Chapter 7 Analysis of results

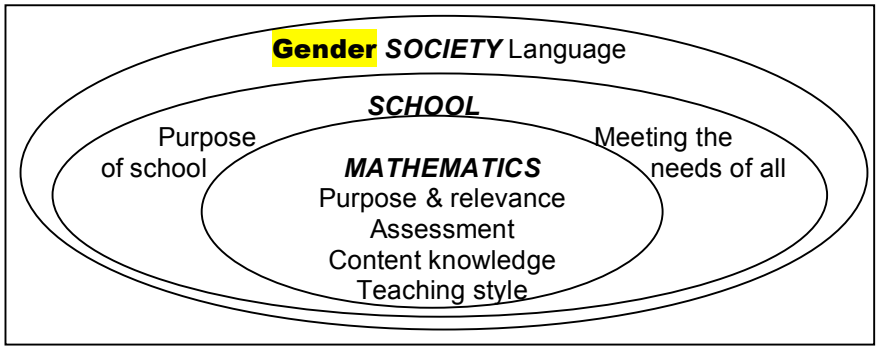
This chapter will explore the results in greater depth. I will examine the policies and their implementation and look at the effects on practice, as they are reflected in my own research findings. For a wider view of the issues, read chapter 8. For convenience, each section starts with the graphic organiser showing all the variables, and a restatement of the brief summary of the findings related to that variable.

The problem posed in Chapter 1 was:

- *How do policy and practice interact in Malawian primary education, in the case of mathematics teaching?*

In chapter 6 I presented the survey results and observations after presenting the policy. This appears to explore the extent to which practice is following policy. In this chapter I have deliberately reversed the order. In this way we are now exploring the extent to which policy is responding to practice.

7.1 Gender



The imbalance of gender opportunity is obvious to an Australian visiting Malawi, but it seems to be less obvious to Malawians, as it has always been part of the traditional way of life. However there are a number of people, mainly women, who perceive the benefits of greater equality. Their battle is part of the drive to 'modernise' Malawian society. How has this been reflected in policy and practice?

7.1.1 Summary of results on gender

Policy aims for gender equality or equal opportunity, and tries to curb the excesses of abuse of girls. Policy has not attempted to compensate for the traditional structured disadvantage except in small ways, and thus seems to be having little effect on changing practice.

Teachers claim to provide equal opportunity within the classroom, but my observations did not support this. They seem powerless to modify the rapid rate at which girls drop out of school. Ralph offered some suggestions from his past practice, but in general the official 'sensitisation' of teachers about the needs of girls seems to fall on closed ears.

7.1.2 Policy vs. practice

Practice

My classroom observations record bias in favour of boys, but the teachers seem generally unaware of their personal biases. Except for Ralph, teachers seemed unaware of the general biases in the system restricting opportunities for girls. My data provides little evidence of the 'gender sensitisation' of teachers that Kadzamira described to me, as almost every teacher wants to be even-handed in their treatment of the sexes and not create additional support for girls.

As far as practice goes, the male-dominated traditional society is still very alive and flourishing in Malawi.

Policy

The policy about gender participation is ambiguous. The PIF (Policy and Investment Framework, 2001) includes these statements:

> … The goal is to improve the participation of girls and women …the intention is to increase female participation to at least 50% of the total national school enrolment.
> (MoESC, 2001, section 1.5.4)

If this only means 'initial enrolment' then this has already been achieved, but if it means 'enrolment at all Standards' then it is a very great challenge. The major attendance problem is not the number of girls who start education – about equal to the number of boys, but the girls' higher rate of dropout at upper levels of primary school. (See data in section 2.2.3.)

In contrast to the pro-female statement above, the primary education equity policies are carefully even-handed. It implies an unwillingness to propose compensatory policies.

> 4. Gender equity shall be promoted by making the school an environment supportive of the needs of both boys and girls. The target is increased and equitable participation of boys and girls in basic education.
> (MoESC, 2001, section 4.1.3 (a) #4)

However there are no specific strategies described in PIF to meet the substantial challenge. The closest we get is this:

> The MoES&C will coordinate a social mobilisation campaign targeting socially disadvantaged groups, which will aim to boost the participation of out-of-school youth, girls, orphans … and children with physical and learning difficulties.
> (MoESC, 2001, 4.1.3 (b) #2)

Without wishing to suggest that the other disadvantaged groups lack importance, the long-standing tradition of gender bias throughout Malawian society would seem to require a different type and scale of 'social mobilisation campaign' from that of the other needy groups described in this strategy.

Two other policies have been drawn up in an attempt to decrease the disadvantage experienced by girls. One is the code of conduct in which a male teacher will lose his job if he molests a girl in his charge. Eve Chinguo explained that this often fails to be implemented – see section 2.4.2. Another policy outlines the right of a girl to be readmitted to school after delivering a baby, if the child can be cared for. This was written down and sent out to all schools, but its implementation has been resisted by many teachers and school principals (Wolf et al, 1999).

The educators I interviewed believe the problem is at the level of community attitudes and societal expectations. These are not addressed in PIF, as the problem is much wider than just the education system. (See section 2.2.5 for policies from the Ministry for Gender.) This was also reflected in the teacher and community resistance to the new 'readmission after pregnancy' policy and to the community confusion about why GABLE was waiving fees only for girls; see section 2.2.5. The fact that the community did not see a reason to support girls more than boys was probably the basis for the total fee waiver that led to Free Primary Education in 1994, with the consequence of massive enrolments and a lowering of quality across the system, from which the system is 'still in shock' (Kadzamira, interview, 2005).

The Malawian government is officially committed to equality in the provision of educational opportunity. The existence of unequal outcomes is due to strong traditional social factors that inhibit gender equality in education, as in much else in society. According to Moser et al (2004) the gender problem is one that pervades all of Malawian society:

> … root causes of discrimination against women, including prevailing gender inequalities in social practices in families and communities, are mirrored in all institutions that govern women's and men's

> lives at local and national, and are well are known by government and civil society activists alike. (Moser et al, 2004, p. 6)

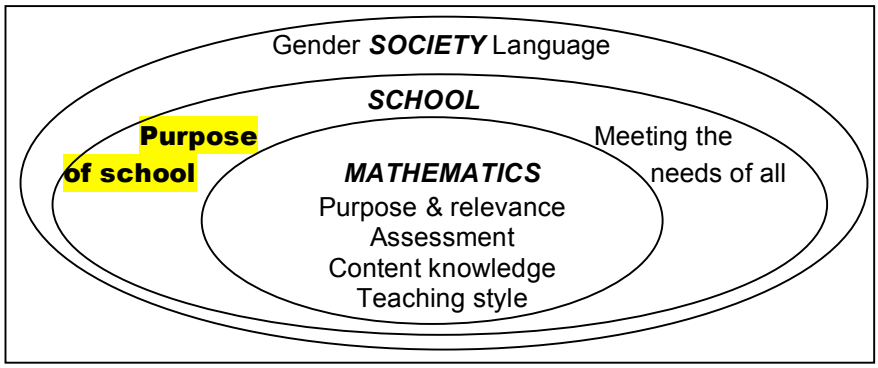
However, there appears to be no clear policy to deal with these matters outside the limited sphere of school education, as change is opposed by a 'dominant male patriarchal culture has shown itself to be highly *resistant* to change' (p. 6).

Key questions

- How do proactive policies and actions to improve the position of women and girls sit against the traditional values and practices in Malawian society?
- Do the relevant parties (government, public and teachers) realise that the position of girls in education will not improve without compensatory policies and practices?
- If such compensation was requested by future policy, it can be expected to meet with a great amount of community opposition. What steps might be taken to be sure it was properly implemented?
- Within the education system, what changes can be made to reduce the drop out rates for girls? Are these changes feasible?
- The HIV/AIDS data suggests that young women, particularly those who have little education, offer the greatest risk. What can be done to limit this risk?

These questions, and similar ones at the end of later sections are drawn together as challenges for the system at the end of this chapter.

7.2 Purpose of primary education



Is primary school for those who survive to the end, or for the majority who drop out on the way? Does it have to be one or the other? Is it possible to meet the needs of both groups?

7.2.1 Summary of results on purpose of primary education

The policy is this area appears confused. 'Poverty alleviation' is the major overall objective of education, but the more specific the education becomes the less relationship there seems to be to poverty alleviation. Policy is also concerned with 'fairness' in selection examinations, preventing cheating etc.

The statement of purpose for primary schools strongly supports 'practical skills'. This aligns well with 'poverty alleviation', and the fact that about two-thirds of the teachers chose 'To help pupils learn what they need for later life' seems to support this. Teachers generally want to do this, and believe it is what the Ministry wants. The exam-orientated goal is not generally supported, except by teachers such as Brenard.

7.2.2 Policy vs. practice

Practice

Teachers say they aim to prepare pupils for later life, although there is a clear admission by some teachers of the importance of selection examinations at upper levels. At all levels knowledge of Malawian culture was rated more important than examinations.

It may be that the 'real life' intentions of teachers are undermined by their lack of awareness of how mathematics is used in real life. The majority of teachers (56% in upper levels) in my survey thought that the main purpose of mathematics teaching was 'To help pupils learn what they need for later life'. It may be that they have little idea of what mathematics pupils might need for later life. Brenard, an experienced Standard 7 teacher, knew of no uses for decimal numbers outside school. Either the areas of local money, measurements, statistics, manufacturing, trade, money exchange rates and so on were unknown to him, or he did not recognise their connections to decimal numbers. The majority of teachers believe that mathematics should be related to later life. But in the upper levels, they focus on examination results. If they truly want relevance, but are ignorant of it, maybe increasing teacher mathematical knowledge of contexts and applications in Malawi might be a key to shifting the goals away from a purely examination focus.

Two competing policies

The purpose of the education system as a whole in Malawi is 'poverty alleviation' (MoESC, 2001, Executive summary), and yet there remains strong support for the secondary education selection examination process.

The PIF also proposes a curriculum that 'de-emphasizes selection'.

> The challenge is to design a school curriculum which de-emphasizes selection for post-primary education. Instead, the focus should be on the more than 90% of the primary and secondary school graduates who have to seek employment in the private and informal sectors. In this connection, the primary and secondary school curriculum of the future should strive to impart essential skills and knowledge on a broad range of issues including new basic skills; critical thinking and analytical skills, civic and democratic values, computer skills, entrepreneurial skills, life skills and environmental education. The teaching of science and mathematics will also deserve more attention in the re-oriented curriculum.
> (MoESC, 2001, 3.4.1)

Ndalama (discussed in section 6.3.2) expressed the purpose of primary education as two-fold:

> 'to … enable them to go along with their education post primary and should they drop out … lead a meaningful life in their society'
> (Ndalama, interview, 2005).

I am led to believe that this two-fold purpose, one for those who go on, and one for those who drop out, is the basis of a very significant clash of interests that causes a great deal of the tension within the education system. Ndalama's first stated goal – getting selection for post-primary – has led to an academic, examination-driven curriculum experience, particularly at the upper levels of primary education. This has also meant that those who drop out have had little chance to be prepared to 'lead a meaningful life' in the sense that they may be illiterate and innumerate. Put simply, under the present conditions an examination-driven education system fails to provide a preparation for 'poverty alleviation' to about 80% of the population – those who drop out.

In section 2.2.2 I outlined a history of the education system in Malawi that suggested that this dichotomy of 'useful' aims versus 'academic' curriculum has been around at least since the 1940s. From the history it seems that the public either prefer education of the academic sort (in order to get a paid job) or they don't care for education at all. It is very likely that they have never been shown an alternative to the examination-focussed curriculum that currently exists.

It is even possible that education, through its examination-centred selection emphasis, is actually creating an elite that certainly gains the benefits from education stated above, but at the cost of preventing the vast majority from achieving the very worthwhile goals of functional literacy and numeracy. This is something that the government does not wish to happen.

> … the PIF stresses the need for ensuring that Malawi's education system does not intensify existing inequalities across social groups and regions.
> (MoESC, 2001, Executive summary)

For some teachers there appears to be no clash between 'education for real life' and 'coaching for passing examinations'. As Brenard explained, students want to get a secondary education because that leads to employment and hence income. In a poverty-stricken country like Malawi, this *seems* a very sensible 'real life goal' for a student from a poor family. They see education as possibly the only way out of the poverty that engulfs them. These are their aspirations, and these aspirations are preventing them from meeting their needs and the development needs of the country through basic education.

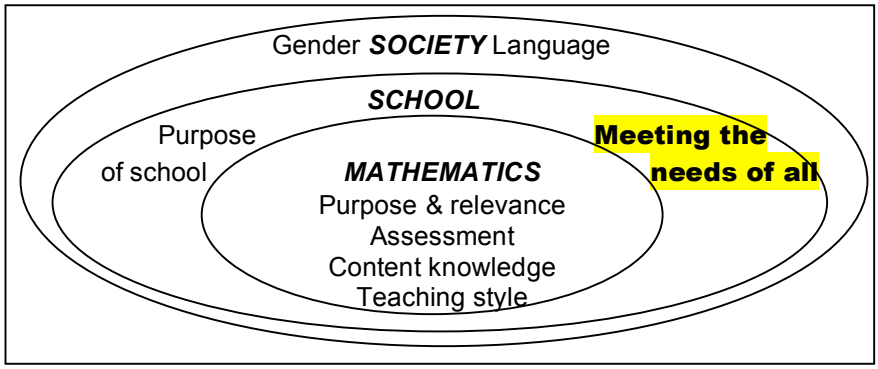
However for the majority these personal financial rewards for many years in the education system are inaccessible. The number of secondary places is so small, and for the minority who pass the examinations at the end, there are few jobs (Mwakapenda, 2000). In other words, it is an *unrealistic* goal for almost everyone.

In the pursuit of this 'academic' goal for the few, the 'real life education' of the vast majority is being sacrificed. Furthermore there is evidence (see section 2.2.6) that it is only those who are financially able to continue learning who have a chance at success; education favours the better off.

Key questions

- How can primary education make a substantial contribution to the national goal of poverty alleviation for all families, as well as selecting the children who will get through to complete secondary school?
- Given that many will leave schooling after Standard 4, is there a worthwhile purpose for the first few years of education that can make education for the first few years a really positive experience for all pupils (despite large classes, poorly trained teachers, few books, etc.)?
- How can the community's evident concern to get their children into secondary school and into paid employment be reconciled with the fact that, for many years at least, most will not achieve that aim, and will need to complete most of a primary education that is complete and worthwhile in itself?
- How can mathematics contribute to these purposes?

7.3 Meeting the needs of all pupils



This section has been broken into two parts for ease of analysis. The first deals with the diversity in the classrooms; this is related to many other factors, such as the class size and repetition of years, and makes teaching particularly difficult. So diversity is related to teaching quality and educational standards. The second part is related because it may be a consequence of the first; this is the phenomenon of pupils dropping out of schooling completely.

I have chosen to leave a brief discussion of education for those who drop out of formal schooling until section 8.1.7.1, as it is not directly concerned with my research.

7.3.1 Summary of results on meeting the needs of all pupils

Government policy has been active in this area. Particular disadvantaged groups, including girls, have been nominated for attention. Concern about the dropout rates has led to targets and strategies to reduce them. Recognising that poor teaching is a contributing factor, targets have been set for recruiting, training and resourcing many more teachers.

There is less government policy concerning the fate of the 80% 'out-of-school youth' who do actually drop out, or for the adults who have had little education.

Educators provided many reasons why pupils drop out of school, with large classes, poor teaching and lack of resources heading the list.

The ability of teachers to provide for the range in the classroom was raised in regard to 'those who get behind'. The majority claim to assist in class time at lower levels, and provide out-of-class help at upper levels. The majority aim for respect as a management tool, but more females than males use punishment, even though they know it is not officially approved.

My observations suggest that individual help is rare, and almost impossible at the lower levels due to the massive class sizes. When a class of 100 or more is taught under a tree, some children are going to get lost and not noticed.

7.3.2 Policy vs. practice

Practice – Diversity in the classroom: Class sizes and teacher deployment

In my small unrepresentative sample, class size varied from 13 to 408. The mean size is closely related to level, with all means in Standards 1 to 4 being over 100, and those over this being well under 100. The overall mean was 101, but the median was 90.

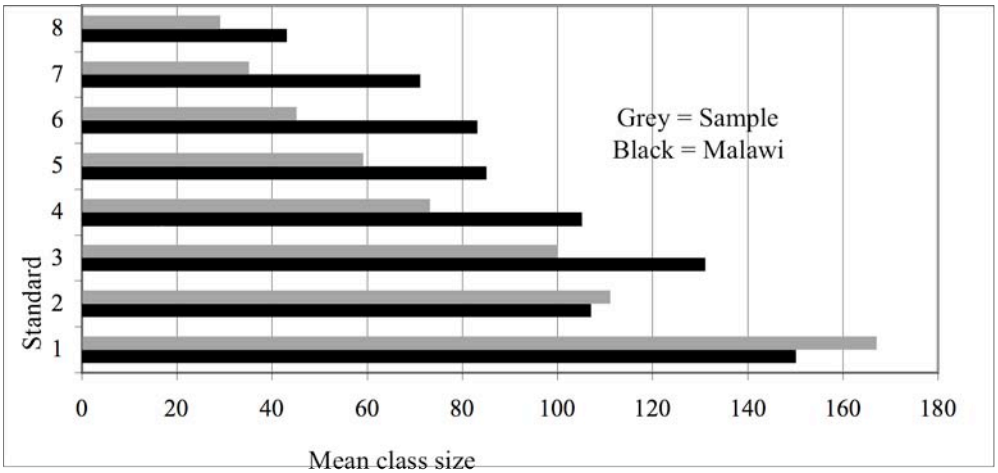
Standard	1	2	3	4	5	6	7	8
Mean class size	150	107	131	105	85	83	71	43

Table 7.1a

In general terms this seems to reflect the practice in schools across Malawi. The 2005 data (EMIS, 2005) does not provide class size data at each level. Instead it gives numbers of pupils at each level, and total numbers of schools. We could make the assumption that the school has one teacher for each level, and work out a class size based on that assumption. If we do, we get these results.

Standard	1	2	3	4	5	6	7	8
Mean class size	167	111	100	73	59	45	35	29

Table 7.1b



Under this assumption, the mean class size is 71. However dividing the number of primary teachers by the number of schools shows that there are 8.6 teachers per school on average, so theoretically there are enough to go around. But many rural classes exist without teachers. This raises questions about which teachers were in which schools: deployment – see section 8.1.4.

Croft (2002b) reported cases of combined classes at Standard 1, so that teachers were able to work as a team – this is briefly described in section 8.3.11.

It seems to be standard practice that women teach the lower levels, meaning the larger classes. There is no formal policy.

Practice – Diversity in the classroom: Repetition

The IEQ/Malawi project used the same test items for all pupils at all Standards. They gathered data about whether or not the pupil had repeated the year. On average, pupils who are repeating a year perform at a consistently lower level than those who are not repeating. The reason for this is, of course, that they are repeating because they have not yet achieved, but it is interesting that repeaters perform at a lower level than pupils learning the material for the first lime (IEQ/Malawi, 2003b, p. 61).

So repeating pupils add to both the numbers in the class and also the range of levels with which the teacher has to deal. This is the basic reason for the policy to discourage repetition, but there is no way of enforcing such a policy at lower levels. However, at Standard 8, where repetition is most prevalent, an attempt is being made and enforcement, as follows.

Mr Ndalama told me also about how the selection policy is being manipulated to reduce repetition at Standard 8: ‘First priority is given to those who are starters.’ According to Mr Ndalama the policy attempts to reduce repetition (at Standard 8) are not generally implemented by teachers. Pupils had to be registered by schools so that the system can tell who is repeating and who is not. However this strategy ‘has fallen apart, because it was difficult to monitor as pupils moved from one school to another’. At present the government is ‘working on trust’ to implement this policy (Interview, 2005). The issue is also being defused by the use of more Community Day Secondary Schools each of which is zoned to cater for a group of primary schools.

There is no issue with repetition in a system, such as South Africa, that uses ‘automatic progression’. In such a system pupils move together with all their peers through the school levels and no-one repeats (except for a few exceptional cases due to illness etc.). Although this might seem desirable as a consequence of the Outcomes-based Curriculum and Continuous Assessment that are being implemented from 2007, the very great shortage of teachers makes such a system unworkable in the short term.

So how do teachers cope with the very great spread of achievements of their pupils? Mary said that her policy was to endeavour to keep all pupils at the same level by actively encouraging the slower ones to 'keep up'. The descriptions of practice in section 6.4.4 describe the considerable risk that slower pupils simply get left behind, receiving less feedback from corrections and no individual help. Group work may support slower pupils, who may choose to make use of that time to get help from their friends (e.g. in their home language), but ultimately there is no safety net.

Policy – Diversity in the classroom

Through the PIF, the Ministry of Education, Sport and Culture (2001) provided policies about five aspects that might reduce the diversity in the classroom at any level. These involve class size, age range, repetition rates, teacher quality and learning materials; the last two might be expected to improve learning and hence reduce repetition.

> Efforts shall be made to reduce the current pupil - qualified teacher ratio to 60:1 across all primary standards by 2012. The national teacher: pupil ratios in Standards I shall reduce from 134:1 in 1997 to 80:1 in 2007 and 60:1 2012.
> (MoESC, 2001, 4.1.4 #3)
>
> Minimum entry into primary education shall be 6 years of age while the maximum age of entry shall be 11 years. Average age range in a class will reduce from 10+ years to 5 years.
> (4.1.2 #5)
>
> The MoES&C shall put in place appropriate measures to reduce pupil repetition .... Repetition rate shall decrease from an average of 15% to 5% in standards 1-7 and to 10% in standard 8.
> (4.1.4a #4)
>
> The MoES&C shall put in place a quality teacher education and development program for all teachers in the system. The percentage of unqualified teachers shall reduce from the estimated 50% in 1997 to 30% in 2002 and to 10% by 2012.
> (4.2.4a #1)
>
> The MoES&C shall improve the distribution of school materials and supplies. It is hoped that by 2002 the distribution of these materials will have improved such that all pupils will be supplied with exercise books and writing materials.
> (4.1.4a #11)

In each case the goal is expressed as a target, but there are no associated strategies. How well have these policies been implemented?

In 2005 there were 83 pupils to each qualified teacher, and 71 for each teacher, including those unqualified (EMIS, 2005). However this masks the massive spread of class size, demonstrated in the data I collected (17 to 408). The combining of the smaller classes at the upper levels would free up teachers to share the far greater numbers at lower levels. There would seem to be a common assumption that classes cannot be combined at the upper levels, as none of the schools in my sample took this step. I suspect that both the amount of content to be covered in the race to the Standard 8 selection examination and the desire for better teaching at those upper levels are factors that prevent this happening. Is it possible that the male teachers, who tend to teach the upper levels, simply want smaller classes? This needs further research, and it could lead to some new policies.

It is likely that head teachers are unaware of, or could be unwilling to apply, the age restrictions. EMIS (2005, p. 22) data showed that in 2005 the spread of ages in Standard 1 was 4 to 14 years, and from 6 to 18 in Standard 3.

The diversity is greatest in the first few years of schooling, and yet these years also have the greatest class sizes. One of the factors that increases class sizes and also increases the range of abilities in the class is repetition of year level. Is the policy to reduce repetition rates working?

In 2005 the repetition rates were much higher than five years previously, ranging from 25% (Standard 1) to 10% (Standard 7), where they had previously ranged from 18.7% (Standard 1) to 10% (Standard 7), see section 2.1.3. As an example, in section 2.5.4 I reported Wolf et al's

(1999) study that showed that the examination marking policy penalising pupils who repeated Standard 8 was either not known or misunderstood.

Due to the hard work done with the MIITEP program, in 2005 the percentage of unqualified teachers (teachers with no training at all) was 14%, although a further 11% had only one year of training. However many teachers would laugh at the policy target (4.1.4a #11) of supplying all pupils with exercise books and writing materials.

Practice – Dropping out of school

I have already referred to the fact that girls tend to drop out of school at a greater rate than boys, particularly at the upper primary levels. This has been discussed in section 2.2.6. This section attempts to uncover the reasons.

Given the thorough study done by Rose (2002, see section 2.2.6) it seems that the most likely major cause for pupil dropout is poverty, which acts particularly on pupils who are female, older and rural; the poorest families are most likely to forego education first due the increased opportunity costs involved.

Policy – Dropping out of school

About 50% drop out by Standard 4, often illiterate in their own language. The 2005 dropout rates averaged 18%. These were a dramatic down-turn from the rates in 2000, when they averaged 9.8%.

The official policy is expressed as a target.

> 'Dropout rate shall reduce to 5% in all standards during the plan period.'
> (MoESC, 2001, 4.1.4a #4).

The PIF strategies to reduce dropout concern provision of schools, classrooms, teachers. Donors were expected to help with furniture and books, etc.

> 1. More schools and classrooms will be built, based on clearly identified needs and priorities especially in areas where there is under-provision. Classroom stock will increase from 25,000 in 1997 to 40,000 in 2012.
>
> 2. Existing schools will be improved, renovated and maintained. Pupil: permanent classroom ratio will improve from 119 in 1997 to 80 in 2012.
> (4.1.2)
>
> 3. Efforts shall be made to reduce the current pupil - qualified teacher ratio to 60:1 across all primary standards by 2012. The national teacher: pupil ratios in Standards I shall reduce from 134:1 in 1997 to 80:1 in 2007 and 60:1 in 2012.
> (4.1.4)

Finding the money and organising the infrastructure is proving a substantial task, but despite this 'things' are more or less on target. The problems appear to be more concerned with 'people'. Who are they and why do they drop out of school?

The Improving Educational Quality project (IEQ/Malawi) has data that suggests that those children who drop out of school are older, tend to be female, and tend to be those who obtained *better than average* results on the skill testing before they dropped out (IEQ/Malawi, 2003a, p. 3). There is a clear loss to Malawian development as a whole while the more able pupils leave the education system before becoming sufficiently literate to be able to make a contribution to the economy.

Both IEQ/Malawi (2003) and EMIS (2005) report *lack of interest in school* as the major reason for leaving. It might be construed as 'lack of success in tests' and failure to be promoted. Although Rose (2002) has suggested that cost might be a hidden cause of some importance, 'lack of interest' still remains significant. And, more importantly, it is something that is easier to deal with.

This *lack of interest* is clearly revealed in the comments of Kaambankadzanja, reported in section 6.3.2, and would seem to be at least partly due to the desperate shortage of teachers, particularly in rural schools.

Chimombo (2005) reports comments about the public view of education that indicate a *lack of interest* among parents also. This would seem to be, at root, a problem arising from the clash between cultures: Malawian vs. western as reflected in the education system of European origin.

> The chief, when asked if the masked dances and other traditions interfered with school attendance, simply replied that he did not tell pupils not to go to school. His responsibility, as he saw it, was to ensure that the boys and girls experienced the traditional rites … He suggested that schooling was an alienating process, estranging young people from their cultural roots and from the community. (p. 161)

This last comment, on the *culturally alienating effect of schools*, indicates a type of resistance that needs further research, as I was not able to access community sentiment in this way. The chief's reported comment reflects a cultural tension between the individualism of the competitive western education system and the cooperative tradition within African culture. The comment shows how the goals of western education are so very different to the cultural transmission goals of the initiation rites.

In section 2.2.2 I cited Kaunda and Kendall who explain how traditional methods of education, as practised in the initiation ceremonies, use quite different styles of teaching, with role-play and very focused memorisation, but no books or examinations (Kaunda and Kendall, 2001). Those authors highlight the *clash of purposes* between traditional (non-formal) education in Malawi and the western (formal) education in the schools.

It may be that the *present style of education is fundamentally irrelevant* at least in some rural areas. Chimombo (2005) reports that this is the view of some parents who argued that

> 'most income in their community was generated through fishing, and fishing was a skill that children would not learn at school.' (p. 161).
>
> 'Many of these people claimed they had not seen any good come from schooling or education.' (p. 166)

Chimombo et al (2000) reports 'the girls in these areas are simply not interested in school.' They recommend

> … that the curriculum be designed to interest the children in their local activities. It appears the school has failed to interest children because they perceive school activities as alien to their everyday environment. The language and the discourse should then be compatible with what children are familiar with.
> (Chimombo et al, 2000, Conclusion 6)

There appears to be a case for a more acceptable educational purpose at the lower levels. In order that pupils are encouraged to continue with education this needs good communication to parents. Allied to this is the need for many more teachers to make sure this purpose is carried through.

For those who leave school early, the future after dropping out will be a mixture of subsistence farming on their own land, micro-business, or working for others. The future may also include extreme poverty, starvation, exploitation, the risk of HIV/AIDS, etc.

For those who continue their education to Standard 8 and maybe into secondary levels, there are also substantial challenges. These include hard study of seemingly irrelevant and culturally alienating material in a foreign language and at the end, little chance of a job.

A caution

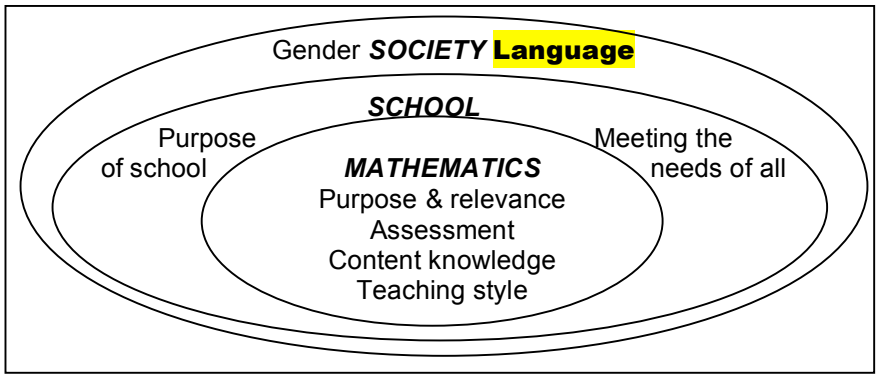
Although the rate at which pupils leave school seems very high and consequently wasteful, the present dropout rates are *necessary* for the very survival of the school system. If the drop out rate were reduced to zero, all those who enrol would stay in the system for eight years. Also assuming no repetition (i.e. automatic promotion), the number enrolled in Standard 1

would be the number at each level. The national attendance data for 2005 (EMIS, 2005) shows an average of 167 pupils per school in Standard 1, and an average over eight levels of 71. So there would be an average of about 167 at *each* Standard level in most schools. At present, and for many years to come, an increase from an average 71 to 167 (more than double) at *every* level is quite untenable.

Key questions

- Should there be policies that lead to more equal class sizes across the levels?
- Diversity is seen as something worth addressing because it reduces the ability of the teacher to meet the needs of all students. Are there ways of helping teachers to handle whatever range of ages, literacy levels, etc. that appear in the classroom?
- Repetition is related to assessment strategies and ranking practices. Are there alternatives that will reduce repetition rates as well as improve the quality of assessment?
- Dropping out due to lack of interest implies a lack of relevance and challenge. What can be done to reduce this, particularly for girls?
- Does the Ministry realise that every reduction in dropout rates implies greater challenges in providing for the subsequently greater numbers in schools at each year level?
- What is being done for the 80% of pupils who start education but drop out before the end of primary school?

7.4 Language of instruction



At all levels, language is the means by which ideas are conveyed between teacher and pupil. Hence the use of language that both teacher and child understand seems essential for meaningful education. For many reasons language of instruction is a contentious political issue in Malawi; decisions in the educational domain are not going to be based only on educational research.

7.4.1 Summary of results on language of instruction

There is confusion about what is official policy, even among the educators who can be expected to know. Some believe that Banda's directive from 1968 – requiring Chichewa to be used as the language of instruction in Standards 1 to 4 – still stands. Others appear to believe that the circular from 1996 – requiring the children's home language – is the official policy. It is not clear whether or not that the circular was officially withdrawn in response to a public outcry.

However practice seems less confused. In probably all cases, teachers use Chichewa as the language of instruction in Standards 1 to 4. This is the case even for Mary, whose own home language is Chiyao, and has 77% Yaos in her class. Sometimes it happens because the teacher

does not speak the home language. However the lack of proper words for mathematical ideas in Chichewa remains a problem at lower levels.

Although there is no confusion about the language of instruction expected in Standards 5 to 8 (English), there seem to be many teachers who often switch to Chichewa, or let their pupils use Chichewa, in an attempt to improve both understanding and participation.

7.4.2 Policy vs. practice

Practice

Despite a general agreement that the 1996 directive instructed teachers to teach in the home language of the majority of their pupils in Standards 1 to 4, almost all teachers appear to teach in Chichewa, even in the predominantly Yao areas of my sample. This is sometimes because teachers do not know the home language of their pupils, but in some cases (such as Chiyao-speaking Mary, whom I observed in Standard 4) it is because they believe that all pupils in the mixed class understand Chichewa, so using that national language makes the lessons comprehensible to all. Mary also made frequent use of group work during which pupils could and did chat with each other in whatever language they felt most comfortable. In this way they had a chance to sort out the concepts through discussion in a non-threatening context.

A majority of 60% of my non-representative sample of 83 teachers use a mixture of home language and English in the lower levels when teaching mathematics. To add to the confusion, in my survey 11% of teachers in Standards 1 to 4 thought that the Ministry wanted them to teach *only* in English. However none of them claim to follow this policy. Of these lower primary teachers 28% think that 'only the child's home language' is to be used (the 1996 'policy'), but 40% say they actually use 'only the home language'.

Of the six teachers I observed, the two who taught Standards 1, 2 and 4 exclusively used Chichewa, although both were aware that this was not a home language for some of their pupils. Alippo (Standard 5) teaches the first year official year of English as the language of instruction. She explained that she normally code-switches, using much more Chichewa in the first term and gradually moves to more English in term 2. (At the end of term 2 I observed almost entirely English.) The three Standard 7 teachers all used English entirely in my presence. However all admit to using Chichewa occasionally to make their explanations clearer. Gift also asks pupils to answer in Chichewa, so that he can see whether or not pupils have understood his English explanations.

Policy – confusion

The debate naturally falls into two related parts: lower and upper levels.

Lower primary Standards – which policy? which language?

In 1968 President Banda declared Chichewa to be the national language and medium of instruction for Standards 1 to 4. 'Schools that did not teach in Chichewa would no longer get a grant from the government.' In 1996 this was changed in favour by a Ministry directive to the present 'policy', that 'children should be learning in their mother tongue'. Since there are two 'official policies', one from 1968 and one from 1996, there is considerable confusion.

There is an on-going debate to form a new policy; for several years annual symposia have been held and many points of view, both educational and political, have been expressed. There is local research supporting teaching in the local language, and experiments in teaching that way have been successful (e.g. Malawi Breakthrough to Literacy, discussed in section 7.7.3).

The research outside of Malawi also clearly supports the use of home language ('mother tongue') in the first few years (see, for example, Holmarsdottir, 2003, cited in section 2.2.8). But there are other forces influencing the choices made by teachers, particularly the fact that

they are obliged to teach the subjects of Chichewa and English as well as mathematics, and most classes (at least in the area of my sample) have a mixture of pupil home languages.

I suspect Patricia and Mary are representative of many teachers who think that Yao children can all understand them quite well in Chichewa. This clashes with Kaphesi's (2001) report that

> pupils whose home language is Chiyao have more problems with mathematics learning that other pupils. The problem is more compounded when they are taught by a teacher whose home language is Chichewa.

It is through the possibility of discrimination against lingual minorities (e.g. Yao, Tumbuka, Tonga) that the language issue takes on a political dimension in Malawi. Language is highly emotive, as it is the embodiment of culture. Malawians will remember that it was a school language issue – being forced to learn in Afrikaans – that started the Soweto riots and massive changes in South Africa.

Many teachers also use English at the lower levels. This would seem to be clearly in opposition to either version of the official policy. There are several reasons for this. Firstly, there is a commitment to the preparation of their pupils to learn in English in later years, and hence a desire to expose them to as much English as possible (Mchazime, interview, 2005). Secondly, they use English because of the lack of suitable words in Chichewa and other Malawian languages for technical terms (Kachiwanda, interview, 2005). Thirdly, teachers need to teach in English some of the time to keep up their own English competence (Kaphesi, 2001).

The lower primary mathematics textbooks are in Chichewa only – not in any other Malawian languages, but the Teachers' guides, Professional development and Teachers' Training College courses are in English only. By making the resources bilingual the Ministry seems to be encouraging the use of both Chichewa and English in Standards 1 to 4. Indeed bilingualism can be regarded as a positive outcome of teachers ignoring policy!

The quality of English at the upper primary Standards

There is concern with the quality of English in the upper primary levels, at least in the teaching of mathematics (Kaphesi, 2001, p. 231). There is clear observational evidence that pupils have much more difficulty learning mathematics in English. They participate less in the lessons. In many cases teachers have much more difficulty teaching in English, and tend to talk all the time, dealing less with content and understanding or with procedures than with classroom management.

However the major focus in upper levels is on the Standard 8 selection examinations whose purpose is secondary selection. These are conducted in English (except for the subject 'Chichewa'), so being able to understand the questions and respond in English is an educational goal. Teachers also recognise that competence in English is a worthwhile educational goal for other reasons, including employment, even for those who drop out before Standard 8 or are not selected for secondary education. So they persist in English.

Those teachers whose teaching style is basically lecturing have few strategies to build concepts in mathematics. Brenard (Standard 7) is a classical example of this type; his classes listened to his lecture, then worked silently on exercises. But those who allow pupils to work in groups, such as Alippo (Standard 5) and Gift (Standard 7) give children an excellent opportunity to make sense of the English by working through the meaning in Chichewa with their peers. I observed these children talking in Chichewa when working in groups, using this opportunity to further seek understanding (at least 'instrumental') of the content being taught.

A language policy requiring English as the language for selection also seems to act to stratify Malawian society (Moto, interview, 2005). Although the Ministry of Education explicitly mentions that its goal is to avoid creating social divisions through education

> … the PIF stresses the need for ensuring that Malawi's education system does not intensify existing inequalities across social groups and regions.
> (MoESC, 2001, Objectives)

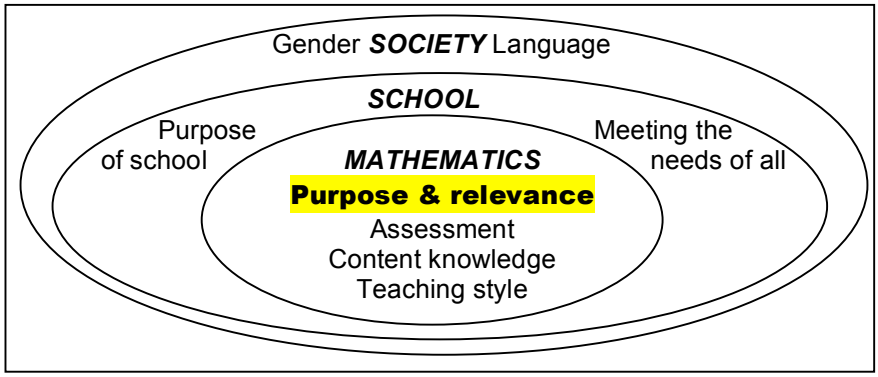
However, social strata do exist in Malawi and education is intensifying them through the use of the English language for selection. Dr Francis Moto clearly identified this as a consequence of the language policy.

> … the language policy largely divides people into socio-political groups. Those that acquire the English language and can speak it very well – like some of us learned it in school – you have got chances of progressing in school. …
>
> There is also the other side where elitists, including myself, tend to separate ourselves from those that have not acquired the language. For instance in doing selection of who is continuing with education, English is used as a barring tool.
> (Moto, interview, 2005)

Key questions

- There has been little official resourcing for the 1996 'policy' requiring the use of mother tongue, and teachers do not appear to follow this 'policy'. Yet it is well supported by educational research. What will be the new policy about language of instruction at lower levels, and how will it be resourced?
- Is Kaphesi (2001) correct, that the exclusive use of English in Standards 5 to 8 reduces the ability of students to understand mathematical content, and relate it to 'everyday life'?
- Are there alternatives that might help overcome the lack of comprehension due to learning in the foreign language of English? For example, would bilingual textbooks help?
- Is the pressure to teach entirely in English at Standard 5 to 8 driven by policy and concerns other than preparation for the Standard 8 selection examination?
- Are there alternatives to the exclusive use of English at upper levels? For example, what would happen if the Standard 8 examination were to become bilingual?

7.5 Purpose and relevance of mathematics education



Within the curriculum of primary school is the subject of mathematics, sometimes called numeracy. Numeracy rates next to literacy in importance. And yet I have found conflicting ideas of what is the purpose of a mathematics education in a Malawian primary school. In practice there is confusion – to whose future is it relevant? What might be the cause of this lack of clarity about purpose and relevance?

7.5.1 Summary of results on purpose and relevance of mathematics education

The official policy concerns 'poverty alleviation' and 'practical numeracy'. However the textbooks and Teachers' guides are at odds with the official policy, dealing instead with

abstract skill development. The syllabus and support materials were written in the 1990s and expect far too much of teachers given class sizes and the time available. This probably leads to more 'practical' topics being omitted.

Despite this my research show that teachers widely support the uses of Malawian examples, and want their mathematics teaching to relate to everyday life. The evidence from my own interviews and the survey supports this desire in teachers to use 'local Malawian examples' rather than 'modern life'. However rural applications are not found in the textbooks, and many teachers may not be sufficiently confident about mathematics to identify them for themselves. Being able to do so depends on a good understanding of mathematics.

7.5.2 Policy vs. practice including PCAR

Practice

The textbook provides the core material to be taught, and the teachers' guide provides teaching ideas for the topics. These have been described in section 6.6.1. However, the textbooks and Teachers' guide do *not* follow the advice of the Rationale, and for much of the time the material is quite abstract.

Despite this, a good teacher can infuse into this abstraction a level of relevance to real life and mathematical understanding. An example is Unit 22 Circles. Alippo taught this lesson to Standard 5 in my presence. She spent a lot of time eliciting from pupils places where circles exist in everyday life, and this seemed a good idea, but was *not* suggested in the guide. Then, following a hint in the guide, pupils were shown how to use two pencils and a length of string to draw a circle. The teacher provided string, but not extra pencils. For almost all pupils this was impossible to coordinate physically. It was not clear whether anyone learned anything from that physical activity. There was no attempt to relate it to outdoor circles, nor circular grain silos in common use in villages, nor did she take the class outdoors and draw larger circles on the ground using longer strings.

Photo 7.1

Another example in the same class involved linear measurement. The lesson started with pupils chanting the 10 for 1 relationship between pairs of the metric length units (km, hm, dam, m, dm, cm, mm); this activity is suggested in the guide. However only four of these units (km, m, cm and mm) are actually ever used in real life in Malawi. The activity part of the lesson also followed the guide and had pupils in groups measuring lengths (horizontal and vertical) all over the building, and the measurements were always given in whole metres and extra centimetres. However Alippo showed the children how to write these as one number with a decimal point. In this way the place value of centimetres as hundredths of a metre was

developed in children's minds at the same time. This relationship between measurement and decimals is an excellent idea, but is not mentioned in the teachers' guide.

These examples illustrate that the textbooks and guides offer suggestions for class activities, but they frequently are either not relevant, no longer manageable because of the large class sizes and shortage of equipment, are unable to relate to either the way the mathematics is used in real life or do not contribute to the bigger picture of the conceptual development of mathematical ideas. But they also show that a teacher with mathematical understanding and knowledge of how mathematics is used in everyday life can improve on the textbook and guide.

Policy – and distortion

The basic policy reads 'Pupils should apply mathematical skills in everyday life.' (MoE, 1991, Objective 21). Teachers support this; they believe that the purpose of mathematics in primary school is 'skills to help you have a better life', in contrast to 'get a good mark in the Standard 8 examination'. The teachers also overwhelmingly wanted 'local Malawian examples of mathematical calculations', in contrast to 'mathematical calculations from situation in modern life, such as in town'. (For details, see section 6.6.3.) Some of my interviews support this: Patricia said 'Mathematics is one of the most important because it makes people to think in their everyday lives.'

However, in section 6.6.1 I have demonstrated that the policy statements, such as 'Pupils should apply mathematical skills in everyday life.', are undermined by the details: the course outline, the textbooks, teachers' guides and the shortage of time to get through the material presented. Practical applications appear infrequently in the textbooks and in upper levels turn into 'word problems' (in English) that teachers find hard to teach and pupils hard to understand and solve – see section 6.7.3.) The major reason for this trend to 'word problems' is that they form the basis of any questions that are not presented abstractly on the Standard 8 examinations – see section 7.7.2. Teachers like Brenard supported this: 'Especially in maths, we teach for them to get higher marks during exams.'

all this is evidence that there is a mismatch between the official real-life goals of the subject (accepted at the lower levels) and the examination-induced goals of the upper levels. The writers – of courses, textbooks, guides etc. and hence the college tutors and everyone else – have been somehow misled into preparing and teaching towards an examination syllabus, and not a learning program for life. In this way the national examination has distorted the curriculum away from its stated goals, distorts textbooks and limits teaching methods and in these ways undermines educational purposes (particularly at the upper primary level).

In section 3.1 I explored the role that mathematics plays in highlighting the values of western-style education. I showed that the values of the formal mathematics curriculum – so common throughout the world – are in direct contrast to the values of African life. With the formal written examination in English at the end of the years of struggle, the whole enterprise has very little clear relevance to the Malawian way of life. My survey showed that teachers prefer rural Malawian examples as part of their teaching, and want mathematics to be much more related to the pupils' everyday lives.

Bishop's (1988) 'four major areas of concern' seem very relevant to Malawi.

- a technique-oriented curriculum
- impersonal learning
- text teaching, allowing the teacher to avoid responsibility for the learning of the pupils
- two false assumptions: that mathematics education is primarily designed to train experts, and that the teacher's responsibility is to teach mathematics, not people.

I believe that we have evidence here that further supports the duality of goals of education that arose from the consideration of the purpose of primary education. Mathematics – through

the textbooks, guides and examinations – is clearly following the academic, examination-preparation route, and is not true to the official goal of relevance to everyday life.

The PCAR course in Malawi

The printed goals recently developed for the Primary Curriculum and Assessment Reform (PCAR) course in mathematics are similar to the 1991 course, emphasising contexts and usefulness.

> Learners should be able to apply mathematical concepts in scientific, technological, socio, environmental, cultural and economic contexts to solve problems.
> (MoEST, 2004, p. 15)

This was expanded in the Rationale for Numeracy and Mathematics.

> Numeracy and mathematics aims at developing learners' critical awareness of how mathematical relationships are used in social, environmental, cultural and economic contexts. At an early stage, the learners will be enabled to count and to carry out basic mathematical operations. At a later stage the learners will be able to make inferences using manipulated data and to apply mathematics for solving practical problems in daily life.
> (MoEST, 2004, p. 17)

In an interview I asked Mr Ndalama about whether the country was concerned about examinations driving the learning.

> There is a policy – it is adopting an outcome-based curriculum in the PCAR [Primary Curriculum and Assessment Reform]. The country noted that our primary education system was examination-centred. We are actually trying to move away from this, because our own studies in terms of learning achievement … indicated a very big gap … between what learners are showing they are able to do in lower primary and what they are showing what they can do in the primary leaving certificate examinations.
> (Ndlama, 2005, interview)

Mr Kaambankadzanja (the PCAR coordinator) spoke to me about the 'outcome-based education' (OBE) of the PCAR course as opposed to 'examination-driven education'.

> We are trying OBE in Malawi. We had a number of challenges in our system – so many problems. When the reform started in 2001 we had to do this thorough analysis … When we looked at the various curriculum models around us and we looked at our problems, then what we could see as a solution was perhaps to have outcome-based education which we learned from our friends in South Africa, also Namibia, Zambia, Uganda. Tanzania is a different system, but we involved all of them. …
>
> We have treaded cautiously and carefully. Even our model we have tuned it to the Malawian way. Pure OBE obviously we could not make it and it wouldn't work. We take a little of this and a little of that and maybe reach the middle.
> (Kaambankadzanja, interview, 2005)

I pointed out that the assumption is being made that if the curriculum is well specified, then pupils can learn. However this assumption seems to be dependent on existence of teachers in front of small classes to mediate the learning. He pointed out the difficulties due to teacher shortage, particularly at lower levels.

> At the National Steering Committee I present the problems I have anticipated. At every meeting I have hinted at these difficulties: What are you doing about this? … I get no answers.

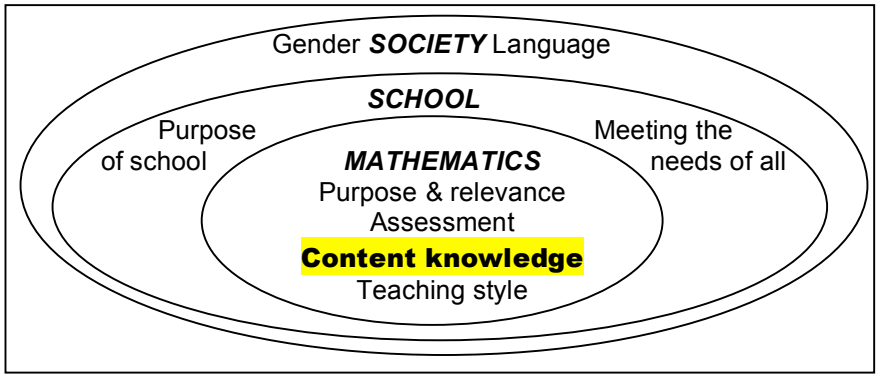
I obtained an electronic copy of the PCAR mathematics courses from Standards 1 to 8. My detailed study of the new mathematics courses shows that PCAR has gone the way of the 1991 course, preparing pupils for examinations and almost ignoring the stated goal. The detailed syllabus reflects an abstract number-oriented progression through clear stages, readily interpreted as preparation for the examinations. There is virtually no mention of 'daily life' applications. For example, although the topic list includes calculations with money and measurement (e.g. bills, budget preparation), there is no actual measuring of real objects (and no doubt no use of real money). Even the statistics section makes no reference to surveys of real contexts by pupils.

In the context of teacher shortages, poor teacher knowledge, large classes, etc. it might be argued that all that can be managed is abstract mathematical competence. If this is so, then the 'daily life' goals of the PCAR curriculum are seriously threatened. It is highly likely that the textbooks and guides that were being written in 2005 and later years will follow the course in detail, and hence also fail to be true to the stated goal. (I was unable to obtain copies of these books.) Thus PCAR mathematics seemed to be following the 'tradition' of the course from 25 years earlier.

Key questions

- Policy documents, such as PIF (2001) seem unaware of the influence of the selection process on what is taught, how it is taught and assessed, and what is learned. Why has policy been blind to this?
- Within the subject of Mathematics, what steps might be taken to realign the key resource documents, such as textbooks and guides, with the agreed goals of the subject?
- It may be that the writers are unaware of what has happened. It may be that they have insufficient understanding of mathematics and awareness of its real-life Malawian applications to realise that they are not preparing the majority for 'applying mathematical skills in everyday life.' If so, what could be done to overcome this?
- If resources relevant to 'mathematical calculations in everyday life' were to be made available to teachers, how might they be helped to understand and teach them well?
- How might the selection examination be changed to reflect the true purpose of mathematical education?

7.6 Teachers' content knowledge of mathematics



For understandable reasons, many primary teachers are not confident with teaching mathematics. In Chichewa, there is a shortage of technical terms. In English there is a lack of confidence. What is being done about this?

7.6.1 Summary of results on teachers' content knowledge of mathematics

It is an unstated policy that teachers should know their subject well, and given the other policies, should be able to relate it to the daily lives of their pupils. The MTTA results show that the mathematical knowledge of primary teachers is poor. Teachers' responses on the survey suggest that their greatest weaknesses are those topics relating to real life, with the exception of handling money. 'Word problems' and 'Measurements' are also the topics they find hardest to teach.

The interview with Brenard showed that he had no knowledge of the applications of decimals, or possibly that he had never thought about it. Clearly the textbook and guide had not

provided any support about applications, as he used these constantly. It seems likely that many teachers are at Brenard's level of understanding of mathematics.

7.6.2 Policy vs. practice including MTTA

Practice

Once teachers get out into schools there is little in the way of support, or even reminders of what they have learned. As has been shown above, the textbooks and guides offer little assistance to an ordinary teacher who still has anxiety or even phobias regarding mathematics.

The evidence from MTTA baselines study shows that the majority of teachers have partial or no mastery of the content at the Standard 8 level – see section 6.7.2. But how much should Malawian primary teachers know about mathematics content? Most would only try to be competent at the level they were teaching. It is a moot point that a Standard 8 examination represents the required level of mathematical knowledge which all should have. It would seem to depend ultimately on the goal of teaching – and this is to prepare pupils for 'mathematical calculations used in everyday life'. At present most teachers do not have much experience of mathematics in daily life, hence their expressed need for help with the application areas of word problems and measurements.

Policy

Policy in this area is unstated, but has to be deduced from implementation policies. There are policies to implement support in three ways: MIITEP training, textbooks and guides, and INSET.

> 2. As a consequence of the high volume of unqualified teachers needing to be trained, a MllTEP-style of teacher education will continue as long as the need for it is justified. (MoESC, 2001, 4.2.4)
>
> 10. The MoES&C shall ensure that each school has an adequate supply of instructional and teaching/learning materials, and that schools have some degree of control and choice over such a supply. The pupil textbook ratio shall improve from an average of 24 pupils per textbook in 1997 to 2 pupils per textbook by 2002. (4.1.4)
>
> 9. The MoES&C shall provide a quality, integrated INSET program for primary school staff. All staff to have at least 3 days of INSET per year. (4.2.4)

Are these policies working?

Using the teacher preparation course known as MIITEP Malawian teacher training has reduced the untrained teacher percentage considerably over the years, but it is not clear that the 'training' it provides has been entirely helpful. Inevitably it fails to improve the student-teacher's confidence in mathematics (see section 2.4). In Malawi the student-teacher's own schooling was some years ago, when the system was even less developed than at present. The abstract material learned at that time, being unrelated to daily life, has been forgotten. The MIITEP course attempts to cram a vast amount of 'relearning' into student teachers' heads in three months, then release them to schools where they are overwhelmed by the challenges of large classes, etc. Such courses inevitably consist of rote learning for tests, and such learning is, once more, quickly forgotten.

The 2005 EMIS data showed that there were more pupils than mathematics textbooks at all levels. The following data was obtained by dividing the number of pupils in 2005 at each level by the number of textbooks at the same level.

Standard	1	2	3	4	5	6	7	8	Total
Pupil : text	1.3	1.4	1.9	1.9	1.7	1.5	1.3	1.1	1.5

Table 7.2

It seems the greatest shortages are at Standards 3 and 4, while Standard 8 is best-supported.

The textbooks are not written to remind teachers of exactly how the mathematics works or why – see section 6.6.1. The standard introduction to an exercise contains one worked example, with no explanation. It seems to be an assumption by the textbook authors and writers of the Teachers' guides that teachers will not need to be reminded of the content they, supposedly, understood when doing their initial training. To this add the fact that, from Standard 5 to 8, textbooks are in English – a second language for teachers – and we can see why there is a lack of confidence in the ranks.

The Malawi Teacher Training Activity (MTTA) runs INSET courses for teachers to improve the teaching of Mathematics, Science and English in primary schools. It focuses on through helping teachers develop better understanding of mathematics using improved teaching methods that they can then use with their own classes. This is a most worthy activity, but at present there is little or no emphasis on the way the mathematics is applied in everyday life. There is little or no other support, except for the on-going work of the Primary Education Advisers – discussed in section 6.9.2.

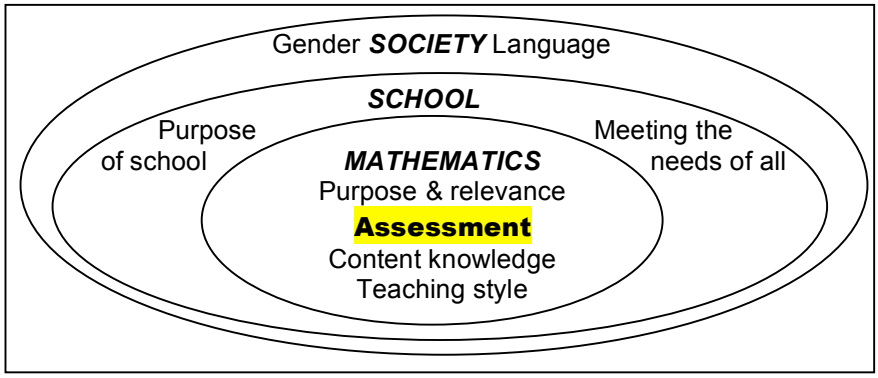
Given the vast number of untrained teachers who have entered the system over the years, and the desperate shortage of teachers even now, the quality of mathematics education would seem to depend heavily on having a better, more clearly defined and more relevant course, and very suitable support materials and on-going training to be able to teach it well.

The task would seem to be to commence building each teacher's knowledge and confidence in mathematics teaching while keeping it relevant to daily life and to poverty alleviation, the national goal of education.

Key questions

- Do teachers know enough about the applications of school mathematics to daily life in Malawi to be able to teach in that way? (My data says the answer is negative, and the implications lead to INSET and materials support programs.)
- What kind of print resources can be given to teachers that will enable them to understand the concepts behind the mathematics, be able to teach them correctly and also to teach pupils to use them to 'apply mathematics for solving practical problems in their own daily lives'?
- Are better quality textbooks, with explanations of use (at least) to the teachers, part of the answer to improving teacher content knowledge, and teaching?
- What kind of INSET programs can be implemented to prepare teachers to teach mathematics with an emphasis on solving practical problems in daily life, and build their confidence to do so?
- Are the Primary Education Advisers the key to on-going teacher development, as Mr Kanjala seems to think (section 6.9.2)?
- How can the pervasive influence of the Standard 8 selection examination be reduced or modified so that these things may be done? (The issue of assessment is addressed next.)

7.7 Assessment



We should recall that less than 6% of those who actually start Standard 1 actually make it into secondary school, and not all of those will survive that gruelling challenge. It appears that, because of the pressure for selection, the needs of the 94% are being sacrificed for the dubious needs of the 6% who might join the secondary school scramble, largely to find that there are not jobs for most of them at the end. These facts suggest that there is a clash between the dual goals of poverty alleviation and secondary school selection. Assessment just might be the culprit.

7.7.1 Summary of results on assessment

The official policy document (PIF, 2001) clearly supports both 'poverty alleviation' and the present system of the Standard 8 selection examination, managed by MANEB. The only policy concerns were with cost-efficiency, and reducing cheating. This has created a practice in which two weeks at the end of each term are taken up with examinations, correction and consequent feedback.

In interviews, many educators expressed concern that the examinations were actually strongly distorting the education system. An alternative, called 'Continuous Assessment', was being planned along with the introduction of the new courses (PCAR). This will be discussed in section 7.7.3, as in 2005 it was in the future.

From the teacher's point of view, regular testing and end of term examinations are what is expected, and are what they do. There was some evidence that my use of the term 'understanding' in relation to mathematics meant little more than 'testable skill' in the experience of most teachers. They use regular marking of student work, but because of class size this must be minimal. In the classroom, teachers I observed seem to be quite adept at using questioning to assess pupils' progress and to modify teaching procedures.

7.7.2 Policy vs. practice in Assessment

Practice: Assessment by classroom testing

The present 'policy' is clearly class testing, as this is promoted at teachers' training colleges in the current MIITEP training program. Indeed no other form of assessment is taught in MIITEP. It would seem that those teachers who believe that the Ministry wants them to test regularly (68% of my unrepresentative 83 teachers) are correct.

Miske et al (2003b) examined the beliefs of teachers about assessment, and found a lack of consistency in belief or practice. They found that teachers frequently tested with items that had not been recently taught and lacked skills in matching items to the teaching that had taken place. Using the teachers' own criteria for 'fairness' (that teaching had taken place) many of their tests were not 'fair' even by the teacher's own criteria. This is explored in more depth in section 2.2.12.

The main function of testing appears to be to provide class ranking (Miske et al, 2003a). The way ranks are produced is highly arbitrary and statistically suspect, and yet these ranks are

announced publicly and often have life-changing consequences. Ranking is apparently a tradition that could prove very hard to break. Miske et al (2003a) write

> However, the practice of ranking has come to serve important symbolic as well as instrumental purposes, and educationists and the general population had come to expect the ranking of pupils and assigning of class positions beginning in primary school. In most schools and communities, this system has become an important part of the culture and continues unquestioned. How students who do not score well feel about this practice, and how this affects them and their life decisions seems not to be subject to critical discussion.
> (Miske et al, 2003a, p. 3)

In terms of the relationship to learning, teachers do gather information about pupil comprehension, and use it to provide some feedback to pupils and to improve their own teaching. We will explore those more positive practices in the next sub-section.

Practice: Oral questions and written classwork as forms of assessment

Written tests or examinations are not being used to assist learning or teaching. However much more informal assessment takes place during class time that has the potential to contribute a lot to improvement of the teaching-learning process.

Each of the teachers I observed asked questions and received responses. My descriptions of this (section 6.8.4) showed that teachers do their best to observe pupils' performance, infer their comprehension and provide feedback when they can. Teachers do not seem to realise that this is a very useful form of assessment, or that they are already using it, however inconsistently, as a tool to assist their planning and teaching and to provide feedback to pupils.

My observations and interviews of teachers showed that class sizes prevented teachers marking the written work of all their pupils each day, so most of the correction takes place in class time. It seems traditional that the teacher is the sole arbiter of ticks and crosses, and that no other method of correction is permitted. This creates a bottleneck and slows the entire process. It prevents the teacher from helping those who need assistance, as there is far too much marking to do.

Susuwele-Banda (2005) noted that work done in class was not used as feedback for pupils. The teachers lacked both knowledge and skills to implement feedback effectively. They gave no individual written or verbal feedback to students. There was no written feedback in students' notebooks apart from crossed out work or work marked correct and in some cases marks indicating how many questions the student got correct (p. 115).

The potential exists to make small changes to common practices so that pupils and teachers get feedback. For example, oral questions can be more carefully spread around the class. Group work, where pupils can assist each other and ask questions of the teacher, was used successfully by half of my observed teachers. The process of marking pupils' work in books can be streamlined so that the bottleneck of all marking being done by the teacher is removed, and the teacher is freed to help those who need it. Alternatives for marking – such as checking against solutions on the board, or correcting each other's problems – work well in other countries.

Practice: Analysis of a Standard 8 examination in Mathematics

Below are some comments on a typical Standard 8 examination paper (2002) in Mathematics, with examples. My qualifications to write these comments are a long and successful career in mathematics teaching, teacher education (pre-service and INSET) and curriculum development at primary and secondary levels, and the production of very many textbooks and other teaching and learning materials.

The examination is for two hours and comprises 30 multiple choice questions followed by five questions that sometimes have linked sections and sometimes not. Calculators are not

allowed. There are layout problems: for two questions the required information is on one side of the paper and the problem is on the back.

One third of the questions are abstract – they have no context – like a complex fraction calculation simply written out. When not entirely symbolic, these often require specialised knowledge of English. For example, this question requires knowledge of the words 'product', 'sum' and the phrase 'take … from …':

> Take the product of $2\frac{1}{7}$ and $1\frac{1}{20}$ from the sum of $3\frac{1}{8}$ and $4\frac{1}{5}$.

The remainder of the problems have pseudo-real contexts, but in most cases the poor but extensively used English to describe the problem (and the lack of supporting diagrams to give some meaning to the words) tends to make the context incomprehensible to poor readers of English. (Even native speakers of English in UK, USA and Australia are known to have substantial difficulties reading the often-specialised language of 'mathematics word problems'.) Here are some examples.

> A fortnight ago Peter left for Zambia. If Peter continues to stay in Zambia for the coming two weeks, for how long will he be away?
> *(Comment: Easy, but only if you know the meaning of 'fortnight' and 'coming two weeks'.)*

> Rates of Commission on Malawi money orders are as follows:
> For an amount not exceeding K10 ... K2.50.
> For each additional K1 or part thereof … K0.15.
> *(Comment: The specialised words 'commission', 'not exceeding' and 'part thereof' are likely to cause many worries.)*

> … If she arrived home at 12.49 pm, how long was her ox-wagon ride?
> *(Comment: Many children associate the word 'long' with length, and not a duration of time, as required by this question.)*

The word problems give an appearance of 'real life' to the questions, but in fact 'reality' is very simplified. For example an aircraft timetable is provided giving the names of the cities Blantyre and Mzuzu. The timetable unrealistically suggests there is only one flight per day, and on each day the flight is at a different time. According to the table, two flights take 35 minutes, one takes 30 and one takes 40, all quite unrealistic. Then pupils are asked:

> If one wanted to save time when flying from Blantyre to Mzuzu, [on] which day would one travel?

Even ignoring the confusion due to the 'one' in the problem, real airline departure and arrival times (particularly in Africa) are very approximate; I know this from experience! But, since no children would have ever flown, this is far removed from their 'everyday life' and is only pretending to be reality in order to test subtraction of times. Why would one choose a day on which to fly in order to save five minutes in actually flying?

There are no 'simple' questions to build up pupils' confidence early. Many problems use significant relationships, but in a reversed form, adding enormous difficulty to the problem, for example, using the distance/speed/time relationship ($d = st$) to find the time, or using the simple interest formula ($I = PRT/100$) to find the principal or the time. Ten of the questions involve the context of money, but these are always contrived problems that require more computations than occur in real life. For example, given a rate of discount and the discount received, find the marked price. Such a problem never occurs in real life and this could be said of all the pseudo-real word problems on this examination paper.

I have demonstrated that while one third of the paper is abstract and irrelevant, the remaining questions use pseudo-real contexts that are presented in a form of words that makes them a test of English rather than of mathematics.

The median on the 2004 mathematics paper was at 37%, and so half of the pupils earned less than 37% of the available marks. In order to get a respectable pass rate (67% of candidates passing), pupils were passed if they earned 22% of the marks or more. Because of the four-way multiple choice questions for 60% of the paper, pupils could earn 15% by guessing. So, to reach 22% they only had to 'earn' 7%. For many pupils this is the final outcome of at least eight (often many more) years of struggle with mathematics in primary school. That so much effort is dedicated to passing on this examination for so little success suggests a great waste of effort and time.

Policy: The Standard 8 examination in Mathematics

The PIF document (Government of Malawi, 2001) has no policies about school-based assessment, and does not mention ranking. It focuses entirely on external examinations.

From the point of view of teachers, the annual Standard 8 examinations are a reminder of the official policy. This section aims to show that the examination is a good match to what is taught, which is a good match to what is examined. In this simple circular logic, the official goals of the course are excluded.

My interview with MANEB officers, as well as a paper describing MANEB procedures, shows a competent administration who have in place well-thought out procedures for running a summative examination that tests what has been taught in Standard 8. As I will demonstrate, the major problem is that 'what has been taught' is selected to make that match as good as possible, so that the exam is actually determining and limiting what is taught, and in so doing is preventing the curriculum from achieving its goals.

The key to the relationship with the syllabus is the content grid that enables a team of teachers to construct draft items for all the content for different question types: fact, skill and analysis. The draft items are scrutinised closely for match to the printed syllabus, and for reasonable level of difficulty. If teaching is matched to the examination requirements and if pupils are able to learn well in English the exam should provide no surprises.

The examination is written entirely in English. Theoretically pupils with at least four years of instruction in English (Standards 5 to 8) should be able to read, comprehend and answer the questions in English, but it is widely acknowledged that the use of the English language is a severe handicap to many. I demonstrate below how this is a problem in the mathematics examination. Some Malawians are even arguing for English to be used exclusively as the language of instruction from the start of primary school largely to overcome this language barrier to success at Standard 8.

Examination vs. the policy

Mathematics has earned the reputation across the world as the gatekeeper to higher learning and hence to later employment success. This is clearly also the case in Malawi, and examinations such as this one are the way it happens. So how does the material on the examination relate to the aims of the curriculum?

The 1991 syllabus for mathematics includes this statement in the National Primary Education Objectives:

> #21. Pupils should apply mathematical skills in everyday life.

This is the only objective that mentions mathematics or numeracy. It remains the official policy until the PCAR changes are implemented, when the wording will change but not the essence.

None of the questions on the paper deal with the 'everyday life' of the pupils. The match to the content in the printed syllabus is satisfactory, but that is because the printed syllabus and the textbooks do not match the stated aims. Indeed it is likely that the textbooks and syllabus are written to prepare pupils for the examination, and so circularity is set up.

All questions are constructed to be highly selective, and to spread out the candidates so that it is easy to select some to proceed to secondary education. My analysis showed that two-thirds of the problems were 'word problems' and needed specialised knowledge of mathematical English. It follows that a significant factor in the selection process in the mathematics exam is capacity to read and to respond in English. To quote Dr Francis Moto again:

> … the language policy largely divides people into socio-political groups. Those that acquire the English language and can speak it very well … have got chances of progressing in school. ... In doing selection of who is to continue with education, English is used as a barring tool.'
> (Moto, interview, 2005)

In summary, the MANEB Standard 8 exam performs a selection function, but in so doing it is forcing teachers to meet its requirements rather than the stated goals of the curriculum. The teachers are presently powerless to resist this pressure, although their response to my questionnaire overwhelmingly (89%) said that the purpose of mathematics in primary school is 'It teaches skills that help you have a better life' (see section 6.6.3). In contrast, as a result of examination-pressure, the syllabus content and the upper level textbooks are geared to providing preparation for examination-type questions.

On the evidence, the national examination distorts the curriculum away from its stated goals, distorts textbooks and limits teaching methods and in these ways undermines educational purposes (particularly at the upper primary level). It even leads to some people applying pressure to have pupils learn in a foreign language (English) in early primary years, in order to be better prepared for the selection examination.

7.7.3 Policy: Continuous Assessment

The policy under development in 2005

'Continuous Assessment' arose through the IEQ/Malawi project's involvement and was trialled in Ntcheu district of southern Malawi. This trial has been described in section 2.2.14. While in Malawi I spent some time discussing this innovation and discovered that there were serious proposals to introduce it, along with PCAR, to the entire primary education system at the same time in the near future. As the following pages will show, I have reasons for doubting the wisdom of this proposal.

As defined by IEQ/Malawi (Mchazime, 2003) 'Continuous assessment is a way of finding out what pupils know, understand and can do.' Mr Ndalama (from MIE) gave me his goals for continuous assessment.

> We are trying, with continuous assessment, to make sure the teachers take assessment as a routine type of activity to make sure all the children are getting skills. We want the child to get skills continuously from lower primary. It should not be the Standard 8 examination that should guide what is in the primary schools, but it should be the daily acquisition of skills and knowledge by the child.

I asked Mr Kaambankadzanja (the PCAR coordinator) about whether Continuous Assessment would help the system deal with the dropout problem.

> Our hope is that with Continuous Assessment we will keep their attention. Half of the pupils fail. These pupils think 'I am a failure, I will not make it, I will just go back to work on the family land.' We will have automatic promotion – that is our hope. We will start with 100% Continuous Assessment at Standard 1, but with increasing proportions of summative assessment.
>
> With Continuous Assessment, if it is well done, every child will be supported.

Dr Susuwele-Banda (from MIE) gave me a definition of Continuous Assessment.

> I feel it is the right direction that we must take. Continuous Assessment in the sense I understand it myself is classroom assessment, where the teacher takes up the role of assessing the learner.
>
> Some people think Continuous Assessment means giving discrete tests and finding the average at the end of the day.
>
> To me I am using it as a tool to support the learning. I need to understand exactly what the problem of this kid is at this particular moment so that I can support the learner. That is the kind of Continuous

> Assessment I would like to see in our schools, where teachers use it as a tool for learning. For every lesson that the teacher prepares, there must be a component of trying to understand whether the learners have really understood the concepts or not. And if not what exactly must come in order that the learning will proceed.
> (Susuwele-Banda, interview, 2005)

I asked him about whether teachers could use the information they will get from Continuous Assessment.

> At a certain point they must realise that they are teaching individuals not a bunch. You do appreciate that you are grappling with a range of abilities.
>
> That also helps you when you are preparing your lessons as well. If I have to include tasks, I should include tasks that will give challenges to those that I feel are much better in this, and I should also have something that gives confidence and to move on to those who have problems. …
> (Susuwele-Banda, interview, 2005)

Mr Kamangira from MIE was in charge of the trial for Continuous Assessment of mathematics at Standard 3 in 21 schools in Ntcheu district; see section 2.2.14 for details. He spoke to me about Continuous Assessment as it was trialled in that project.

> Continuous Assessment is a process of finding out – gathering information – of what does a pupil know, what does the pupil understand and what can the pupil do.
> (Kamangira, interview, 2005)

The project divided the content for Standard 3 into six sub-levels, and named them after the colours in the rainbow. He explained that it is a process in which the teacher holds an informal one-to-one interview with each child and asks the child a series of ten questions at the sub-level at which the child has been working. If the child can get eight of the ten correct then the child can move to the next sub-level, but if not the child stays at the same sub-level. Detailed records are kept of the performance and sub-level of each child, so there is 'continuous monitoring' of the learning.

> The teachers were very willing to do the project – they were interested, even the head teachers were very supportive. Parents were informed and interested. …The pupils were able to write their names after the first term. The children were able to identify the words, to identify the letters, to do simple operations right at the beginning, so we saw that as a success. … The learning in the classroom was going on very well.

However even on this small scale, highly supported and monitored, Mr Kamangira explained that there were problems. Most problems were due to the large numbers in the classes. Teachers were keen but over-worked, due to the extra preparation required, record keeping and so on. Some teachers died and were hard to replace, and some refused to comply with the record-keeping requirements.

I asked him about how the teaching was done when the teacher was busy almost full-time interviewing.

> To begin with, the teacher must prepare more materials for various levels, and put all those materials into a box which we used to call 'job-card box'. As the teacher is assessing, he groups the pupils according to their abilities and uses as much as possible those who are able to be the leaders in those groups. And then ask each and every group to go into the job card box [to select and use a card] according to his or her level.

He described the two 'principles' of remediation (for those taking longer than usual to grasp some content) and enrichment (for those who need extending). These would also be accommodated using 'job cards'.

I asked him about how teachers would decide which children would be promoted under this system.

> If the child has not fulfilled up to the top level, it is up to the discretion of the teacher to say 'Ah, this child has not been able to pass, has not acquired the skills, has not been able to do, does not understand ABCDE.' So we insisted on records. … If by third term you find that a child is still in Red [the lowest level] you begin to wonder what is the problem.

Mr Kamangira explained that the teachers wrote their own 'job cards' and devised their own interview questions. He explained that teachers who are trained in TALULAR can write their own materials (job cards) and use TALULAR as part of the interview questions. I asked him about how the teachers coped with the challenges of this system.

> It was difficult for some teachers anyway, but with training, motivation, support it may not pose a big, big problem, but it was really a problem to other teachers.

In summary, both Mr Kaambankadzanja (the PCAR coordinator) and Mr Kamangira (the Continuous Assessment mathematics trial leader) are enthusiastic and optimistic about the possibilities presented by Continuous Assessment, while being aware of the challenges of 'going to scale'.

The role of the Malawi national Examinations Board will be critical to the success of this innovation. I therefore asked the officers at MANEB about their understanding of Continuous Assessment and their reaction to it.

> Some of us have been part of the process. We are only an arm of government, and have to implement government policy. We have to implement the Continuous Assessment I think. What MANEB is doing meantime is consulting a number of examining institutions, in other countries who have gone some steps ahead of Continuous Assessment.
>
> The experience MANEB has on Continuous Assessment is more or less a negative one. The point is that some parts of examinations which were using Continuous Assessment, a proportion of the grade from Continuous Assessment and a proportion from summative assessment. … Some teachers were inflating the grades, much that the grades were not varied enough. So on that ground MANEB thought of dropping that proportion and is currently relying on summative assessment. So because of this fear we do not say 'We adopt it and we just go into it without a lot of ground work done'. We are saying 'No, let us consult other examining bodies in Africa; how are they faring with Continuous Assessment, how are they handling the ratios, how much of the Continuous Assessment and how much can be summative assessment'. We have not yet come up with a policy, but we are in the process.
> (Njati, interview, 2005)

The use of Continuous Assessment in Malawi, as envisaged in 2005

The Malawi Primary Education Curriculum and Assessment Framework (MPECAF, 2004) is a statement of the intentions of the PCAR reforms and includes a section about Outcome-Based Education and Continuous Assessment (CA). The intention is to use 100% CA in Standards 1, 2 and 3, 60% of CA and 40% of end-of-term tests for Standards 4 and 5, and 40% of CA and 60% of end-of-term tests for Standards 6, 7 and 8, ending with the use of the Standard 8 examination as 60% of the selection for secondary schools. In 2005, it was not clear whether MANEB was going to agree to this.

In some ways this resembles 'Mastery Learning' as developed elsewhere in the middle of the twentieth century, since pupils need an 80% success rate to move to the next level, and it will depend on a great diversity of printed, or hand-written, resources (in the trial these were teacher-made 'job cards'). This will be a quite radical departure from the total reliance on summative testing at all levels in the past. In 2005 it was planned that this would be phased in from 2007.

The process envisaged involves a varied program of learning activities 'to provide for the learners' different learning styles and different levels of mastery of concepts and skills.'

> The evidence collected through continuous assessment is selected and compiled by the learner, supported by the teacher, and together with the Learner's Achievement Record is put into a container called the Learner's Portfolio.
> (MoEST and MIE, 2004)

The assessment is to be based on tasks being split into sub-levels, four per year level, and the recording is to be done by placing the child into one of these four levels. These sets of tasks comprise 'Assessment Standards' for each sub-level and represent different levels of complexity in the nominated core elements of each curriculum area (to be known as Primary Outcomes).

There is a considerable overlap of the levels of student achievement in different Standards, and this has many implications for the rainbow charts and continuous assessment. In many Western schools, the policy of automatic promotion is adopted, and teachers use ideas similar to continuous assessment to adapt their teaching to the various needs of the children in their classes.

It seems that the design is based on the CA trial in Ntcheu, in which 21 schools tried this process in three subjects at only Standard 3 (IEQ, 2003, Kamangira, 2003, du Pesseis, 2003, Miske, 2003, Mchazime 2003, Kamangira, 2005). Although that trial was apparently quite successful, there were enough difficulties to suggest that any attempt to 'take it to scale' (a euphemism for try to make it work for everyone with far less support) is fraught with many problems. I present some of the research involved in 'taking innovations to scale' in section 8.7.2.

I have reported my interview with Mr Kamangira, who supervised the Ntcheu trial in mathematics. In summary Mr Kamangira described Continuous Assessment (and the related learning processes) as a process of learning in ability groups with associated individual assessment done in one-on-one interviews.

Kadyoma (2002) reported an interview with one of the teachers who had been involved with the trial in Ntcheu. Basically he admitted that he and many other teachers 'cheated' and reported pupils' achievements that had not been assessed, because there had not been enough time.

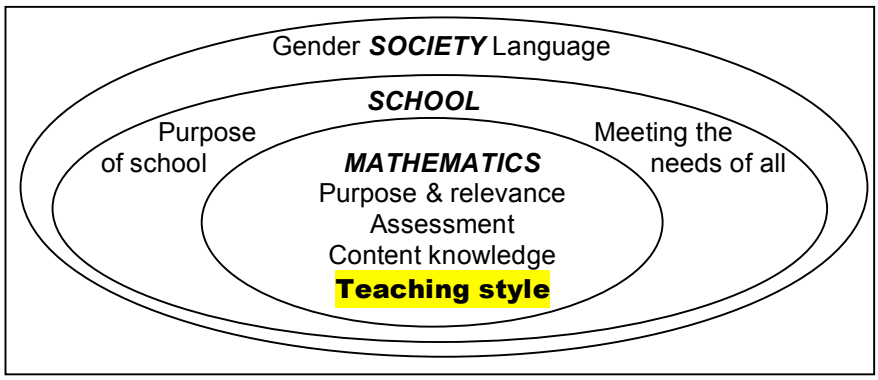
> I am one of those teachers; we have so many things to do. We have an exercise book, in which we write tasks for continuous assessment. It is too involving. … As a result, most of the teachers just tick. But that is not a true reflection of the student's performance as such. They tick so that when those concerned come they should see that the work is being done yet we are just cheating; as a result the learning of children is going down. It is too much. (p. 124).

If this form of assessment is to be attempted again, and on a much larger scale, then the teachers will need much more support. Even the enthusiastic and evangelising Mr Kamangira admitted that the teachers were overworked.

Key questions

- At the lower levels the effects of the selection examination (in English) are less insidious. How can assessment and feedback practices be improved in the context of very large classes so that learning also improves?
- My research provides no results on ranking, as I chose not to explore the practice. However if Miske et al (2003a) are correct, this traditional practice is increasing repetition and dropout. How prevalent is it, and how can it be stopped?
- Can the waste of two weeks per term for practice examinations be eliminated?
- How can the nexus between course outlines, textbooks and guides (on the one hand) and the annual selection examinations (on the other) be broken so that teaching can again meet the true goals of the course?
- It seems that teachers are willing to have mathematics teaching be more related to applications in rural Malawian life. How can this become what is tested both throughout school and also in the selection examinations?
- Is there an alternative to annual selection examinations in English? For example, could the examinations be bilingual?
- Is there another way to select the best pupils for the limited number of secondary schools?
- Is Continuous Assessment able to be a successful implementation, or will it be inadequately supported or explained and consequently fail?

7.8 Teaching style



The 'traditional' picture of teachers lecturing to very large classes and unable to do otherwise is not uniformly true. Yet it probably was true for many in the past.

Is it true that teachers taught by rote methods cannot learn to teach by methods that encourage deeper understandings?

7.8.1 Summary of results on teaching style

There is no clear policy about how to teach, although the 1991 syllabus promotes activity methods.

There is a style of teaching promoted by the training program most experienced by teachers: the Malawi Integrated Inservice Teacher Education Program (MIITEP), and maybe this could be regarded as 'policy'. MIITEP two-year courses started a theoretical component – three months at a college in which the principle mode of teaching was *lecturing*. New methods were promoted, but not used, by the lecturers. These included TALULAR, involving extensive use of home-made 'hands-on' materials. The courses did not relate to the teachers' previous experience, despite the fact that many of those starting MIITEP had been teaching for years before starting their training.

This was followed by 19 months 'practice teaching' in schools, where they often taught full-time without support. The 'distance education' component frequently failed to assist them. As a consequence it should not surprise us if many teachers in 2005 taught as they themselves were taught as pupils. See section 2.4 for more detail.

Despite the grim picture afforded by MIITEP – the only substantial attempt to enunciate policy – my results are far more positive. My survey, observations and interviews with teachers suggest that many teachers actually do far more than lecture, and are able to use innovative methods in very large classes. I found evidence of 11 different 'styles' within the 18 lessons I observed. Of most interest were the two quite distinct approaches to group work.

However it seems that for most teachers, the goal of teaching is still success on a test, and as we have seen, this seems to be supported by 'policy' regarding assessment. For most teachers, 'understanding' means no more than 'skill competence'. Based on my study of teachers' content knowledge, it is possible that many could have little real 'understanding' of mathematics themselves, and many may have no idea that it is possible to 'understand' mathematical concepts

7.8.2 Policy vs. practice including Malawi Breakthrough To Literacy

Practice

Malawi should congratulate itself on both the quality and energy of its teachers. Nevertheless what is being achieved is clearly greatly constrained by conditions well outside the control of the teachers: large classes, lack of resources, lack of community understanding leading to erratic attendance patterns and pupil dropout, traditional expectations regarding gender roles,

use of multiple languages including being expected to teach in the foreign language of English at upper primary Standards, and so on.

There is a wide gulf between what is happening now and 1991 policy. The 1991 policy ('For a meaningful learning experience to occur, the learner must be engaged in some form of activity.') may have been workable with relatively small classes in 1991 but, viewed in 2005, requires levels of support and teacher behaviour that are now beyond the reach of most teachers, struggling as they are with large classes in poor conditions.

The meanings of 'understanding'

My description of the teaching styles of observed teachers in the sections above suggests that most teachers teach skills, even when they claim to be teaching for 'understanding'. The idea of 'understanding' shared by Patricia, Mary, Alippo, Gift and Brenard seems to be strictly performance-oriented, or what Skemp (1976) calls 'instrumental'.

It is possible that they have no deeper ideas about mathematical understanding than this, although the limited time involved in the interviews, and the constraints of their limited English, may have prevented me from discovering the depth of their own understanding of mathematics. For example, in a later email correspondence with Gift, I asked him to explain what he meant by 'students understanding a mathematical concept'.

> I mean there is need for us Teachers to give students the right knowledge to students that will make students understand the Mathematics subject.
> (Gift Kawiza, personal correspondence, 2007)

In my observations they did not attempt to develop any deeper connections or meaning in the mathematical ideas being presented, this being Skemp's (1976) 'relational' understanding for meaning. 'Instrumental' teachers teach 'what' to do, and 'relational' teachers teach 'what to do' and also 'why to do it'. (The meaning and implications of deep understanding in mathematics has been the subject of many papers in recent years, for example Fennema and Romberg, 1999.) In contrast, I believe that Ralph has an understanding of mathematics that is basically relational, and tries, through his extensive questioning, to develop this type of understanding in his pupils.

My data shows that a significant percentage (around 50%) claim to teach for 'understanding' but I think they believe, as Brenard explained to me, that students 'understand' when they can do the work correctly, meaning they 'can follow instructions'. I believe that most Malawian teachers who claim to teach for understanding, mean 'instrumental' understanding, or knowing what to do. I have discussed the implications of living in an oral culture in section 2.2.11. Its learning mode is centred on memory, and not any form of 'understanding', as understood by western educators.

Teachers who only 'understand' mathematics themselves 'instrumentally' cannot be expected to teach otherwise. Mr Phiri made that point clearly.

> We have a problem with people's understanding of how to teach because they have not been properly developed partly because they themselves were not properly taught.
> (Phiri, interview, 2005)

Teachers in general are not confident with mathematics, at any level of understanding. The results of the MTTA baseline study of teachers showed that the majority (96.5%) of primary teachers have only 'partial mastery' or even 'no mastery' of Standard 8 level mathematics. The test used was a shortened Standard 8 examination, and was therefore very 'instrumental' in its approach. It would seem that most primary teachers are not personally competent at Standard 8 mathematics at an 'instrumental' level.

So teaching does not generally aim at relational understanding. My observations and the large-scale testing results (see section 2.3.1), permit me to infer that the quality of instruction, even at an instrumental level, is inadequate. This is due to the problems of implementing the

policies advocated above, most of which stem from the massive influx of pupils at the introduction of Free Primary Education in 1994 and the continuing high levels (particularly in Standards 1 and 2) ever since.

Practice in pedagogy: teacher preparation

Section 2.4 has described the several approaches to teacher development, often combining pre-service and inservice elements. For the vast majority of the teachers in primary schools at present, MIITEP had been their only mode of preparation for classroom service.

Phiri (interview reported above) also pointed out the inadequacies of the very short in-college part of the teacher training (MIITEP) that most of the present teachers had undergone. The time permitted for making sure the teachers had some level of competence in the subjects they were to teach was dramatically reduced. 'Mathematics was one of the subjects that suffered in this contest.' The teaching style used by the tutors was generally 'transmission' and in contrast to the espoused learner-centred approach which was the content (but not the methodology) of the lectures. In the view of Croft (2002)

> There did not appear to be active mechanisms whereby current teachers could contribute their knowledge of how to teach in an era of mass education to the materials and the strengths of an oral teaching style were therefore underused. (p. 16)

Themu (2005) offered a list of the 'challenges' encountered by MIITEP. In summary this list showed that the time in college was far too short to have any impact. It is a common experience in all countries that teachers generally teach as they were taught, having observed teachers in action for many years in their own education; it is for this reason that teaching is such a conservative profession.

Did MIITEP booklets on teaching methodology make any difference? For most teachers, probably not, according to Phiri (interview, 2005). The support for the experienced but untrained teachers in the schools, by 'more experienced teachers' or college staff was almost non-existent, largely because the untrained were given a class of their own and told to teach.

The last cohort of MIITEP 'on-the-job' trainees completed their course in 2005. Now at last the colleges could focus of training new teachers not already teaching in schools. It is hoped that the reorganisation of teacher training into the IPTER (Initial Primary Teacher Education Reform) model will overcome many of the problems encountered by MIITEP and previous programs.

Practice in pedagogy: resources

Textbooks and common teaching styles (e.g. my observations) focus on worked examples and not general methods of solutions that can be memorised. (I discussed this with Brenard, and he was of the opinion that pupils were able to figure out the general methods from the worked examples he provided. I think pupils' lack of success in actually doing just that in later tests and examinations proves him wrong.)

The IEQ/Malawi project reported that only 54% of teachers still had their teacher's guide for mathematics. These guides had been printed and distributed many years before, and additional copies have long been unavailable. Apart from expensive INSET the only effective way to communicate methodology to those teachers no longer doing teacher training is through these guides; most of those without guides are having to 'make it up as they go along', or learn from their peers.

It is significant that only two of my six observed teachers actually made visible use of the textbook. Patricia brought out the only books she had (five of them) for her 120 pupils in Standard 2. This highlighted a problem with supply. Brenard taught with his own textbook held tightly in his hand, but his pupils did not have them. The others wrote practice questions on the board. I wonder how widespread is a lack of use of textbooks by pupils. In 2007 I emailed Gift and asked him questions about textbooks, trying to unearth any problems he may

have observed. He explained that he had enough books in his Demonstration School, but chose not to use them when I visited his class. Here is some of his reply:

> Most students do understand the problems on their own. Most of the books are very clear and easy to follow. The books are good only that sometimes writers make mistakes which Teachers do corrections on their own.
>
> When I am teaching I give pupils work without books to make sure that when I am saying of any mathematics concept the Students should be altative ['attentive?] to what I am teaching. When you give books to students when teaching, some of them they go through the book and see other problems which they have not asked to do, hence they don't concentrate to what the teacher is doing.
>
> Teaching is not only using books, but delivering the concept which Mathematics are requiring to be taught and that Students can understood, one can use books but he/she can fail to deliver the right stuff to students.
> (Gift Kawiza, personal correspondence, 2007)

From this I read that both he and his pupils can read and understand the textbooks well, but some answers at the back of the book are wrong. He also knows that teaching is more than using a textbook.

Section 2.2.10 includes a paragraph about problems with textbooks in Ghana, based on the research of Okyere & Harris (1997), and there is a need to learn more about the use of these resources in Malawi. The implication of the Ghana study is that there must be enough books (one per pupil) and teachers have to learn how to use them well. Neither of these conditions were being met in Malawi in 2005.

For many teachers, there appears to be a lack of knowledge of alternatives to just 'talk and chalk' and practice questions either out of a textbook or on the board. While working with tutors at the various teachers' colleges in preparing the curriculum for the new training program (to support the forthcoming change known as PCAR) I used familiar 'counters' (bottle-tops) to demonstrate how 'hands-on' methods can be used to support the development of concepts. I did no more than show how they could be used (in rectangular arrays) to demonstrate factors, multiples and related concepts, but none of these teacher trainers, some many years on the job, had seen anything like it before. Many were amazed and apparently pleased – but no-one asked for more similar ideas.

In fact, in none of my observations did I actually see textbooks in use, except in the hands of the teacher; Patricia used five books in a class of 120, and that was hardly effective!) On enquiry I discovered that there was a critical shortage of books in several cases, so the problems were written on the board. In all primary schools there is a severe lack of resources, and little furniture to cope with very large classes, particularly at Standards 1 and 2. Many classes are so large they must be taught outside, where management is challenging and pupils find concentration very difficult.

Practice in pedagogy: alternatives

TALULAR

'Teaching and learning using locally available resources' (see section 6.9.1) has shown that, in the hands of a competent teacher, *hands-on resources* can become a tool for developing genuine 'relational' understanding. However, for this to happen the teacher must have a personal understanding of mathematics at that level and recognise that as a major goal for teaching. Phiri (interviewed) noted 'if you did not have a good teacher yourself, you cannot teach others well'. TALULAR has strengths and weaknesses in the present system. It can require more time than a busy teacher can spare, and more storage than is often available, but used well it can certainly improve the depth of pupils' mathematical understanding. The difficulty is that most teachers have only learned 'instrumentally'; they know a set of procedures to handle a limited set of types of mathematical problems. So they have a poor understanding of how children learn differently from that, for example through use of

TALULAR. They will have to relearn mathematics in a conceptual way themselves, possibly through TALULAR.

Malawian Breakthrough To Literacy

The program called Malawian Breakthrough To Literacy is based on the Breakthrough to Literacy initiative from Zambia. The coordinator of this program was Mr Chilora. With his permission, I recorded a lecture he gave, with a Powerpoint presentation, to about 40 teachers at MIE. The following is a summary of it in my own words.

> The majority of the trial took place in Ntcheu, where 135 schools trialled a new method of teaching literacy in the early years. The maximum class size permitted was 60, achieved by splitting classes and running some in a second shift. Each lesson ran for one hour.
>
> The class was organised into four groups of 15 pupils, each with a name and a leader. The lessons were planned in groups of four, so the four class groups rotated around the various activities. The lessons always had a beginning together to introduce the various activities, broke into groups and had a whole-class ending for sharing what had been achieved. Tasks were on cards or sheets, with a different task for each group.
>
> The teaching took place in the local language of the children, in a print rich environment with as many printed materials in their language as possible. (In Ntcheu this was feasible because the local language is Chichewa.) Displays also included large numbers of pupil-created work. Other learning areas, including numeracy, were included into the rotations so that it encompassed most of the learning areas at this level.
>
> The program was monitored using continuous assessment. Pupils worked in special books and these were taken up and between lessons the pupils work was compared to a checklist of skills, to guide the next lot of activities. Records were also kept using this checking of the books.
>
> Someone asked about the special (financial) incentives available for teachers to do all this work. His reply: 'There are no special incentives. Teachers do their best with this method because it works!' (Lowe, from Chilora, 2005)

This initiative has pioneered many of the best characteristics of quality education for Malawian primary schools. The conditions under which it worked overcame most of the limitations of the rest of the system. It had enough teachers, well-equipped classrooms, class sizes of 60, experts on hand to inform the teachers, resources such as books in the children's home languages, sensible teaching methods based on group work, regular assessment and feedback to the children, and best of all, enough time (60 minute lessons) to achieve success.

Policy

The official 1991 policy about teaching style advocates 'activity methods'. Yet this was written before the introduction of Free Primary Education (1995) and the consequent massive class sizes, and critical teacher shortage that followed. The system is still reeling from that shock.

This out-of-date policy has not been the basis of teacher training in MIITEP or other programs. Instead these have used *lecturing* methods to inform teachers about how to *teach with activities*, such as TALULAR.

MTTA is a teacher development program working specifically on developing a combination of content knowledge and pedagogical content knowledge – teaching content by means of suitable activities for pupil learning. I described this significant, and apparently successful, program of 'continuous teacher development' in section 7.6.2.

In 2005 a new policy (PCAR) and teacher preparation program (IPTER) was being developed.

Key questions

- The majority of teachers are now at least two-year trained, at least in MIITEP, however limited that training might be. What is the best way to improve their mathematics pedagogy (and possibly their confidence)?

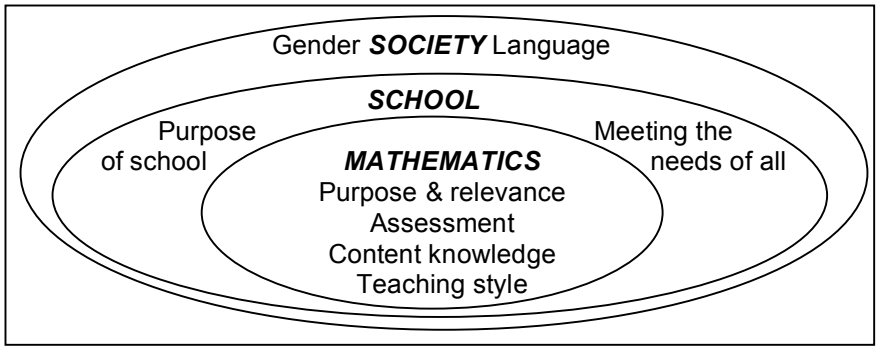
- Is the idea of teaching with 'activity methods' the best choice for Malawian teachers at this time, given the massive constraints within which they work, and the pressures for success at the selection examination?
- Instrumental learning, particularly that which is learned for mainly examination purposes, does not transfer to real life. I have submitted that most teachers try to accomplish only instrumental learning of mathematics with their pupils. Yet the evidence shows that they do not adequately succeed at that goal. Is the best procedure now to help teachers achieve better skill performance levels, by improving conditions and providing training in teaching large classes and books?
- Should Malawi be moving towards 'deep understanding' of mathematics, in the hope that it will transfer to the solution of practical problems of life, and possibly poverty alleviation?
- Is TALULAR a good vehicle for continuous teacher development, for example as it is used in the MTTA workshops?
- The use of group work in the observed lessons (e.g. Mary, Gift and in Malawi Breakthrough To Literacy) was successful in some ways (such as sharing 'understandings' in the learners' home language), and unsuccessful in others (such as when the groups were too large, or dominated by boys). Should group work method be made more widespread and its efficiency improved?
- The use of questioning is mainly limited to a very low level requiring instant factual response. Deeper questions requiring thought were rarely asked, except by Ralph. Why is this? Should questioning techniques be improved, including more extensive wait-times?
- Some teachers, such as Patricia and Brenard, insist that pupils do seat work alone, and never help one another. This tactic certainly limited 'cheating', but also limited the sources of assistance available to many pupils. Should pupils be encouraged to assist one another, and even taught how to do it usefully?
- In large classes correcting of work by the teacher seems to advantage only the faster workers, who get feedback, and occasionally assistance. Slower pupils seem to miss out on both of these. Also faster pupils who finish early have nothing further to do and waste a lot of time. Should textbooks be provided with either answers or even solutions, so that pupils can work at their own rates, check their own work and learn from 'model' solutions?
- How can the Teacher Development Centres and their associated Primary Education Advisors be best used to help teachers grow?
- Teachers are keen to use Malawian examples, from rural life, in their mathematics teaching. This implies that they are less interested in western than in ethno-mathematics. By what methods can teachers (and therefore pupils) learn some kind of mathematics that is both relevant in Malawi and does not embody the 'western values' (Bishop, 1990) that are alien to their culture?
- Once out in a school, the teacher has few forms of assistance. How can resources, particularly textbooks and guides, be improved to assist teachers use better teaching methods?

7.9 Summary of response to the research question

The problem posed in Chapter 1 was:

- *How do policy and practice interact in Malawian primary education, in the case of mathematics teaching?*

This has been explored in relation to eight variables, four about primary education itself, and four about primary mathematics education in particular. This graphic has summarized them.



The results of this research are presented in a dramatically over-simplified form below.

Gender

While outsiders demonstrate that girls are structurally disadvantaged in Malawian education and society, the policies reflect the end goal of equal treatment and do little to compensate for the gender bias already built into the system. Most teachers seem unaware of this level of bias.

Purpose of primary education

The official purpose (according to policy) is poverty alleviation, and teachers would seem to support this as a goal. However the actual purpose would seem to be preparation for selection examinations, at the end of each Standard, and also Standard 8. Policy is vague about how education can impact on poverty alleviation; it may be being interpreted as 'poverty escape' via education to get paid employment. Certainly preparation for life on the land is not part of the curriculum.

Meeting the needs of all

Policy officially aims at reducing class size by providing more teachers, but the goal of one teacher to 60 pupils did not include policies to ensure even deployment of teachers across the urban-rural divide, or to establish roughly equal class sizes in any primary school.

Official policies aim at reducing repetition rates, and reducing pupil drop out rates, but, were these to succeed, they would have the negative effect of increasing class sizes.

In 2005 there was no official policy and certainly little practical activity regarding the education of the 80% or more who did not complete primary school. About 50% had dropped out before completing Standard 4, most after Standard 1, and remained illiterate in their own language.

Language of instruction

Teachers all use Chichewa as the major language of instruction up to Standard 4, and English thereafter. Policy is confused about the possible use of 'mother tongue' where it is not Chichewa, and there are political pressures on the education system to improve the ability of pupils in English particularly by Standard 8. Textbooks to Standard 4 are provided only in Chichewa, but guides for teachers at all Standards are in English, which seems inconsistent at the lower levels.

Purpose and relevance of school mathematics

The official policy from 1991, and reflected again in PCAR in 2004, is that the purpose of mathematics education is to support poverty alleviation and practical numeracy for everyday life. Teachers would seem to support this as a goal. However the details of the curriculum and its support materials clearly reflect a different goal – preparation for advanced, abstract mathematics, as seen over the years in the Standard 8 selection examinations. There seems to be no process that ensures that both the written curriculum and the examination matches the official policy goals.

Mathematical content knowledge of teachers

Consistent with world-wide practice, primary teachers are generally insecure in their mathematical knowledge. Policy in this regard is contained in the teacher preparation process (pre-service and in-service). Most teachers have done two years of training, but often this was unsupported teaching alone in a classroom. The theoretical work has been crammed into a few months of lectures.

However it is not policy to provide much support in writing to teachers in schools. Textbooks and guides provide few reminders that would trigger memories of the why and how of mathematics. Instead we find worked examples without explanations followed by highly repetitious exercises, leading at best only to rote instruction and recall.

While policy says that all teachers will engage in INSET, practice in a system strained by a critical shortage of teachers is usually otherwise, particularly in rural schools where the shortage is greatest. There is a critical shortage of qualified people to run suitable INSET, particularly relating to mathematics education.

Assessment methods relating to mathematics

In 2005 official policy referred only to the conduct of the Standard 8 selection examination. The practice of regular testing of work taught, and consequent ranking of pupils has the status of official policy, being supported by pre-service courses. Other researchers have commented on the negative effects of testing and ranking, leading as it does to repetition and dropping out of pupils.

My analysis of a typical Standard 8 examination in mathematics showed a mix of highly abstract questions and ‘word problems’, abstract problems dressed up as applications. Since the examination is entirely in English, it can be regarded as more a test of mathematical English than mathematics.

Continuous Assessment has been trialled as an alternative to the ‘test and rank’ approach. The trial included positive aspects of teaching style (e.g. group work and TALULAR) and considerable logistic support. It has yet to be seen whether or not policies will be produced to enable this ‘full version’ of continuous assessment to be implemented with adequate support elsewhere.

Teaching styles

There is no policy about how to teach mathematics. Pre-service courses gave lectures about activity methods, and such methods were advocated by the 1991 syllabus. Under present conditions, it is understandable that most teachers use lectures infused with question and answer (‘chalk and talk’). However I observed two different uses of group work and other variations that show more variety than I expected. Given their lack of understanding of mathematical ideas, most teachers can do little more than provide direct instruction about techniques.

Policies exist about supply of trained teachers, textbooks, classrooms, teaching materials, class size, and many other matters that, were they to be implemented, would considerably improve teaching styles. Although some research suggests that reducing class size makes little

difference to learning, this is in the absence of a change of teacher-dominated class teaching. Reducing class sizes does make a difference to the types of teaching styles possible, and it is that change that, over time, might lift the quality of teaching in Malawian schools.

In very brief

The very short answer to the research question – *How do policy and practice interact in Malawian primary education, in the case of mathematics teaching?* – is that policy rarely seems to be able to make a real difference to practice. In the next chapter I will endeavour to explore why this might be the case, and suggest some alternatives.

7.10 Challenges to practice

This chapter has raised challenges to be met by the system in the form of questions arising from the discussion of the variables. Sometimes they reflect policies that are in place but need better implementation, but sometimes policies did not exist in 2005 to meet these challenges. They are categorised below and will be further discussed as challenges to the system at the start of chapter 8.

This list does not imply that all challenges are of equal importance, or that there are not many more challenges beyond those mentioned. These are the challenges that arise from my research, and on which I have something to say.

1 Poverty alleviation

- The purpose of primary education (see the end of 7.2)

2 Social equity

- Gender bias (see the end of 7.1)

3 Quality of learning

- Meeting the needs of all, preventing drop-out etc. (see the end of 7.3)
- Language of instruction (see the end of 7.4)
- Teaching style (see the end of 7.8)

4 Recruiting teachers

- Teacher shortage and uneven distribution of teachers across schools (see the end of 7.3)

5 Professional learning for mathematics teaching

- Purpose and relevance of mathematics education (see the end of 7.5)
- Teachers' content knowledge of mathematics (see the end of 7.6)
- Teaching style (see the end of 7.8)

6 Assessment reform, including 'Continuous Assessment'

- Assessment, including Continuous Assessment (see the end of 7.7)

7 Community education

- Meeting the educational needs of those who drop out of school (see the end of 7.3)