got a P7 class, Savio got a P3 and P4.

R: When did the government come in?

D: Because government is aware that the foundation body is doing a good job, it only comes in to give scholastic materials e.g. books. We also get UPE funds. All pupils are on UPE and the teachers are paid by the government. We also suffer the same government staff ceiling.

R: Do the pupils pay some money or it is purely UPE funds?

D: They pay, being that we have a boarding facility and you know to cater for most of the things such as stationary and co-curricular activities, UPE funds are not enough. At times parents think that the number of government teachers is not enough and they recommend that we have extra teachers. The government pays for 14 teachers and we have an extra 15 teachers. We have many other expenditures which necessity that pupils pay fees.

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R: Did your school also attract a big number of pupils as a result of UPE?

D: Not really, since we require parents to pay extra money as I have already mentioned.

R: Now I would also like to know how your school conducts continuous assessment of pupils. Can you please tell me how you do it?

D: We have our own system of continuous assessment in a way that we have four tests every month. When the UNEB policy came up, for us we were already doing our continuous assessment and we thought that beginning something new altogether would somehow delay us. So we didn't embrace the UNEB system wholesomely but we used the test materials as revision exercises but when setting school exams we set our own.

R: Why do you have to set your own exams and give the UNEB tests as mere exercises?

D: UNEB wanted to make the tests standardised to serve all schools nationally. However, when it comes to our school you find that when we first tried those tests, you could give an exercise and you could see that this has not had an impact on the boys. In the UNEB tests, everyone could get over 90% and we were ashamed of giving such results to the parents. They were not a good reflection of what the students could do. Precisely, the UNEB tests are very simple given the standard of our boys. The P 6 tests are suitable for P 5 chaps. Therefore you cannot convince a parent that all children got over 90%. The UNEB tests are very simple and they do not challenge the pupils. Every pupil scores highly which is not a reflection of what a pupil can actually do.

R: So, would you say that the way your school assesses is a better way of assessing the pupils…?

D: Yes. Because when we set our papers, the pupils' results are a reflection of what they can actually do. For example, when you give a test, you can roughly tell that a certain boy is going to get such and such a score and be in such and such a position. This usually happens. Scores are well spaced to represent multiple abilities of pupils in a given class other than having everyone scoring highly. When everyone scores highly, pupils get false assurances that they are well and since we are also still doing these national exams, the PLE at the end such pupils come up with nothing but failures.

R: Let us assume that the UNEB tests materials were of good standard, would you then endorse the national policy of continuous assessment to be in operation in Uganda's primary schools?

D: Yes, it would be the best method of assessment. This is because, in testing a child for a period of time, in case of anything such as sickness and the child is not able to complete the year, one is able to judge from the child's previous performance and say that although this boy has not been able to complete the final year, these marks give a picture that he can go to another stage.

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R: How has the school understood continuous assessment to mean?

D: My view was CA to test all areas of the curriculum. Now if you see the materials we were given, we were only given materials for maths, English, Science and Social Studies. I thought that we would even look at these out of class activities such as music, football, etc.

R: But on the cumulative record cards that you were given, such things are provided for although the cards are not telling you how you're going to assess them.

D: Yes, that one will depend on one's opinion, attitude and expertise. If I am a footballer, then I will be able to assess the pupils who play football. If the teacher doesn't know or doesn't like games, he can't be fair there.

R: So are you suggesting that teachers should first be made experts in these co-curricular activities to be able to assess them?

D: I think this would be necessary. Teachers might need a bit of comprehensive training.

R: What about if we are only looking at the academic aspect of continuous assessment, what do you understand continuous assessment to mean to you in this aspect?

D: For me I thought CA was like what is done in higher institutions of learning. This year they teach and assess Philosophy, the other year Psychology, the other year Sociology, etc. But in this policy of continuous assessment, if it is maths, the child is tested about sets in P 5, sets in P 6, sets, in P 7, etc. The system is more cumulative than continuous. It is testing the same thing but at different levels.

R: UNEB stipulates that much of CA should be in form of tests and that teachers should give at least 11 tests per term (they are expecting 33 tests in P5, P6 and P7). What are your feelings about this?

D: Of course it is the easiest method by which continuous assessment can be conducted nationwide. I don't see any other alternative that could be used.

R: How effective is this system/method in terms of helping teachers understand how the children are progressing in their learning? Testing is something that your school has been doing for ages. Has it been of much use to you, or you think that there is something that could be used to complement this method of assessment?

D: It could may be made more practical to assess practical skills of pupils. Otherwise I don't see anything else that could be added there.

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R: How has this system of assessment (continuous testing) helped you to understand the children's progress in your school?

D: When you do tests, you see the interests of the learners and as you go on, you see that either someone is progressing or not.

R: Do you regard these tests as helping the teachers improve their teaching and helping pupil improve in how they learn?

D: As I have told you, if we use materials from UNEB in our case we would not know whether someone is improving or not because the first time we tried them children did not take them seriously. They were getting everything right. But when we do our own tests, you follow and see this time there has been some improvement. I don't know how upcountry schools have experienced these materials. Our parents here are always on the teacher's back. When they see very high marks they become suspicious that something wrong is going on.

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Appendix 8 **Part of the Formative Observation Instrument designed and used by the Florida Beginning Teacher Programme**
(Florida Teacher Programme 1982: 241-246)

3.5 Teacher Academic Feedback

	Frequ -ency	Sub-total	Sub-total	Frequ -ency	
3.5.1 Simple positive feedback for correct response					Ignores student response
3.5.2 Specific praise for correct response					Overuse of general praise/non-specific praise
3.5.3 Provides explanation of student error					Negative response or ignores student question
3.5.4 Asks other students (s) to clarify response					Continues without clarification
TOTAL					

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Appendix 9: Example of researcher's notes on a lesson

TEACHER: KATO
LESSON: ON EQUATIONS
DATE: 25/7/2000

The lesson/ teacher's words	Researcher's interpretation
Kato Who still remembers what we learnt yesterday? What did we talk about yesterday in maths? Nankumba:	*Question targeting the factual knowledge pupils can recall from the previous lesson.*
Pupil Substitution.	*Closed question*
Kato Repeat after her.	*Non-specific approval (asking the class to repeat implies approval))*
Class Substitution.	
Kato To replace is the same as substitution. So we are given y = 3, z = 2 and they say find y + z. It means that you're going to replace y with 3 and z with 2.	
So from there we do what?	*Closed question since there is no further probing after the pupil gives the answer as "we add"..*
Pupil We add.	
Kato So 3 + 2 what do we get? Ssengendo:	*Closed question*
Pupil Five.	
Kato So do we get five?	*Closed question*
Class Yes.	*Non-specific approval with no further comment (repeated questioning implies approval in this incidence) Peer-assistance restricted to asking other learners to decide whether the response is correct or wrong...*
Kato So our answer is five. As simple as that. Now there is a situation where they say 2y + 3z.	*Non-specific approval with no further comment*
What does 2y means?	*Closed question since there is no further probing after the answer is given.*
Pupil Two times y.	
Kato Very good.	*Reports achievement/evaluative comment*
So there we say 2 × y.	*Non-specific approval with no further comment*

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What does 3z mean? Mugerwa: Pupil Three times z.	*Closed question*
Kato Alright. So it is 3 × z. Now from there we are going to substitute. We are going to replace where there is y we put three and where there is z we put 2. Am I clear? Class Yes.	*Non-specific approval* *Closed question/no further probing the class*
Kato Now I want one person to tell us the next step. Namale: Pupil Two times three (2 × 3). Kato Stand up and complete the statement. Pupil Two times three plus three times two (2 × 3 + 3 × 2).	
Kato Is she correct? Class Yes.	*Closed question/no further probing* *Peer assistance restricted to asking other learners to decide whether the response is correct or wrong...*
Kato Yah. Now we are going to multiply, two times three equals six (2 × 3 = 6) and three times two equals six (3 × 2 = 6). Then we are going to add six plus six (6 × 6).	*Non-specific approval*
So what is the product of six plus six? Kisitu: Pupil Twelve.	*Closed question*
Kato Very good.	*Reports achievement/evaluative comment*
We get twelve. As simple as that. So today we are going to look at equations. *(He writes the heading on the blackboard): EQUATIONS.* Equations. Say equations Class Equations.	*Non-specific approval*
Kato Before we go in details, what is an equation? Let us know what the word equation means? Is there anyone with an idea?	*Question offers opportunity to assess pupils' prior knowledge of equations but the teacher doesn't pursue it. Closed question*

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Class No. Kato Okay let me tell you. An equation is a mathematical statement showing that two quantities must be equal. For example No. 1: X + 5 = 8. This is an equation. So we must see that the two sides can balance such that this side (left side) is equal to the other side (right side). If this side is 8 *(referring to the right side)*, we have to find out that even the other side *(left side)* equals to 8. We must see that both sides do what? Class Balance. Kato So the equations must always be balanced. In this equation (X + 5 = 8), we have letter X which is called "unknown". So we are going to look for the value of X. When we are looking for the value of letter X, we are solving the equation. So in the process of looking for the value of X, we are solving the equation.	
So we are going to solve the equation X + 5 = 8. What is the opposite of plus 5? Mubiru:	*Closed question*
Pupil Minus five.	
Kato So we are going to subtract five on both sides. So by subtracting five on both sides, we are going to be solving the equation. So we are going to say: X + 5 - 5 = 8 - 5. So what is the product of +5-5?	*Closed question*
Pupil Zero.	
Kato We get zero. So we get x plus zero equals eight minus five equals three (X + 0 = 8 - 5 = 3). So our next step is going to be x equals three (X = 3). So we have solved the equation and we have got the value of x which we have called the un?	*Non-specific approval* *Closed question*
Class Unknown.	
Kato So we have known the value of x. What is the value of x?	*Closed question*
Class The value of x is three.	

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Kato Good. So let us see whether we have balanced our equation.	*Reports achievement/evaluative comment*
So where there is x we put what? Pupil Three. Kato *(Writes on the blackboard)* So three plus five equals (3 + 5)? Class Eight.	*Closed question* *Closed question*
Kato So both sides are balanced. So we have finished to solve the equation and the two sides have balanced. Clear? Class Yes	*Closed question*
Kato So let us look at another example 2: n + 7 = 12. Now I want somebody to stand up and tell me the next step which I am going to write. Ssempijja: Pupil n plus seven minus seven equals twelve minus seven (n + 7 - 7 = 12 - 7). Kato Thank you very much. Sit down.	*Closed question/task* *Reward with no further comment*
I want another one to tell me the next step. Ssekatawa: Pupil n times (n ×)... *(Before he can complete the teacher interjects).*	*Closed question*
Kato Is he right? Class No.	*Closed question* *Peer-assistance restricted...*
Kato Nagawa help him. Pupil n plus zero equals twelve minus seven (n + 0 = 12 - 7).	*Asks another pupil to correct the error without providing opportunities for the individual to self-correct.*
Kato Good. Next step?... Mastulah: Pupil n equals five (n = 5).	*Reports achievement/evaluative comment. Closed question*
Kato Thank you very much. So the value of n is 5. As simple as that.	*Rewards with no further comment. Non-specific approval*
So I want you somewhere in your books to do the following number for me: b + 3 = 10. (Pupils attempt the number individually. The	*Closed question*

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teacher is seen moving around looking at pupils' books without saying a word. After a minute or so, he asks to look at the books of those who have finished. As he marks them, he doesn't say much apart from putting a tick (correct answer) or a cross (wrong answer). After marking quite a number of books (almost all of them) in a routine manner, the lesson comes to the end.	

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Appendix 10: **Example of completed video-observation schedule for the lesson in Appendix 8.**

Part 1: Questioning

Formative questioning	freq	Sub-total	Missed opportunities	freq	Sub-total
A. Teacher asks questions aimed at assessing pupils' prior knowledge on the topic so as to build new knowledge upon existing knowledge.			**xB.** Teacher does not ask questions to assess pupils' prior knowledge or asks questions targeting the factual knowledge pupils can recall from the previous lesson (fixed principles).	/	*01*
C. Teacher asks open-ended or thought provoking questions which require extended thinking to respond to them.			**xD.** Teacher asks closed questions which call for one specific answer or which require the recall of fixed principles, and therefore, which require lower order thinking skills.	/////// /////// ///////	*21*
E. Teacher gives pupils the opportunity to raise questions about what is being taught and uses the questions to mediate further learning.			**F.** Teacher tells pupils to ask questions but is not genuinely looking for their questions. E.g. he just says it in passing and does not provide them with enough time to answer.		
G. Teacher uses pupils' questions as a means of interacting with and stretching pupils' understanding by involving them in finding solutions to their questions..			**H.** Teacher offers answers to pupils' questions straight away or asks other learners to do so without engaging the individuals who asked the questions in finding solutions to their questions.		

Part 2: Feedback and handling of incorrect responses or errors

Formative usage	*freq*	Sub-total	Missed opportunities	*freq*	Sub-total
A. Teacher offers strategies or helpful hints/clues to facilitate self-correction when a pupil errs or fails.			**B.** Teacher provides the answer himself straight away when a pupil errs.		
C. Teacher repeats pupil's response in a neutral tone to permit self-assessment and self-correction of error.			**xD.** Teacher asks another pupil(s) to correct the error without providing opportunities for the individual to self-correct.	/	*01*

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E. Teacher notes pupil's error, probes, and provides enough wait-time for the pupil to try again and self-correct.			**F.** Teacher merely disapproves e.g. "That's not correct" without any other comment or provides the desired response without giving the individual the chance to try again and self-correct.		
G. Teacher models an example of the required response and asks the child to model his/her response based on the given example i.e. more practice given.					
H. Teacher uses pupil's response to offer further clarification/explanation.					
I. Peer-assistance: Teacher asks other learners to mediate understanding to their peer(s) or asks pupils to collaborate to find solutions to given problems collaboratively.			**xJ.** Peer-assistance is restricted to asking other learners to decide whether the response is correct or wrong without requiring them to give any other comment e.g. "Is she correct?"	///	*03*
K. Specific approval or specific acknowledgement of attainment.			**xL.** Non-specific approval of correct response e.g. "That's right", with no further comment.	/////// /	*08*
			xM. Rewards e.g. clapping or thanking without any supplementary comment.	//	*02*
			xN. Uses pupil's response to report achievement e.g. offers positive or negative evaluative comments such as: very good, well tried, well done, poor, … without specifying strengths or weaknesses and the way forward.	////	*04*

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Appendix 11: Example of a coded pre-observation interview

TEACHER: BATTE
DATE of Interview: 14/07/2000

Interview	**Researcher's Coding/interpretation**
…	
T: Continuous assessment is a way of regular testing of the learner's performance. You can give a test today or in the morning and then you give another one in the evening. It is something, when you teach you can decide to give a test within every after two days. So that is what I can define as continuous assessment. You can give regular tests and then you record his score or marks.	**Understanding of CA** *Regular testing*
R: So to you continuous assessment means giving regular tests?	
T: Yes, but what I wanted to mean was that with continuous assessment you can give a test, or you can observe a child in a particular activity and then you record his score or marks, then after sometime you also give him a test and you also record. That is continuous assessment.	**Understanding of CA** *Regular recording of marks*
…	
T: They want teachers to be in position to know how the child is performing and also to make it contribute to the final results of children in P.7. I understand continuous assessment is going to contribute twenty percent to the final results of PLE.	**Understanding of CA** Intention of the national policy *To assess pupils' performance* *Results to contribute to PLE*
R: …To know how the child is performing? In your case how do you go about that? What is it that you do to know how the child is performing?	
T: We have been giving them tests and marks to know how the child has performed.	**Assessment strategies** Tests
R: What kind of tests do you give?	

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T: We give them monthly and termly tests. We are looking at the way the children cram what we covered. You can also know whether they are revising or they have abandoned each and everything.	**Assessment strategies** Tests *Monthly test (*to assess how pupils cram) *Terminal tests*
R: When you talk of "we", what are you exactly referring to?	
T: That is what my school requires. That every after four weeks, you can say after a month we give a test and also at the end of every term.	**Assessment strategies** School requirement *Monthly and terminal tests*
R: So that's your school's policy of continuous assessment?	
T: Yes.	
R: Is there anything else that your school requires that you do in the continuous assessment of the pupils?	
T: Homework.	School requirement *Homework*
R: What is the policy on homework like? Does every teacher give homework everyday?	
T: Every teacher is supposed to give homework everyday but really it is very difficult. So for me I am giving homework three times a week.	
R: What is the purpose of giving pupils homework?	
T: The parents are supposed to supervise them or to give them time so that they can accomplish that work.	School requirement *Homework (*for parents' involvement in supervision and time provision at home)
...	
T: We also decided to make it that way because of the way how our pupils are performing. They are very weak so they need to revise at that very particular portion they have learnt a day. So that is why we are giving some five numbers or three numbers per day so that they can go back and look at the work and revise it.	School requirement *Homework (*revision and more practice given)

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R: What about the national policy of continuous assessment? How do you and your school put it into practice?	
T: This one of UNEB is very good because after completing a topic you give a test. We were given test booklets with tests covering each topic in each subject. We teach a given topic and then we give out tests, then we find that some of these numbers are difficult then you squeeze some time and go back to those numbers. Normally we go through all the numbers in the paper. We solve those numbers on the blackboard with the pupils so that they can make corrections where they failed.	**Assessment strategies** National policy *Topical testing* **Utilisation of assessment evidence** *Correction done after a test*
R: You said the UNEB system of testing per topic is very good. What makes it a good system?	
T: ...In the sense that one is able to set a question on everything that has been taught in a topic. But if you wait to test at the end of the month, a test cannot cover everything that was taught in a month.	National policy requirement *Topical testing (*has potential to test all that has been done in a topic)
R: You have said that you do corrections at the end of every topical test given, is there anything else that you do with the test results?	
T: These marks are recorded in the cumulative record cards, and then they are saying that after giving a reasonable number of tests you work out the average. Apart from recording, the test results give me a chance to know where they are weak then we can go back and revisit that part which they have done poorly. We are actually supposed to arrange for remedial teaching after every test, but this is very difficult to follow because of time. You can see that we are not teaching in more than two subjects. You have to organise this class, then this subject, because you move from this class to another... Otherwise after marking we give out those papers to the children. Nothing much is done except that we go through the numbers. Those who failed the numbers try as much as possible to see to it that they catch up.	**Utilisation of assessment evidence** *marks recorded* *Diagnosis of weak areas*

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R: Now you have told me about your school's system of assessment and the national policy of topical testing. What do you see as the new aspect in the national policy of continuous assessment in relation to what your school has been doing?	
T: The only thing which is new to me is to use those cumulative cards and keep the card, if the child is now in P5 that we are supposed to keep that card up to P7 to see how the child is progressing from P5 to P7 and that card is to contribute about 20% to PLE.	**Understanding of CA** New aspects in the national policy *Recording on cumulative cards* *Contributing to PLE*
....	
T: I give them some numbers every after a lesson to attempt in their exercise books, from there I can easily tell that this one is now coming up, this one has been following, this one has been off. I give them written exercises and they write individually.	**Assessment strategies** Teachers' own *Written exercises at the end of the lesson*
R: Is there anything else that you do as a means of assessing your pupils before a given mathematics lesson comes to an end? I mean, before you give a written exercise at the end of the lesson?	
T: First of all during the time of teaching that is when I start trying to find out whether they are moving together with me. I keep on asking them oral questions as I teach to see if they are understanding what I am teaching. Then at the end of the lesson I give them a written exercise. I keep moving and looking at the way they are calculating the numbers during the written exercise. Then after there I give some numbers after I have completed the topic.	**Assessment strategies** Teachers' own *Oral questions during the lesson*
...	
T: Yes. ...*(After a long silence)* Oh yes, I also sometimes give them group work.	**Assessment strategies** Teacher's own *Group work*
R: What is your intention of giving them group work?	
T: To find out whether the children can	*Group work (*team spirit assessed)

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work co-operatively with others to solve a problem. R: How is the group work arranged? T: I select a group of pupils, mainly those who failed a certain task and I give them a few numbers to go and discuss as a group. When they have finished discussing, each one attempts the numbers on a sheet of paper and then I mark them individually. ... T: For me I only tick the correct answers and cross the wrong ones. Then after I have finished all the work, I count the correct answers. If for example I gave ten numbers and the pupil has failed four numbers out of the ten, I write there six out of ten. I also write some comments such as "excellent" or "very good" in case one gets all the numbers correct or "poor" if one fails all or most of the numbers. ... T: To encourage the pupils. If one sees he has ten out of ten and has been given excellent, he is encouraged to work even harder. Those who get one out of ten and see they have "very poor" are also encouraged to work harder next time to get a good mark and a good comment like their friends. ...	*Group work (co-operative work* to groups of pupils with learning problems) **Feedback strategies** *Marks and evaluative comments* **Feedback strategies** *Marks and evaluative comments* *(*purpose: encouragement to pupils)

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NODE LISTING

Teacher: **Batte**
Interview type: **Pre-observation interview**
Date of interview: **14/07/2000**

1) **Understanding of continuous assessment**
   Definition
   Regular testing
   Regular recording

   Intention of CA

Assessment of pupils' performance
To contribute to PLE results

New aspects in CA
Recording on cumulative cards
Contribution to PLE

2) **Assessment strategies**
School requirement
Tests/monthly, terminal
Homework/parents' involvement/more practice given to pupils

National policy
Tests/topical testing

Own assessment
Written exercises at the end of the lesson
Oral questions during the lesson
Group work

3) **Utilisation of assessment evidence**
Marks recorded
Corrections done after a test
Diagnosis of weak areas

4) **Feedback strategies**
Marks and evaluative comments
Purpose: encouragement to pupils

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Appendix 12 Opoka's lesson on multiplying weights (17/10/2000) **(viewed during the workshop)**

Opoka	Let us look at the correction of what we did yesterday. …let's begin with number one.
Pupil	Change ½kg to grams.
Opoka	…you see this one (half kg) is a bigger unit and this one (grams) is a smaller unit. What are we supposed to do when we are changing a bigger unit to a smaller unit?
Pupil 1	Divide.
Opoka	Are we supposed to divide?
Pupil 2	Multiply.
Opoka	Multiply. Good. So what is 1kg into grams? How many grams are there in one kilogram?
Pupil	One thousand grams
Opoka	One thousand grams. So one kilogram equals one thousand grams. Now we are having ½. Here we are saying that 1kg = 1000g. What about ½kg and this ½ is given in grams. So we are supposed to multiply and we are going to have: ½ kg × 1000. Are we together?
Class	Yes.
Opoka	Now we are supposed to make this one (1000) a fraction, that is 1000/1. Are we together?
Class	Yes.
Opoka	…I forgot to tell you that when we are multiplying fractions, we are supposed to multiply numerator separately and denominators…?
Class	Separate.
Opoka	Now were we are going to have one over two times one thousand over one which equals one times one thousand, equals one thousand. And then we are supposed to divide it by?
Class	Two.
Opoka	One thousand divide by two. Are we together?
Class	Yes.
Opoka	*(draws a division sign on the BB)* $\overline{)\quad}$ Which number should be inside and which one should be outside? We have 1000/2. Which one will be outside?
Class	Two.
Opoka	And the 1000 will be?
Class	Inside.
Opoka	Now we can see that $2\overline{)1000}$ …so one is less than two. So now we are supposed to take two place values (10). Are we together?
Class	Yes.
Opoka	Now ten divide by two?

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Class Five.
Opoka Five. So it will be five. Five times two is?
Class Ten.
Opoka And so these two zeros we are supposed to take them up. Are we together?
Class Yes.
Opoka So one thousand divide by two is equal to five hundred. Therefore ½ kg equals 500 grams. Is it clear?
Class Yes.
Opoka That was changing a bigger unit to a smaller unit. …today we are going to see and look at multiplying weights. For example, 14.85kg by 8. Here we are supposed to arrange the numbers the other way round. So we are going to have 14.85kg "by" here means multiply… so we are going to have:

$$\begin{array}{r} 14.85 \\ \times \quad 8 \\ \hline \end{array}$$

This 8 is supposed to multiply all the digits from up there (i.e. 14.85). Is it clear?
Class Yes.
Opoka 14.85

$$\times \quad 8$$

Now let us ask ourselves that what is 8×5?
Pupil Forty.
Opoka 40? Okay, we are supposed to write 40 there?
Class No.
Opoka We are supposed to write what?
Class Zero.
Opoka And we carry forward how many?
Pupil 4.
Opoka 4. …8×8? This is something you should all know.
Pupil 61.
Opoka 61? Have you multiplied very well? Let me ask this one here. Jobi
Pupil 84.
Opoka 84? That is very wrong. You get a piece of paper and multiply it properly. You will get it. Francis:
Pupil 64.
Opoka 64. That is 64. So what are supposed to write?
Pupil 4.
Opoka 4?
Class No.
Opoka Remember we have another four up here. So we are supposed to add 4 to it… So we add 64+4 = ? Brenda:
Pupil 68.
Opoka Sixty?
Pupil Eight.
Opoka So we are supposed to write 8 and then we carry?
Pupil Six.
Opoka Then 8×4?
Pupil 32.
Opoka 32. Do you remember that we have six up here?

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Class Yes.
Opoka 32+6?
Pupil 38.
Opoka Thirty…?
Pupil Eight.
Opoka 38. So we are going to write?
Pupil 8.
Opoka And then we carry how many?
Pupil 3.
Opoka Yes. We are going to carry 3. Now we are remaining with last one. We are remaining with 8×1 only. Who is going to tell us that one?
Pupil 8.
Opoka 8. Is it clear?
Class Yes.
Opoka Now 8+3?
Pupil 12.
Opoka 8+3 is 12?
Class No.
Opoka Everybody put up your hands. This one is going to tell us the answer. 8+3?
Pupil 11.
Opoka Eleven. He said what?
Class Eleven.
Opoka Is he correct?
Class Yes.
Opoka Yah. So here it will be 11, i.e. 14.85

$$\begin{array}{r} \times \quad 8 \\ \hline 118\ 80\ \text{kg.} \end{array}$$

Now we have finished. Isn't it?
Class No.
Opoka We are still wrong?
Pupil Yes. The decimal points.
Opoka Okay, the decimal…. How many decimal points, one, two. Is it clear?
Class Yes.
Opoka So we are going to count from zero (11880), one, two, and then we put it there (118.80). Now we are correct. Isn't it?
Class Yes.
Opoka …Now let us look at another example. Who can read for us this one? i.e.868g
Pupil Eight hundred sixty eight grams.
Opoka Good. Eight hundred sixty eight grams. So if they had asked you to write that number in words you could have written what you have said… Now we have 868 divided by 7…. Now we are going to have our division symbol like that (*draws the symbol on the BB)* and then we ask ourselves, we are having 868g divided by 7. Then you say which one is going to be inside and which one is going to be outside? Yes 7 is going to be outside and 868g will be inside.

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...Is 8 divisible by 7? Can we divide 8 to 7?

Class Yes.

Opoka Okay. If yes, how many times will 8 be reduced into 7?

Pupil 1 time remainder 1.

Opoka One remainder?

Pupil One.

Opoka So you put one on top of 8 because we have started with 8. Isn't it?

Class Yes.

Opoka ...Okay 1×7 we are going to get?

Pupil 7.

Opoka Seven. Is it clear?

Class Yes.

Opoka (*takes the pupils through the division of the sum by way of involving them in giving factual answers such as 8-7?, 6-0?, etc., until the final answer of 124 is reached).* ...Now can we say that our answer is equal to 124? Are we correct?

Class Yes.

Opoka How many are saying that we are correct, by putting up your hands? ...how many are saying we are wrong? ...Okay put down your hands. We are starting with those who have said we are correct? What shows that we are correct?

Class (*nobody responds)*

Opoka ...let us now look at those who said that we are not correct. What shows that we are not correct? (*A pupil puts up his hand).* Are you supporting that we are not correct?

Pupil Yes sir.

Opoka Okay you tell us. What shows that we are not correct?

Pupil Because our answer is 124g.

Opoka So there is something remaining. Isn't it?

Pupil Yes.

Opoka There is something missing. He has been observant. We have been dividing in grams. Isn't it?

Class Yes.

Opoka So we have 124g. Are we now correct?

Class Yes.

Opoka ...Okay, let us try this one in our books. (*writes one sum on the blackboard):*

<u>Multiply 74.35kg by 6</u>

The pupils start doing the exercise. Afterwards the teacher starts going around the class to mark those who have finished. Besides giving ticks and crosses, he was captured making the following comments to different pupils:

This is correct

Now what is this? Here you made a mistake. So you should do corrections.

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We are multiplying the number by six, but is this six? What happened? You write six and you multiply it.

Opoka Six times seven it is what?
Pupil Forty-two.
Opoka Now you have forgotten this two you carried. You're supposed to add it to 42. You had forgotten. You see!

You first add up 18+3, now we count with our fingers: eighteen, nineteen, twenty, twenty-one. Now we have twenty-one. Is this one? You wrote 8. Now you work out this number again.

Can you look here? Multiply. Is it the same as the one of dividing? No. You're not supposed to divide. Multiply should be that sign (×). Okay? So you multiply this number again. We are not dividing.

Opoka It is 26, now you see what you have written here. Is that six? …okay let us multiply together. We are starting with 6×5
Pupil 30.
Opoka It is 30. So we write here 0 and we carry 3. Isn't it?
Pupil Yes.
Opoka Then 6×3?
Pupil 18?
Opoka Then 18+3?
Pupil 21.
Opoka So we have 21, we shall write 1 and then we carry?
Pupil 2.
Opoka Then 6×4?
Pupil 24.
Opoka It is 24+2?
Pupil 26.
Opoka You check what you have written… If this is 26, we are going to carry 2 and we write 6. Is it clear?
Pupil Yes.
Opoka …so first do the corrections before you do the exercise.

You haven't added properly.

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Appendix 13 Extracts from relatively interactive lessons

Ddumba
Lesson 1: Lesson on Pictographs, 7/8/2000

Ddumba — Then if one picture represents one hundred and fifty pupils, how many children can we have in Buloba Demonstration School? *(Four pictures appear in the column of Buloba Demonstratin School).* It is just a matter of computing things. Take your time. It is very simple. (*Some pupils have computed the answer very fast and several hands can be seen up. Others are still busy computing and the teacher gives them a few seconds to complete. After a minute all pupils' hands are up).* Nakku:

Pupil — Six hundred pupils.

Ddumba — Can we take Nakku's answer?

Class — Yes.

Ddumba — Okay. I want anyone of you to tell us why Nakku is saying that Buloba has six hundred pupils. Mulinda:

Pupil — She has multiplied one hundred and fifty by four.

Ddumba — Why four?

Pupil — Because in Boloba Demonstration School they have given us four pictures.

Ddumba — Okay. Since in Buloba we have got four pictures and then our scale says: (*He writes on the blackboard)*

1 picuture = 150 pupils Then what about four pictures?

4 pictures = ? X we don't know

Now what method are we going to use to find X? We want a formula. In mathematics this is very important.

Pupil — We are going to cross multiply.

Ddumba — Repeat after her.

Class: — We are going to cross-multiply.

Dbumba — 

This will give us $1 \times X = 4 \times 150$.

So what is the product of $1 \times X$?

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Pupil	It is X.
Dbumba	And what is the product of four times one hundred and fifty (4 × 150)? Lutaaya:
Pupil	Six hundred pupils.
Dbumba	Six hundred pupils. But remember we have got another way of multiplying this one very fast. Who can give me another method of multiplying this number very fast? Wasieba:
Pupil	We can use the multiple method.
Dbumba	Okay, it can also work. It is just a matter of getting 150 × 4 = 600. What else?
Pupil	We cancel the zeros.
Ddumba	When we are multiplying, is it true that we cancel the zeros class?
Class	*(Some say "no" others say "yes")*
Ddumba	Be sincere. If you're saying a big yes or no, say it loudly. Is it true that we cancel the zeros when we multiply?
Class	No
Ddumba	Any other method we can use in solving this number? Katwere:
Pupil	Breaking method.
Ddumba	Yes, we are about to get the answer but that is not the answer.
Pupil:	We add 100 on each side.
Ddumba	Yes, but that is mechanical. Thank you for trying. What method can we use?
Pupil	We use fractions.
Ddumba	Not quite. What can we do with this number? We have got 4 pictures and the scale is 150. What are we going to do? I am not going to tell you the answer because I know you know. Nabbaale, what can we do with 150 pupils?
Pupil	We use the multiple sign.
Ddumba	No. You think of what we can do.
Pupil	We use powers
Ddumba	No, thank you.
Pupil	We are going to expand.
Ddumba	Yes. We are going to expand. In maths we need to get very many methods of calculating numbers. How many of you don't know that when you're calculating and multiplying a bigger number and you see that it is not going to be worked out very fast, you expand the number? You have to expand 150. What are you going to get when you expand 150? Nalweyiso:
Pupil	*(Inaudible).*
Ddumba	So this means that you're going to multiply four by one hundred (4 x 100) and this is very simple because it consists of zeros. It is just a matter of multiplying four times one hundred equals 400 (4 x 100 = 400). Then you get your four times fifty (4 x 50) equals two hundred (200). When you add 400 + 200 you get what?
Class	Six hundred.
Ddumba	This is another way of multiplying numbers in case you've got a bigger number. So I just want to give you a bigger number to calculate for me. I want you to calculate the number of pupils found in Nsuube Primary School. Remember you have to study the last picture (*It is a picture of*

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half a boy i.e with one side (half head, one hand, one leg...). Do you have anything to say about the last picture?

Ruhweju

Lesson 1: Lesson on Simple rates and proportion, 3/10/2000

Ruhweju *(Starts the lesson by posing a question from previous work):* Here we were told to list, 2kg of sugar at 1000/= per kg, we have 2 ½ bars of soap at 750/= per bar and then 2 bunches of matooke at Shs6 000. Who can come and remind us how we discussed the question and in case such a question comes, how do you attempt it? How much money was spent on each item? Yes Gladys:

Pupil *Comes to the blackboard and starts interpreting the question. She first tabulates the question as follows:*

ITEM	QUANTITY	UNIT COST	TOTAL
Sugar	2kg	2 × 1000	2000
Soap	2 ½	2 ½ × 750	

Ruhweju Please try to explain what you're trying to do.

Pupil Two times one thousand equals?

Class Two thousand .

Pupil *(Writes the 2000 in the row of sugar under the Total column. She continues to write on the blackboard. Now she is trying to solve the total amount that was spent on sugar:* 2 ½ × 750 =*)*

Ruhweju Is she on the right truck?

Class Yes.

Ruhweju But you're not using the class. You're just calculating the numbers alone.

Pupil Two and a half times seven hundred and fifty over one i.e. $2\frac{1}{2} \times \frac{750}{1}$

Ruhweju But are you supposed to put all figures under the cost...?

Class No.

Pupil Two and a half times seven hundred and fifty over two: $2\frac{1}{2} \times \frac{750}{2}$

Okay, two times two (2 × 2)?

Class Four.

Ruhweju *(Realises that Gladys is not on the right truck and interjects).* Okay let me help you. Ruth help her. You're supposed to get the unit cost per kilogram or per item

Pupil *(Comes forward and writes on the blackboard:* 2 × 750. *She multiplies the sum by asking the class to give the answer at each stage. E.g.* two times zero *and the class responds:* zero *until she reaches the right answer):*

$$\begin{array}{r} 750 \\ \times\ 2 \\ \hline 1500 \end{array}$$

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So two times seven hundred and fifty we shall get one thousand five hundred. And then you get seven hundred and fifty divided by two: 750 ÷ 2. *(She goes through the division with the entire class until they come up with the final answer as 375).*
So half a bar of soap costs shillings three hundred and seventy five. So now we shall get one thousand five hundred plus three hundred and seventy five to get the total amount spent on soap: 1500
+ 375

(Goes through the process of adding the sum with the entire class and finally they come up with a total of 1875).
So the cost of 2 ½ bars of soap will be shillings one thousand eight hundred and seventy five.

Ruhweju — Now let us go to the matooke where we were given two bunches of matooke which cost six thousand (6000/=).... What will be the cost of each bunch? Who can answer that one?

Pupil 1 — One bunch of matooke...

Ruhweju — Come and calculate the number on the blackboard and show the working. Thank you Ruth (Thanks the pupil who has calculated the money that was spent on soap).

Pupil 1 — (Comes to the blackboard and starts dividing the six thousand by three i.e. 6000 ÷ 3. Together with the class they come up with 2000 but when the pupil writes the answer on the blackboard she writes 3000 instead of 2000).

Ruhweju — Three from where?

Pupil 1 — It is two.... So the cost of one bunch of matooke is two thousand shillings.

Ruhweju — ...Okay, how much money did he spend altogether on all the three items? ...Let us hear from Kindu... We are going to add the total...

Pupil — (Comes to the blackboard and writes): 2000 (for sugar)
+1875 (for soap)
6000 (for matooke)

(Kindu goes through the normal steps of adding the above sums with the involvement of the entire class. E.g. he says: "zero plus five" and the class say: "five" until they arrive at the final answer which is 9875).

Ruhweju — ...now how would you answer the question. The question says: "How much money did he spend altogether? You tell us how he or she could answer that.

Pupil — I added two thousand plus one thousand eight hundred and seventy five plus six thousand.

Ruhweju — Altogether. Good. Now the second question asks: If he had fifteen thousand shillings (15,000/=) in his pocket, what would be his balance? Nina show us how you would calculate the balance in case he went with fifteen thousand. Try to speak up.

Pupil — I will subtract nine thousand eight hundred seventy five from fifteen thousand (she talks as she writes on the blackboard):
15000
- 9875

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	(Nina goes through the normal step of subtracting the above sums with the entire class as Kindu did with the addition task, until they reach the final answer which is 5125 shillings).
Ruhweju	Now how would you answer that question fully? You tell us. Don't write anything on the blackboard… (Nina is quiet and the teacher jumps quickly to call on the rest of the class to answer…). Class how would you answer the question? (Many have put up their hands). Evelyn:
Pupil	If he had fifteen thousand shillings and he spent nine thousand eight hundred and seventy five then his balance was five thousand one hundred and twenty five shillings.
Ruhweju	Good. So he went with fifteen thousand shillings, then his balance was five thousand one hundred and twenty five shillings. Alright?
Class	Yes.

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Appendix 14 Extracts from largely transmission lessons

Kato

Lesson 1: Lesson on Equations, 25/7/2000

Kato	Today we are going to look at equations. *(He writes the heading on the blackboard): EQUATIONS.* Equations. Say equations
Class	Equations.
Kato	Before we go in details, what is an equation? Let us know what the word equation means? Is there anyone with an idea?
Class	No.
Kato	Okay let me tell you. An equation is a mathematical statement showing that two quantities must be equal. For example No. 1: X + 5 = 8. This is an equation. So we must see that the two sides can balance such that this side (left side) is equal to the other side (right side). If this side is 8 *(referring to the right side),* we have to find out that even the other side *(left side)* equals to 8. We must see that both sides do what?
Class	Balance.
Kato	So the equations must always be balanced. In this equation (X + 5 = 8), we have letter X which is called "unknown". So we are going to look for the value of X. When we are looking for the value of letter X, we are solving the equation. So in the process of looking for the value of X, we are solving the equation. So we are going to solve the equation X + 5 = 8. What is the opposite of plus 5? Mubiru:
Pupil	Minus five.
Kato	So we are going to subtract five on both sides. So by subtracting five on both sides, we are going to be solving the equation. So we are going to say: X + 5 - 5 = 8 - 5. So what is the product of +5-5?
Pupil	Zero.
Kato	We get zero because I told you that a positive five (+5) mean that you have some money in your pocket and a negative five (-5) means you have a debt. And so you give out five you will remain with zero. So we get x plus zero equals eight minus five equals three (X + 0 = 8 - 5 = 3). So our next step is going to be x equals three (X = 3). So we have solved the equation and we have got the value of x which we have called the un?
Class	Unknown.
Kato	So we have known the value of x. What is the value of x?
Class	The value of x is three.
Kato	Good. So let us see whether we have balanced our equation. So where there is x we put what?
Pupil	Three.
Kato	*(Writes on the blackboard)* So three plus five equals (3 + 5)?
Class	Eight.
Kato	So both sides are balanced. So we have finished to solve the equation and the two sides have balanced. Clear?
Class	Yes

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Ojok

Lesson 1: Lesson on diving numbers by two, 5/7/2000

Ojok	...today we are going to look at dividing numbers by two. Open page 68. Today we are going to look at divisibility by two. ...So we have to divide the following numbers by two: 0,1,2,3,4,5,6,7,8,9. ...zero divide by 2?
Class	Two.
Ojok	How did you get two?
Class	Zero.
Ojok	It is equal to zero. Then we come to one. One divide by two is going to give us?
Pupil	One.
Ojok	How did you get one?
Pupil 2	Zero.
Ojok	How did you get zero? Okay, one divided by two is equal to half or zero point five. Then we have three divide by two is going to give us?
Pupil	One remainder one.
Ojok	That's good. That's very good. It is going to give us what?
Pupil 2	Two remainder one.
Ojok	Paul what are you saying?
Pupil 2	One remainder one.
Ojok	Okay, good. One and a half. Then we come to four divide by two is going to give us? When we divide four by two the answer will be?
Class	Two.
Ojok	Okay it is equal to two. Then five by two will give us?
Pupil	Two remainder one.
Ojok	It will give us two remainder one. And then six by two?
Pupil	Three.
Ojok	Yes it will give us three. And then seven divide by two?
Pupil	Three remainder one.
Ojok	Three remainder one. And then eight divide by two? When we divide eight by two, it will give us...?
Class	Four.
Ojok	It gives us four. Okay. And then nine divide by two will give us?
Pupil	Four and a half.
Ojok	It will give us four remainder one. Look at your text books. Go to A. It says: "which numbers are exactly divisible by two with no remainders? Which numbers from 0,1,2,3,4,5,6,7,8,9? Can you tell us?
Pupil	Zero.
Ojok	It is equal to zero?
Class	No.
Ojok	Two...
Class	four, six, eight.
Ojok	Okay, keep quiet if you're not asked to say anything. Okay, those are the numbers which are divisible by two with no remainder. ...So we come to question B: Which numbers when divided by two have got a remainder?
Pupil	One.
Ojok	Yes.

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Pupil 2	Three.
Ojok	Okay.
Pupil 3	Seven, nine
Ojok	Okay. Then C: What do we call a set of numbers exactly divisible by two?
Pupil	Odd numbers.
Ojok	Well tried. Okay, can you remember our previous work on sets? Okay we said that those numbers which are divisible by two, they are called even numbers. They are called what?
Class	Even numbers.
Ojok	They are even numbers. So these numbers 2,4,6,8 are even numbers. When divided by two, there will be no remainder. They will finish up. Okay?
Class	Yes.
Ojok	…Okay, from these, choose numbers which are divisible by two: 561,672,633,714,205,136,117 and 158. Who can give us the answers?
Pupil	714.
Ojok	Okay, the next one?
Pupil 2	136.
Ojok	Yes.
Pupil 3	158.
Ojok	Very good. …Now what about this? Look at Exercise 38. Which numbers are divisible by two? From here, which numbers are divisible by two?
Pupil	Four.
Ojok	Yes, you have mentioned four. Another one? George:
Pupil	Six.
Ojok	Good. Another one?
Pupil	Eight.
Ojok	Don't speak from the floor. It is a wrong way of learning. Yes:
Pupil	Ten.
Ojok	Good. Next?
Pupil	Nine.
Ojok	I beg your pardon. What have you said?
Pupil	Two.
Ojok	Good. …those are the only even numbers which are divisible by two in question 1. Now let us look at question 2: We have 11,12,13,15,16,17,18 and 19. Of these numbers which of them are even numbers?
Pupil	Twelve.
Ojok	Another one:
Pupil 2	Sixteen.
Ojok	Good. Another one:
Pupil 3	Eighteen.
Ojok	Eighteen. Then? Okay those are the numbers. …have you understood?
Class	Yes.
Ojok	Now get your books and do for me the following numbers: 3-10.

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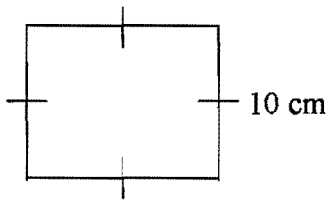
Tuhirirwe

Lesson 1: Lesson on the area of a rectangle, 2/10/2000

Tuhirirwe — yesterday we looked at the area of different figures. For example this one (*draws a square on the blackboard)*



What formula can we use to find the area of such a figure? Noelina

Pupil — Side times side (side × side).

Tuhirirwe — You come and write it on the blackboard

Pupil — *(Writes on the blackboard:* (side × side)

Tuhirirwe — You find the area of that figure.

Pupil — *Writes on the blackboard without talking:*

$$\text{Area} = s \times s$$
$$= 10 \times 10$$
$$= 100\text{cm}$$

Tuhirirwe — Is something wrong? *(A few pupils put up their hands and the teacher selects one of them).*

Pupil — *(Goes to the blackboard and is wanting to start the working afresh).*

Tuhirirwe — You add only one thing which is missing.

Pupil — *(Doesn't listen to what the teacher is saying and goes ahead and rubs off all what Noelina has written, and starts the working afresh. He does it quietly):*

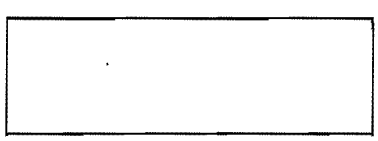
$$\text{Area} = s \times s$$
$$= s^2$$
$$= 10 \times 10$$
$$= 100\ \text{cm}^2$$

Tuhirirwe — Can you clap for him?

Class — Clap.

Tuhirirwe — So that exercise was well done and some people scored good marks. So this afternoon we are moving further to a rectangle. Who can sketch a rectangle? …just to draw a sketch of a rectangle?

Pupil 1



Tuhirirwe — Can somebody add on that rectangle? …because that one is not good enough. …something to identify a rectangle?

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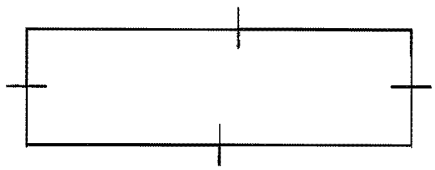
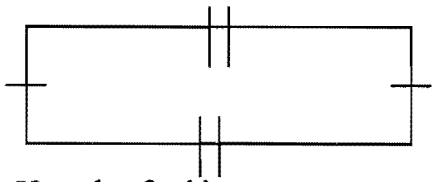
Pupil 2 

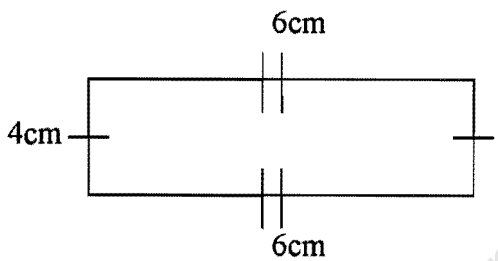
Tuhirirwe That one? … the identification is wrong.

Pupil 3 

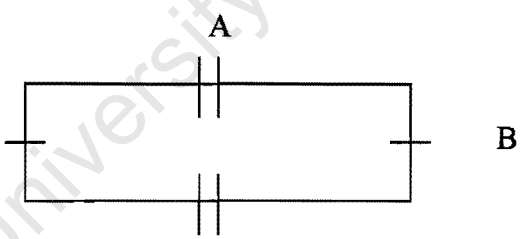
Tuhirirwe You clap for him.

Class Clap.

Tuhirirwe Is that all? Is that how we can identify a rectangle? Something to add here? Who can add something to identify a rectangle?

Pupil 3 

Tuhirirwe That is okay. So a rectangle has got two parallel sides that are equal. *(He refers to the pupils' diagram above:* These two sides are equal (*the 6cm sides)* and these (*4 cm sides)* are parallel and equal. *(He names the 6cm side A and the 4 cm side B):*



Now, what do you call this long side (A)? What is the name given to A and what is the name given to B? Yes Ruth:

Pupil A is length.

Tuhirirwe What about B?

Pupil Width.

Tuhirirwe Okay, if you see of the two lines, which is longer than the other?

Pupil Length.

Tuhirirwe Length is longer than width. So this afternoon we are going to look at the area of a rectangle. Not the area of a square but the area of a rectangle. What is the meaning of area? *(No response from the class and the teacher goes ahead to give the definition):* Area is a space occupied by a polygon not a perimeter.... Perimeter is the distance... while area is the space occupied by the polygon. Now look around the classroom, what is the shape of this class?

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