

Evaluation and monitoring exercise of the Mathematics curriculum (June 1998)

Executive Summary

This document presents the result and findings of an evaluation and monitoring exercise of the Mathematics curriculum conducted by the National Institute for Educational Development in June 1998. The evaluation was necessary to examine what problem teachers are experiencing in implementing the curriculum reform. This was done with the intention of informing the relevant decision making bodies in education of possible ways to improve the implementation process.

The study focused on examining whether the implementation of Grade 7 Mathematics curriculum materials are carried out as intended and to what extent, with particular emphasis on learner centered education. The investigation involved many aspects of research into various teaching approaches, continuous assessment and the use of syllabi. Our findings indicate that the implementation of learner centered education for this curriculum is still in its inception period and is in many cases not being realized in the classroom.

This report highlights the problems experienced in classrooms in implementing Educational Reform in the teaching of Mathematics and makes recommendations to both National and Regional bodies.

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1. Introduction

1.1 Background Information

In June, 1998, the Curriculum Development Division in collaboration with the Research Unit under Professional Development at the National Institute for Educational Development (NIED) carried out an evaluation and monitoring exercise to study the implementation process of the curriculum reform at upper and lower primary level. The study was comprehensive since it involved four different subjects at a time. These subjects were Mathematics, Natural Science and Health Education (NSHE), Social Study and English. The study presented in this document focuses solely on Mathematics Grade 7.

Fifty-six (56) schools from seven (7) different educational regions Katima Mulilo (KM), Keetmashoop (KMH), Khorixas (KH), Ondangwa East (On.E), and Ondangwa West (On.W), Rundu (RU) and Windhoek (WHK) were involved. This brought the total number of Mathematics teachers who participated in the study to sixty-two (62).

Therefore in this document, the result and findings of an evaluation and monitoring exercise of Mathematics curriculum are presented. The data used to compile the report was collected through classroom observation and interviews. This report was made possible by the cooperation of 28 staff members from NIED and 12 Regional Officers (RO) who participated in collecting the information.

1.2 Aims and Objectives:

Aims:

Eight years after independence in Namibia, the importance of evaluating and monitoring the Education Reform initiative is crucial. The exercise of evaluation which is defined as "The systematic collection and analysis of information necessary to promote the improvements of the curriculum; and assess its effectiveness and efficiency...." Brown (1989:223) should therefore reflect how the reform is being implemented on the ground. The findings of this report are aimed primarily at NIED, MBEC, Regional Officers and all other interested groups, because they have crucial roles to play in decision making towards better quality of education in the country.

Focus:

This evaluation and monitoring exercises investigated the curriculum at its operational level (how it is being implemented) and experiential level (how it is being experienced by the teachers). Its specific focus was therefore to investigate:

- Teachers' experiences with the curriculum materials prescribed to them (i.e. syllabus, teachers guide);
- Teachers' interpretations of these curricular materials in the classroom situation;
- Teachers' practical understandings and implementation of a learner centered approach;
- Teachers' views about the in-service or pre-service training received to implement the curricular materials; and
- The clarity of the continuous assessment prescriptions.

Objectives:

The study is a comprehensive investigation into four listed subjects, and it looks at more than one aspect of the curriculum which involve methodological approach, instructional materials, continuous assessment (CA), language proficiency, and the effectiveness of training programs teachers receive.

Based on the above highlighted components, the aim and objective of this evaluation and monitoring are twofold. Firstly, to study the ongoing implementation of the Mathematics curriculum for Grade 7 launched in 1997. Secondly, to see whether implementation of the curricular materials developed and prescribed for this Grade is carried out as intended.

In order to conceptualize the components mentioned above, specific questions were formulated as presented below.

1. To what extent learner centered education (LCE) is being applied in the classroom?
2. To what extent are the curriculum materials relevant for this specific Grade?
3. To what extent and how effectively English, as the language of medium of instruction, is being applied in the classroom?
4. To what extent the continuous assessment is being implemented?
5. To what extent teachers have been trained to carry and implement curricula materials; developed and prescribed by NIED?

1.3 Terminology

In order to make it easier for the reader, it is vital to discuss some of the terms that will appear in the following pages of the report

Curricula material: Curricula materials in this context refers to text books, teachers' guide, syllabus and any other documents that teachers are using in an attempt to implement the educational reform.

Curricular reform: This term implies the new change and approaches used to bring about changes in an organization. Curricular change in our education sectors refers to a new curriculum reform brought in after the country's independence. Its implementation is still in the process and at the same time being evaluated for improvement purposes.

Evaluation: Although different theorists have different definitions of this concept, they all have the same connotation as defined by Scriven (1973): to determine the worth or merit of something of what ever is being evaluated. In this context an object under evaluation is the implementation process of the Grade 7 Mathematics curriculum.

Monitoring: Rossi and Freeman (1987:170) defined programme monitoring as "the systematic attempt by evaluation researcher to examine program coverage and delivery. Assessing *program coverage* consists of estimating the extent to which a program has reached its intended target population; evaluating *program delivery*

consists of measuring the degree of congruence between the plan for providing services and treatments (program elements) and the way they actually are provided".

1.4 Study Limitations and Constraints

Due to time and cost, schools involved in the study were those in urban and semi-urban areas (schools close to the city). The arrangement was also made to consider schools within short distances to one another and a teacher who teaches any two or three of the subjects under study were favored. This is in order to facilitate the movement of the evaluation team that it could move from one school to another during the school time and cover as many lessons as possible within the limited time span. Due to this situation, schools in many rural areas were left out of this study.

Another limitation is that although the study was looking on the aspect of the learner centered approach, it was later realized that a relevant question was not included in the instrument: i.e. how are teachers coping in applying learner centered education in overcrowded classes?

In some educational regions the number of teachers visited is less than those compared to other regions. This is due to the fact that some regional directors failed to inform the schools about the evaluation and monitoring study. As a result, at the time of this study, teachers to be involved were out of school either for a workshop of another subject or for other reasons.

2. Evaluation Design and Research Methodology

This evaluation was designed on the basis of J. Wilmot's framework of syllabus monitoring consultancy: *Evaluating Syllabuses within the Namibian School Curriculum from Grade 1-12. (1996)*, a report of a research consultant which he compiled and presented to NIED. The report was designed to serve the Institute in studying the syllabi at all phases of Namibian schools. However, this framework was modified to suit the needs of this monitoring and evaluation exercise.

2.1 Target Group

The target group was the Grade 7 teachers at primary level. As curriculum implementers, this group of teachers was selected since in this grade, the implementation of the Mathematics curriculum was launched last year, 1997. While their experiences with this curriculum is still fresh to them, it was therefore decided to conduct this study and to get their views, perceptions and their experiences with regard to the Mathematics curriculum, with the view to possible adaptation of the syllabus if that is necessary. The ideal study was to involve eight (8) Mathematics teachers per educational region. Fifty -six schools from different environmental backgrounds were involved. The criteria used in selecting these schools include school setting and school size. School setting refers to a place where the school is located (urban or rural area). School size refers to schools offering a primary phase only or a combination of both primary and secondary phases.

2.2 Sampling Design and Selection

In selecting schools, the NIED staff members who originally came from any of the seven educational regions and knew most school backgrounds were used as key informants. They assisted in selecting schools because of their knowledge about the conditions at the schools and to make sure that different types of schools became part of the sample. The list was sent directly through to the regional directors in their respective regions. Sending the list to the Regional Office rather than schools themselves was done to involve the Regional Directors in the study. They were given the responsibility of consulting and informing the schools about the programme of monitoring and evaluation.

3. Data Collection Methods and Instrumentation

To answer the main question of the study mentioned in Section 1.1, data collection methods and instruments were selected. The study was designed to collect both qualitative and quantitative data. Interview and classroom observation methods were found to be appropriate in this study. This resulted in the construction of the interview and observation schedules.

Sanders and Worthen (1978) recommend that stakeholders be involved in evaluation design and be asked what type of information they need to be included in the evaluation study. This recommendation was found vital and resulting in a training session for the NIED staff members to explain what is to be evaluated and clarify the rationale behind this evaluation study. The training was also held to create a common understanding of the key indicators of the learner centered approach to be used. This training gave an opportunity for the members to give their input with regard to the study. The Research Unit kept contact with the NIED staff until the construction of instruments was completed. After a long deliberation an agreement was reached that the instruments were clear and adequate.

3.1 Classroom Observation

Classroom observation was used to collect the following information i.e. to what extent and how teachers carry out Mathematics lessons in a learner centered approach; how teachers are interpreting the syllabus and if the syllabus is used as intended; to observe the verbal communication of teachers as he/she interacts with learners.

Each observer was provided with the observation schedule, which contains the key indicators of the learner centered method in the classroom. The key indicators provided to the observer described behaviors to be observed in learner centered lesson. The observation schedule was to be completed on a rating scale by the observer.

The scale indicators were rated on a five-point scale (*4 - to a large extent, 3 - to a certain extent, 2 - to a small extent, 1 - not at all, 0 - not applicable*). *Not applicable* describes the lesson taught as not appropriate to teach it in a learner centered way and therefore another teaching method was used. From the beginning of the lesson a teacher observed was also to provide the observer with his/her lesson plan. This was to deduce more information on the use of the syllabus.

3.2 Interview Method Schedule

The interview method was chosen since it is well known in collecting rich and contextual qualitative information. Besides, it allows free discussion between interviewer and interviewee while at the same time reduces misunderstanding between the two parties.

The interview method was structured and focused on teachers' experiences of the curriculum materials, their interpretations and views on continuous assessment, the effectiveness of training they received to carry out and implement the curricular materials prescribed to them and the accessibility of these curricular materials to them. Since teacher qualification is known to influence the way teachers interpret the curriculum during interview, information about teacher qualifications were also collected. Finally, teachers were asked to give their input (suggestions) on how the syllabus can be better improved.

4. Data Analysis

In the following pages findings from the data analysis will be discussed. It is essential to remind the reader that this study was not conducted free of problems. Constraints experienced during the study are discussed under paragraph "Limitations".

Qualitative data: In analyzing qualitative data, the key incident approach was used. For each specific question, responses given were grouped first per region and then nationally. From these responses, key incidents or frequent response were taken.</P>

Quantitative data: From the scale indicators mentioned earlier, the number was entered and analyzed by means of Excel programme. The interpretations were then made based on these results.

In presenting the result, where possible regional results are separately presented from one another. Note that in regions where very few teachers were visited, one teacher was observed twice or three times. Henceforth, in some instances the number of responses recorded are higher than the total numbers of teachers visited

5. Data Interpretation and Findings

Interpretation Constraints

As far as the instrument was concerned, it was found that a rating scale was not the most ideal approach. This approach was followed to make the data more manageable for analysis, but in fact it contributed to difficult interpretation of some of the data. The main reason for this is that observers' perceptions of the different categories are not the same. Although there was a training session to attempt to create a common understanding of what is meant by for instance 'to a large extent' this was not necessarily reached. Another limitation of the study was that the length of the training session was not adequate to standardize the observations.

Furthermore, although the questions used in the study were relevant and appropriate, they could not yield enough information, since the questions used were very broad. The following paragraphs present findings from both classroom observation and interview method.

5.1 Classroom Observation

One of the advantages of observation is that it often reveals variation between how the programme *is* running and how it is *intended* to run which an evaluator may not discover through interviews or reading (Worthen and Sanders, 1987). On the other hand, this method has also its disadvantages, as stipulated by Boehm and Weinberg 1997: "If individuals know they are being observed, and particularly if they know why, they might behave in ways to please the observer.... other individuals become more nervous and display signs of anxiety not normally shown".

Incidents such as teachers observed teaching lessons which they taught before support Boehm and Weinberg. Some teachers came to school unprepared with no lesson plan. There were also some reports about rude behavior of teachers towards their learners. Taking cognition of these incidents, in analyzing learner- centered teaching, we focus on the teaching approach (how the lesson was presented) without taking into account whether the lesson was 'new' or 'old'. This is because it would be hard to justify which lessons were already presented a previous time and which were the lessons supposed to have been presented then. Outcomes of observations and interview from different regions are presented on the following pages.

5.1.1 Syllabus Specific Information

All teachers were interviewed on their experiences with the Grade 7 Mathematics syllabus. They were asked to identify topics that they think have been left out and should be included in the syllabus and identify irrelevant or inappropriate topics that should be removed. Outlined below are some of the specific questions posed during the interview followed by the results of their responses presented in Table 1.

1. Is the content load of the syllabus appropriate?
2. Is the prescribed content in the syllabus at the appropriate level for the learners?
3. Do the basic competency of the syllabus make it easier to teach in English?

Table 1. Percentage (%) of positive responses form teachers per region

Questions	KM	KMH	KH	On. E	On. W	RU	WHK	National
1	89	100	71	63	80	50	100	82.2
2	88	100	100	75	73	75	100	85.4
3	89	100	100	38	73	50	100	80.6

As shown in Table 1 above, 82% of teachers participated found the content and level of the Mathematics syllabus appropriate and relevant. Low figures were obtained from Ondangwa East and Rundu. This low results is not surprising as it agreed with figures obtained in the same regions when asked about their views concerning the training they have received to implement the syllabus (See In-Service Training p.16). Almost all teachers indicated that basic competencies are easy to teach through English at this level. They were also asked how the Grade 7 syllabus links to the Grade 6 syllabus. The majority of teachers feel that the two are appropriately linked. It is unfortunate that among these positive responses some teachers could not give a clear indication as to why they are supporting the syllabus as adequate and

appropriate. Through exploration during the interviews many observers confirmed that some of the teachers do not use the syllabus when preparing their lessons.

A small number of teachers, however, felt that the syllabus is overloaded and that there is a repetition of basic competencies from Grade 6. Some teachers also said that some topics in the syllabus are difficult for this level but failed to specify the difficult topics.

Another group of teachers, however, felt that topics such as: *introduction to algebra*, *more geometry* and *basic introduction to graphs* should be included in the syllabus. *Data*, *mode*, *mean* and *median* should also be included in this syllabus at this Grade.

Lesson plan:

From the beginning of each lesson teachers were to provide their lesson plan to the observer. Although not all teachers had their lesson plan when observed, when analyzed, results at the national level yielded a positive remark with about 60 % showing that the lesson plan of the teachers corresponded with items listed in the syllabus. However the outcome of this question shows a remarkable discrepancy amongst the regions. For example, compare the Ondangwa East and Ondangwa West to the Windhoek regions and Khorixas regions.

5.1.2 Availability of teaching materials

On the questions about the accessibility of Mathematics curricular materials for this Grade and whether they receive these materials in time. Table 2 indicates that 87% of all the teachers participated were in possession of a correct version of the syllabus, while 84 % possessed the correct version of teachers' guide. The study also found that the majority received these documents on time. Many teachers indicated that they were satisfied with the basic competencies of the syllabus, but expressed that the syllabus does not give clear guidance on learner centered teaching (LCT) nor does it provide explicit examples of teaching aids to be used.

Table 2. The grid reflects the distribution of teachers having access to the correct syllabus and teacher's guide for Mathematics.

Educational Region	No. of respondents per region	Teachers with the correct syllabus %	Teachers with the correct teachers' guide %
Katima Mulilo	9	100	88
Keetmanshoop	12	92	83
Khorixas	7	100	86
Ondangwa East	8	75	75
Ondangwa West	15	73	80
Rundu	4	75	100
Windhoek	7	100	100
National	62	87	85

The study indicates that in some regions teachers seem to have a problem of interpreting the syllabus and are not aware about these basic competencies. For this reason they only use textbooks to prepare their lessons. This might explain why some

of these teachers could not give clear responses on which topics they felt should be removed.

This information supports the evidence observed in some regions that in some classes learners have not met the basic competencies of previous Grades.

5.1.3 Continuous Assessment

Participant teachers were asked if the continuous assessment prescriptions in the syllabus were clear and appropriate. They were also asked if they received sufficient guidance in the use of CA. Results from the scale indicators yielded that 100% incidents from Keetmanshoop found CA clear and 100% cases indicated that they received sufficient guidance on the use of CA. The result also shows 99 % of incidents indicating that Khorixas teachers find CA clear and 100% of responses revealed that they received sufficient guidance.

Ondangwa West: 85% finds CA clear while 85% cases received guidance on CA. Other regions have low positive remarks on CA. Windhoek region responded that they did not at all find it clear and received no guidance on the use of CA. In Rundu only 28 % cases found it clear but did not receive any guidance on how to use the CA. Ondangwa East responded that they have received guidance. Katima Mulilo, 85 % cases shows that they received sufficient guidance while 71% find the CA prescription clear.

Ondangwa East only 33 % responded that they have received sufficient guidance on CA and 28% find it clear. The degree of clarity and guidance received on CA is different from teacher to teachers in their respective regions.

Regardless of the responses above, in all regions teachers seem to share the same problems concerning the clarity and practicality of the CA prescription.

They have requested clear CA prescriptions to be included in the syllabus, which should give clear guidance on how to conduct continuous assessment. "A standard and uniform CA is definitely needed," a teacher stated. They expressed an urgent need for assistance on how to deal with continuous assessment prescription. They have also expressed their concern that most of them use the continuous assessment information, which they acquired, from other workshops which in some cases seem not to fit. Assessment marks (amount/weight) are not indicated, also the mark list is unclear on how to go about it.

Clear mark allocation for projects, homework and participation should be indicated. In addition, continuous assessment training for Mathematics teachers is requested.

5.1.4 Teachers Qualifications

The table represents observed teachers' qualifications.

Qualifications	KM	KMH	KH	On. W	On. E	RU	WHK	Total
Gr. 10	3	0	0	1	0	0	1	5
Gr. 10 + H/LPTC	1	0	0	0	0	0	1	3
NEC	0	0	1	0	1	0	0	2
Gr. 10 + PTC / ECP	0	0	0	0	1	1	2	3
Gr. 10 + NEC	0	0	0	1	0	0	0	1
Nat. Dip. in Agrc.	0	0	0	0	1	0	0	1
	0	0	0	0	0	0	0	0
Gr. 10 + ED	0	2	0	0	0	0	0	2
Gr. 12	1	1	1	0	3	1	0	7
Gr. 12 + LPTC	1	0	0	0	0	0	0	1
Gr. 12 + NEC	1	0	0	0	0	0	0	1
Gr. 12 + NHEC	1	0	0	0	0	0	0	1
Gr. 12 + ECP/PTC	0	2	1	1	0	0	0	4
Gr. 12 + ED	0	2	0	0	0	0	0	2
Gr. 12 + HED	0	1	0	0	0	0	3	4
Gr. 12 + HPEC	1	4	2	1	0	0	0	8
PTD (Azaliah)*	0	0	0	0	3	0	0	3
BA hons	0	0	1	0	0	0	0	1
BETD/ BETD (inset)	0	0	1	0	0	1#	0	2
BETD(Preset)*	0	0	0	4	6	1		11
Total	9	12	7	8	15	4	7	62
Teachers /region with no teaching qualification or partly qualified by %	44#	83#	14.2# 14.2*	12.5# 50*	20# 75*	25# 75*	14.2#	

Key: *no teaching qualification, #partly qualified

Information on teachers' qualifications was collected and presented in table 3 .

This figure shows that in Katima Mulilo a big proportion of teachers is teaching with no teaching qualifications. While in Ondangwa West and Rundu, there are a number of teachers who are still in upgrading programmes, therefore, regarded as partly qualified.

Findings from specific regions reveal no evidence of relationship between teachers' qualifications and their performance of LCE. For example among the regions visited, learner centered teaching was observed more in those regions where most teachers with no teaching qualifications or who are partly qualified are found i.e. Katima Mulilo and Rundu regions. However, in this study it may not be fair to make such an assumption, since the data collected does not indicate if teachers observed were teaching the subject out of own choice or a subject that they have specialized in during their training, which may hamper their teaching performance.

It was also revealed that among these teachers, there are some teachers who have difficulties in teaching Math. The study, however, did not identify which teachers are these in terms of their qualifications. Relevant years of teaching experience as presented in Table 4 seem to yield no connection between teaching experience, views about the syllabus or the level of training received.

Table 4. The table below reflects the level of teaching experience the teachers in the sample have.

Educational Region	Total	Years of teaching experience		
		5 years and more	2 – 5 years	less than 2 years
Katima Mulilo	9	4	5	0
Keetmanshoop	12	9	3	0
Khorixas	7	6	1	0
Ondangwa East	8	5	2	1
Ondangwa West	15	5	6	4
Rundu	4	1	1	2
Windhoek	7	7	0	0
Total	62	34	21	7

5.1.5 Learner Centered Education - General trends

These paragraphs discuss a general impression on learner centred teaching as was observed in each region. For anonymous reason, numbers instead of their names represents the regions.

Region 1: Many lessons observed; on basic competencies, teachers used question and answer method and individual work. Learners received support individually.

Region 2: Most lessons were taught in a learner- centered way. With teacher support, they learned through group work and individual work. However, what was lacking in this teaching process is that some teachers fail to explain the whole concept of the lesson to the whole class; in other words in many lessons there were no consolidation at the end of the lesson. It was recognized that more practical and daily life experience should be taken into consideration when syllabi are drafted. This would facilitate group work where learners are applying what they are learning to daily life or to their immediate environment.

Region 3: Information missing

The information collected with regard to learn centered approach could not be relayed as papers on this information were misplaced.

Region 4: In this region, the general trend of teaching Mathematics as observed in many lessons, was that the content is not connected to a real life situation. No real problem solving activities were given to learners rather merely sums from the textbook. More class time is spent on script correction with learners working

individually on chalkboard while others are just sitting. More active participation of all learners needs to be encouraged.

Region 5: The observers mentioned that in most lessons there was little evidence of learner-centered teaching. Learners were observed to sit in groups, yet learner involvement and participation could hardly be observed.

Region 6: The observers noted that teacher-centered teaching dominates in many lessons. There was little indication of LCE taking place. In all of the lessons observed only one lesson was carried out in a satisfactory way. There was little initiative/response from the learners' side.

Region 7: Although teacher centered method was observed to dominate many lessons, some evidence of LCE was also recorded. Evidence of LCE included teachers using group work and worksheets. Learners providing feed back were also noted. However, in other lessons teaching was continuous lecture type/ more teacher centered. Some teachers were reported not to be familiar with the Mathematics syllabus.

In summarizing these findings it appears that in all regions there is a problem in implementing learner centered education in this subject. The findings presented above indicate that teachers seem to experience difficulties in applying learner centered education in the Mathematics lessons. Teachers appear to fall back on the traditional way of teaching, which is teacher centered and learners are working individually instead of sharing knowledge and ideas with one another and actively participating in the learning process. A lot of Mathematics problems given to learners to accomplish are directly from the textbook, in other words, the textbook determines the Mathematics problems to be solved by learners. Learners are not provided a chance to do mathematical problems that enforce them to think critically by applying what they have learnt to a real life situation. This seems to be a general trend as observed in many regions; namely that Mathematics content is being taught without application of the content to the real life situation.

5.1.6 Learner Centered Education-results of the scale indicators

The paragraphs below present findings from the indicators that were regarded as the representative of the learner centered teaching. Scale indicators (Appendix 1) were used to measure the extent to which LCE is being applied in the classroom. The results at national level are presented in Graph I (next page), while those at regional level are presented in Appendix 2.

The numbers that appear below this graph represent the question numbers in the interviewing and observation schedule of the monitoring instruments (Appendix 1). In the interpretation of all graphs, the first two (*large extent, certain extent*) are collectively taken to indicate a positive response while (*small extent, not at all*) are collectively taken as negative response. Regional outcomes on these questions are presented in Graph 1-12a -b (See Appendix 2).

Notice that the regions were analyzed in two groups A and B. This division was made on the prediction that the three northern regions may perform differently than the more central/southern regions. Therefore regions in the north, Katima Mulilo, Ondangwa East, Ondangwa West and Rundu were grouped as (A) while Keetmanshoop, Khorixas and Windhoek grouped as (B). Only questions with the most significant results are presented in the graphs.

Findings as represent in Graph I

Question 1. The graph shows that there were 72.5% incidents where teachers asked learners questions in order to determine what they know already.

Question 2 represent the extent to which the teacher provides enough time for learners to answers questions. The graph shows 73.9 % of incidents that teachers provided enough time for learners to answer question.

Question 3 implies that in all lessons observed, only 31.6 % of the incidents show teachers try to find out why learners ask certain question.

Question 4 indicates that from all the lessons observed 25.6% of the incidents show that teachers monitor learners' progress during their learning process. This figure is very low for such an important aspect of learner-centered teaching.

Question 5, the graph shows 67% incidents of the observed lessons that learners ask questions related to the topic.

In question 6 the graph indicates that only 42.3% incidents of the observed classes learners show that learners are given a chance to share ideas. Rundu region is not represented in this result, due to some misunderstanding with regard to the question and therefore was left uncompleted by the observers. Whereas in Ondangwa East there seems to be a positive tendency of teachers to give learners the opportunity to share ideas. This however is contrary to what the observer noted in the open responses.

Question 7. The graph show 83 % of the incidents of observed lessons which reveal that enough time is provided for the learners to complete tasks successfully.

Question 8. The graph shows that at national level, 67 % of the learners are given the opportunity to apply their knowledge. Although this result seems to be high, there is a large discrepancy to what is really happening in different regions with regard to this aspect. Compare regions in Graph 8 a and b. It was observed that the general trend of teaching Mathematics is that the content is not connected to a real life situation . No real problem solving activities occur, merely sums from the textbook. Also that through this process, the teacher never takes into consideration that the concept learned need to be clear or explained again to the whole class.

Question 9 was to find to what extent learners are actively involved in their own learning. 82.2% incidents show that the learners are involved in their own learning.

Though this result is positive at national level, it is unfortunate that positive responses were reported from only 2 regions, Katima Mulilo and Rundu.

Indicators of learners involved in their own learning could be reported as learners working in groups and allowed to report back on what they have learned from one another. From other regions, it has been reported that some lessons were more teacher centered and little involvement from learners was observed. Some observers noted that in some lessons learners worked individually while sitting in groups and no sharing or exchanging of information took place. As mentioned earlier, some teachers were also reported spending too much class time on script correction.

Question 11. The graph shows 76% of the incidence that the lesson plan covered the basic competencies from the syllabus. Unfortunately, there is a large discrepancy in different regions on this question. Compare for example Ondangwa East where very little of this tendency was observed, while in Khorixas a high positive incident was observed.

Question 12 wanted to find out if the lesson plans correspond with the syllabus. The graph shows 67% of the positive answer.

As can be seen, the analysis on scale indicators revealed a lot of inconsistency between the observers' notes on what they have observed and what they indicated on the scale indicators of the observation sheet.

5.1.7 In-Service Training

Teachers were asked if they had received any in-service training to assist them teaching the syllabus. They were also asked to state if the training helped them to teach the new syllabus.

The result shows that about 83 % at Katima Mulilo received sufficient training and 75 % felt that the training helped them to teach the new syllabus. Keetmanshoop, 100 % received training and 100% responded that the training helped them to teach the new syllabus. Khorixas, 99.3% received training and 88% responded that the training helped them to teach the new syllabus. Ondangwa East indicated that they did not receive training to teach the new syllabus. Ondangwa West shows 50% received training and 62.5% felt that the training helped them. In Rundu, 16% received training and 25 % felt that the training did help them. Windhoek 83% received in-service training to assist to teach the new syllabus and 75 % felt that the training helped them to teach the new syllabus.

5.1.8 Teaching Aids

The common teaching aids utilized in all regions are chalkboard and textbooks. In some instances, worksheets, a few posters and overhead projectors are used in various schools but to a small extent. Most teaching aids observed are broken or do not exist at school. Self-prepared teaching aids are lacking.

Textbooks in some regions were reported insufficient. A reason given for insufficient supplies was because the materials are expensive. This includes calculators.

Findings have shown that there is a lack of teaching aids for this subject. It also appears that teachers are heavily dependent on ready-made teaching aids.

Other Comments

At the end of observations, each observer was asked to give his/her comments (impression) in relation to what he/she has observed. These are some of the comments.

- Classrooms are dull no picture or placards which are conducive to teaching /learning process were seen. Sometimes teachers are not familiar to the math's syllabus. Some of the daily preparations are not up to standard.
- "Teachers need help and advice".
- "Little learner centered education; training in learner centered education is urgently needed. The Regional office must guide and help more through subject advisors. Teachers are sometimes rude and frighten learners which influences learner centered education negatively."
- "In this specific region, three teachers were absent when the schools were visited. At two schools, BETD students in their III year were helping out. How will they continue with their studies?. Female learners should receive more encouragement. Teacher could use more group work using learners understanding the work as group leaders (peer teaching). Twice the best teaching took place during the break following the Math period.
- "Teachers are textbook bound and not syllabus bound in some cases. Teacher Centered Education and Learner Centered Method are used inappropriately in terms of content offered".
- "Some teachers had neither lesson plans nor teaching aids and were not prepared".

6. Conclusion

In conclusion, this study has illustrated that many components of a learner centered approach in the Mathematics curriculum are lagging behind. Among these is the problem of learners still learning passively by receiving information from the teachers resulting in low learner participation. The main complaint was that the guiding documents used do not guide teachers to teach in a learner centered way. Handling and manipulating information that would allow application of knowledge to learners' immediate environment is not realized. In addition to this, the lack of skills in interpreting the syllabus still exists with a number of teachers. The use of continuous assessment prescriptions prescribed to teachers is not taking place, although the majority of teachers revealed that they received training to use some of these documents

These findings should be taken as a challenge and encouragement to find different modes which are effective to facilitate the implementation process of change. The pace of process is often a slow process and can only materialize if Education Officers and Advisory Teachers at the training level are competent enough on the components of the curriculum they would be expected to address.

7. Recommendations

From what emerged in this study, the Research Unit would like to recommend the following

7.1 NIED Specific Recommendations

- The Mathematics syllabus is not conducive to teaching in the learner centered approach. It is suggested that the design of the Mathematics syllabus be reviewed and redesigned to complement the learner centered approach.
- Provision of clear forms of Continuous Assessment prescriptions followed by training on how to use them needs immediate attention. For sustainability and as a school-based support, a suggestion is to train Heads of Department at schools and to equip them with necessary skills and knowledge on how to use CA.
- Training to equip teachers with knowledge on how to interpret the syllabus needs to be conducted. A general training that would enable teachers to interpret a syllabus of any subject should be considered.
- NIED, as spearheading agency of educational reform, should limit its administrative work and become more practical by monitoring how documents developed by the Institute are being implemented. Consistent visits at school level help officials to become aware of the practical reality of teachers in classroom and will thus assist in prioritizing their needs.

7.2 Region Specific Recommendations

- Efforts should be made to encourage Mathematics teachers to use their potential skill in inventing their own teaching aids using locally available materials in order to improve their quality of teaching.
- Teachers should be encouraged and exposed to develop questioning skills in Mathematics that will enable learners to develop critical thinking and applying their mathematical knowledge.
- The application of Mathematics knowledge to real life situations needs to be addressed. It is felt that this approach to learning would enhance an understanding amongst learners to realize the necessity of learning Mathematics as a subject in school. Advisory teachers should put more emphasis in training teachers in teaching Mathematics in a learner-centered approach.

8. References

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9. Appendices

Appendix 1 - Monitoring Instruments

Appendix 2 - Graphs on Learner Centered Teaching by Regions