CHAPTER 8

ASSESSMENT AND SUPPORT

8.1 Introduction

Chapter 4 described the design and development of study material for the UNISA Mathematics Access Module. Chapters 5, 6 and 7 describe two sets of action research cycles, focusing on two interventions that were implemented. A number of other issues evolved over time, which affected the assessment methods used and the varying levels of support that were also provided in response to perceived student need. These issues were all affected by the philosophical and pedagogical perspective within which the Mathematics Access Module was developed, and by a number of practical factors such as availability of staff.

In this chapter we now consider the introduction of different approaches to assessment and the effects of these on students' success, as reflected by the pass rate. A number of tables are provided to highlight different aspects of student performance, such as examination admission and pass rate. We also consider the impact of different forms of support that were introduced.

8.2 Assessment

Assignments and examinations were the main assessment tools. These activities are summarised in Table 8.1, but will be discussed in more detail further on.

Table 8.1:

Summary of Mathematics Access Module assessment practices

Year	Exam admission automatic Yes (Y) No (N)	Credits required for exam admission Maximum credits	Formative assessment type (number of assignments)	Summative assessment type	Formative assessment contribution (Assignments taken into account)	Summative assessment contribution	Criteria for admission to supplementary exam	% passed[1] (wrt number who wrote[2])
1997	Y	none	none	examination	none (N/A)	100%	$\geq$ 45%	17,6
1998	Y	none	none	examination	none (N/A)	100%	$\geq$ 45%	9,8
1999	N	100 125	Assignments CM-MCQs (5)	examination CM-MCQs	none (none)	100%	$\geq$ 45%	24,5
2000	N	100 200	Assignments CM-MCQs (5)	examination CM-MCQs	none (none)	100%	$\geq$ 45%	30,7
2001	N	100 275	Assignments (incl. project) LMQs (5) Self-assessed (1)	examination LMQs	10% (3 & 4) 3 = project	90%	$\geq$ 30%	24,7
2002	N	100 275	Assignments (incl. project) LMQs (5) Self-assessed (1)	examination LMQs	10% (3 & 4) 3 = project	90%	$\geq$ 30%	14,9
2003	N	100 260	Assignments (incl. project) CM-MCQs (3) LMQs (4)	examination LMQs	10% (3 & 5) 3 = project	90%	$\geq$ 30%	27,0
2004	N	100 260	Assignments CM-MCQs (4) LMQs (3)	examination LMQs	none	100%	$\geq$ 30%	N/A

[1]This figure reflects the consolidated pass rate, taking into account the year-end and supplementary examinations.

[2] It was evident from Table 4.2 in Chapter 4 that not all students who were eligible to write the examination did so.

8.2.1 Assignments

Once study material had been written assignments were introduced. In 1999 and 2000 assignments consisting of computer-marked multiple-choice questions (MCQs) provided an opportunity for formative assessment. Questions were based on the content of the study guides. In MCQs students have no opportunity to demonstrate partial understanding. Furthermore, the right-wrong nature of the answers to MCQs does not provide an opportunity for meaningful formative assessment, even when students receive solutions to the assignments. In 2001 the assignment format was thus changed from computer-marked MCQs to lecturer-marked questions (LMQs), and, occasionally, a self-assessed assignment. The LMQs in particular facilitated formative assessment, in that they were extensively marked with respect to conceptual understanding and mathematical presentation. The markers gave substantial comment on content, reasoning, presentation, and appropriate methods. Such comments are important, as students benefit more from knowing where and why marks are deducted than simply from knowing what mark they received (Mason, 2002). The use of LMQs requires considerably greater marking time and expertise than computer-marked MCQs. In 2001 and 2002 (with LMQs only) the workload increased to such an extent that MCQs were reintroduced in 2003. In 2003 and 2004 each assignment containing MCQs revised the concepts that had been assessed in the previous assignment which contained LMQs, so that there were no sections of work which had been assessed in only one format.

In considering what assessment activities were relevant to the learning outcomes of the Mathematics Access Module, it seems that the last item in Grayson & Clarke's list (see Section 2.3.2 in Chapter 2), namely an understanding of the epistemology of mathematics, is probably beyond the scope of students at this level. The teaching philosophy of the module, with its focus on relational understanding, suggests that the first three items on the list probably represent the least important types of assessment tasks. The remaining assessment activities appear to be relevant and applicable, and the assignments were designed to provide opportunities for 'synthesis, integration of knowledge'.

The MATH Taxonomy (see Table 2.2 in Chapter 2) suggests a categorisation of assessment activities in three groups. These groups are not mutually exclusive. Without factual knowledge and comprehension (Group A), transfer and application to new situations (Group B) is unlikely. Skills in Group C are possibly too advanced for students at an access level, however, some justification and interpretation is necessary, particularly to assist students in the development of

meta-cognitive skills. The development of Group C skills is also dependent on well-established Group A skills.

The assessment activities selected for the Access Module reflect various aspects (italicised below) of Table 2.1 in Chapter 2. *Testing*[3] is not a practical option for UNISA, since there are vast logistical issues involved in setting up venues and arranging for invigilation across the country, and elsewhere. At this stage *examining* thus plays by far the greatest role. Neither *measuring* nor *documenting* plays a significant role. *Evaluation* does not take place, but *assessing* does: the activities in the study guides (examples, activities and exercises) and the assignments are a means of keeping students informed as to the current status of their knowledge in relation to what they should know; although a grade is assigned to the work, the comments and solutions are regarded as more important. The study guide activities and assignments thus provide opportunity for formative assessment, and students are advised to make maximum use of this opportunity[4].

Formative assessment requires that students receive sufficient meaningful feedback on their assignments. It is suggested that for each assignment they should first study the relevant sections of the work, then do and submit the assignment. Once they have received the marked assignments and printed solutions[5], they should study the solutions and compare these answers with their own answers, to determine where they have made mistakes, and carefully take note of any comments. At times it was felt that particular problems (noted by the markers) would possibly not have been dealt with adequately in the marking process, and in such cases additional feedback was provided in the form of follow-up tutorial letters[6] sent to all students (not necessarily for each assignment). Details are given in Table 8.2.

Table 8.2:

Additional general assignment feedback

Year	Assignments for which additional feedback was given
2001	1, 2
2002	1, 2, 3, 4
2003	1

[3] The diagnostic assessment (discussed in Chapter 9) may perhaps be interpreted as a 'test'.
[4] Submission of assignments is voluntary, and students do not necessarily do all assignments.
[5] All students are sent detailed printed solutions after the closing date for the assignment, whether or not they have submitted the assignments
[6] Written by Carol Bohlmann

Streamlining the marking of assignments

Many common errors occurred in students' assignments, which required considerable comment from the markers. All those involved in marking assignments are expected to aim for a two-week turn-around time, which is difficult at peak periods. To streamline the marking, and reduce the necessity of having to write the same comments repeatedly, it was decided to create a system of codes[7], which markers could use if they chose to do so. With such a system a marker can then reference a specific mistake by means of a letter, for example K. In the code sheet K then relates to an explanation of the specific error. The printed code sheet can then be included in the marked assignment before it is returned to the student. Apart from the time-consuming nature of writing meaningful comments, the code sheet minimises problems experienced by markers whose mother tongue is not English. Preparation of the codes in advance make it possible to formulate concise and precise comments, avoiding the use of jargon, sloppy language, personal abbreviations or vocabulary that might be unfamiliar to students.

8.2.2 Assignments and the credit system

Apart from the formative assessment role played by assignments, they are also important as a means by which students can be admitted to the examinations. The assignment questions, closing dates for submission of the assignments, and a suggested work schedule based on these dates, are usually provided in the first tutorial letter for each module (Tutorial Letter 101), which students receive when they register. Closing dates are stipulated to help students pace themselves. From 1999 to 2002 the due date for the first assignment was as late as the end of April, but brought forward to the middle of March in 2003[8].

In the Science Faculty students qualify to write the examinations on the basis of credits obtained from assignments. They need to obtain 100 credits to be able to write the examination. When credits are obtained on the basis of assignment submission, without taking into account the marks obtained, it is possible for students to submit assignments without making an effort to understand the questions. Relating credits to assignment marks fulfils a pedagogical function: doing assignments helps students to develop an understanding of the concepts and learn to apply them. Credits are then a measure of the extent to which students have been able to do this. The assignments provide the only opportunity for formative assessment, and it is thus important that

[7] Designed by Carol Bohlmann

[8] The earlier date was selected since the first assignment in 2003 also aimed to diagnose reading problems. The diagnosis needed to be done as early as possible to give students time to take remedial action.

students benefit from working regularly and receiving feedback, growing into an understanding of the work, rather than trying to cram at the last minute, thereby possibly passing but learning little.

This process of qualifying for examination admission also has practical implications: given the large number of students who register at UNISA, and the large number of examination venues that need to be provided and staffed both inside and outside South Africa, it is impractical to provide examination facilities for students who have no intention of writing. In earning credits and thereby obtaining examination admission students in effect provide a 'statement of intent' with respect to the examination, and plans can be made accordingly. Table 8.3 provides more detail than Table 8.1, and shows the number and type of assignments, possible credits, and the spacing of the assignments. In the column giving the spacing of assignments the due dates of the first and last assignments are shown. The maximum number of credits is based on the assumption that students obtain 100% for each assignment, except in cases where credits were awarded simply for submission of an assignment, as in 1999 and 2000.

Table 8.3:

Assignments and possible credits

Year	No. of assign-ments	Type of assignment	Approximate time between assignments	Maximum number of credits	Number of credits per assignment
1997	0				
1998	0				
1999	5	MCQs (all)	4 weeks 30/04 to 20/08	$5 \times 25 = 125$	25, based on submission
2000	5	MCQs (all) Ass. 5: 1999 exam paper	4 weeks 28/04 to 15/08	$(4 \times 25) + 100 = 200$	Ass. 1, 2, 3 and 4: 25, based on submission Ass. 5: 100
2001	6	LMQs (all) Ass. 3: project Ass. 6: 'mock' exam	4 weeks 27/04 to 15/08	$(3 \times 25) + (2 \times 100) = 275$	Ass. 1, 2 & 5: 25 Ass. 3, 4: 100
2002	6	As for 2001 Ass. 6: 2001 exam paper	As for 2001	As for 2001	Ass. 1, 2 & 5: 25 Ass. 3, 4: 100

2003	7	MCQs in Ass. 2, 4, 6 LMQs in Ass. 1, 5, 7 Ass. 3: project[9] Ass. 7: 2002 exam paper	4 weeks (first four); 3 weeks (last three) 13/03 to 7/08	(25 + 25) + (3 × 20) + (3 × 50) = 260	Ass. 1: Part A: 25, based on submission Part B: 25 Ass. 2, 4, 6: 20 Ass. 3, 5, 7: 50
2004	7	MCQs in Ass. 1, 2, 4, 6 LMQs in Ass. 3, 5, 7 Ass. 7: 2003 exam paper	4 weeks (first four); 3 weeks (last three) 13/03 to 7/08	(4 × 20) + (3 × 60) = 260	Ass. 1, 2, 4, 6: 20 Ass. 3, 5, 7: 60

The following example illustrates how the process of earning credits has changed:

In 1999, a student who submitted all assignments would have obtained 125 credits.

In 2003, students could obtain (maximally)

25 credits for submitting Part A of Assignment 1[10]

25 credits (half of mark out of 50) for part B of Assignment 1

50 credits for Assignments 3, 5, and 7 (half the percentage)

20 credits for Assignments, 2, 4 and 6 (one fifth of the percentage).

In 2003 the credits of a student with the marks shown below would have thus been calculated as follows:

for answering Part A and Part B of Assignment 1, and obtaining 40 out of 50 for Part B (LMQs):

25 + 20 credits; i.e.	45 credits	
for obtaining 60% in Assignment 2 (MCQs):	12 credits	
for obtaining 50% in Assignment 3 (project):	25 credits	
for obtaining 55% in Assignment 4 (MCQs):	11 credits	i.e. 173 credits.
for obtaining 70% in Assignment 5 (LMQs):	35 credits	
for obtaining 65% in Assignment 6 (MCQs):	13 credits	
for obtaining 64% in Assignment 7 (LMQs):	32 credits	

With five assignments initially (in 1999), students could afford to miss only one assignment: if they missed more than one they could not obtain examination admission. From 2000 the system

[9] This project is discussed in Chapter 7.
[10] The nature of this assignment is explained in Chapter 6.

was changed, to make provision for students who could not submit all the assignments. The examination admission requirements have been the same in each year (100 credits) although the maximum number of credits has changed.

The difference between the number of students who registered and the number of students who were admitted to the examination has increased each year (see also the information given in the third column of Table 4.2 in Chapter 4). It appears that students have found it increasingly difficult to obtain the required number of credits. Table 8.4 shows the approximate percentages of students admitted to the examination, and those who wrote, in relation to those who registered.

Table 8.4:

Participation rates in examinations

Year	Registered students admitted to examination (%)	Difference between no. registered and no. wrote (D)	Attrition (%) D/No. reg	Registered students who wrote examination
1997	116 (100%)	31	27%	73%
1998	293 (100%)	79	27%	73%
1999	727 (91%)	224	23%	72%
2000	653 (82%)	184	23%	77%
2001	869 (68%)	553	43%	57%
2002	812 (57%)	725	54%	49%
2003	651 (40%)	1 048	65%	35%

8.2.3 Examinations

Year-end and supplementary examinations determine whether students pass or fail. In 1997 and 1998 students could write the Mathematics Access examination, twice a year in both cases. The examination questions were all computer-marked MCQs, and there were no supplementary examinations.

Supplementary examinations

From 1999 onwards examinations were no longer scheduled according to the semester system, and students wrote only a year-end examination in late October or early November, with the option of a supplementary examination in January or February of the following year. A mark of 50% or above is a pass. Up to the beginning of 2000, if students obtained from 45% to 49% they qualified to write the supplementary examination. The supplementary examination period also accommodated aegrotat examinations. A question frequently asked was whether a student with 44% was possibly just as likely as a student with 45% to pass on a second attempt. This led to

changes in the Science Faculty's assessment practices. As from the year-end examinations in 2000, Science Faculty students who had failed but had obtained at least 30% qualified to write the supplementary examination. This practice, initially an experiment within the Science Faculty, showed promising results and the practice was then continued, and was applied to students registered for the Mathematics Access Module from January 2001.

Format of questions

When the assignments consisted of computer-marked MCQs only, it would have been considered unfair if other types of questions were included in the two examinations; thus in 1999 and 2000 the examination also consisted of MCQs only. With the introduction of LMQs in assignments in 2001 it was possible to change the format of the examination as well.

The use of past examination papers

As a result of the change from CMQs to LMQs in 2001, students were no longer in a position to use the previous year's examination paper to prepare for their examinations. In 2001 they were thus sent an additional tutorial letter containing a 'mock' examination paper to use when they prepared for the examination at the end of 2001. The 'mock' examination, October examination and January (supplementary) examination were set up at the same time, by the same person. Solutions for the mock paper were also provided. In 2002 the 2001 end-of-year examination paper was set as a self-assessed assignment; in 2003 (and 2004) the 2002 (and 2003) end-of-year paper was included as the final lecturer-marked assignment.

Inclusion of a year mark component

The practice for most mathematics modules at UNISA is that students pass or fail on the basis of their examination results. The assignments are used to obtain examination admission (see above), but the assignment marks are not normally taken into account. It is clear that the sole use of a timed examination at the end of the year is unlikely to provide a sufficiently comprehensive picture of a student's knowledge and competence. At the two opposite ends of the spectrum such a system of assessment may distinguish between the exceptionally good and the exceptionally weak students, but for the rest some opportunity for students to demonstrate competence during the year may be helpful. However, practical and logistical considerations impact on the implementation of such a system. In 2000 UNISA decided that instead of relying on examinations as the only means of summative assessment, it would be appropriate if students could earn some credit towards a final mark through work done during the course of the year. As from 2001 the

Science Faculty instituted a more flexible assessment policy, in which up to 15% of the work done during the year could count towards the students' final marks, and this practice was then applied in the Mathematics Access Module. Two assignments were selected, which were allowed to contribute a maximum of 10% of the total mark. One of these assignments (Assignment 3) was the 'project' assignment (see Chapter 7) and the other, Assignment 4 (in 2001 and 2002) or Assignment 5 (in 2003), was one of the conventional lecturer-marked assignments[11]. This assignment was selected as it was based on the first six topics of Book 4: *Functions and their Graphs*. It is impossible to understand and work with functions and graphs without understanding the underlying algebraic and numerical principles, which are dealt with in Books 2 and 3. In essence Book 4 is thus a synthesis of Books 2 and 3 as well as an introduction to new concepts that are fundamental to future mathematics. It was made clear to students that if they passed the examination these two assignments would not be permitted to bring their final marks down; however, if students did well their assignment marks could help them move up from a borderline supplementary/ fail/ high pass category into a supplementary/ pass/ distinction category.

The possibility of including work done during the year in the students' final marks led to the following situation:

In 2001 and 2002 the final mark could include 10% of the marks obtained for Assignments 3 and 4.

For example, a student with 46% in the examination, 84% for Assignment 3 and 88% for Assignment 4 could have obtained

$$(90\% \times 46) + 10\% \times \frac{84+88}{2} = 41{,}4 + 8{,}6 = 50{,}0$$

i.e. a final mark of 50%, which is a pass.

In 2003 the final mark could include 10% of the marks for Assignments 3 and 5.

Thus a student with 29% in the examination, 84% for Assignment 3 and 68% for Assignment 5 could have obtained

$$(90\% \times 29)$$

i.e. a final mark of 34%, thus qualifying to write the supplementary examination.

Since it was clear that the mark adjustment would affect all borderline categories it was necessary

[11] Although it was the intention to include the marks of Assignment 3, the performance in this assignment was so poor that it was decided to ignore the possible contribution of these marks towards the students' final marks, and consider only Assignment 4 (in 2001 and 2002) or Assignment 5 (in 2003).

to consider carefully examination papers of students in the three borderline categories (those who failed who might qualify for a supplementary examination, those who failed but might pass, and those who might be able to get a distinction). Marks from as low as 23% were thus considered. Although it seemed unlikely, if such a student had obtained 93% for Assignment 4 (or 5), after adjusting the marks (see the calculation below) he/she would have obtained a final mark of 30%, and would then have qualified to write the supplementary examination:

90% of examination mark = 0,9 x 23% = 20,7%

10% of assignment mark = 0,1 x 93% = 9,3%

Final mark = 20,7% + 9,3% = 30%

The practice of revising the marks in this way was labour intensive (since the adjustments were done manually, and not automatically by the Examination Department) and appeared to have been of limited benefit in terms of increasing the number of passes. This was particularly so in the light of automatic adjustments that were made: marks of 48% and 49% are automatically adjusted to 50%; examination scripts with marks of 46% and 47% are carefully scrutinised to determine whether they could possibly reach 48% and hence 50%.

8.3 Provision of support

8.3.1 Contact with lecturers

For the first three years (1997 – 1999) there was limited contact, in the form of the lecturers responsible for teaching the module (only useful for students living close enough to UNISA to make arrangements to see them on an ad hoc basis), and discussion classes and tutorial classes in certain centres.

At the beginning of 2000 more formal arrangements were made regarding contact between students and lecturers: if students wanted help they were asked to make appointments with lecturers. The number of lecturers involved in teaching the module increased from two to three (two permanent staff members and one appointed under contract, who was subsequently (in 2001) permanently appointed). Each of the lecturers set aside one day in the week for student appointments. With three lecturers available there was greater opportunity to attend to individual queries via e-mail, phone, fax, etc.

In 2001 the marking workload was significant, with approximately 1 000 project assignments[12] and 3 420 other assignments received. In 2002 funding was made available for two additional external markers to be appointed. Five external markers were thus available to assist with the marking of assignments; two of them assisted with examination marking as well. In the Department of Mathematics two additional members of staff were asked to become involved in seeing students, increasing the number of appointment days from three to five. The three lecturers originally involved still undertook most of the teaching of the module (setting assignments and examinations, answering student queries, etc.) but the marking load was more evenly spread, and the involvement of two other lecturers meant that it was possible to have someone available every day of the week to see students.

The number of centres where discussion classes were offered also increased, as shown below, in Table 8.5.

Table 8.5:

Mathematics Access Module discussion classes

Centre	Year introduced	Approximate attendance when introduced (and in 2004)	Year discontinued (reason)
Pretoria	1999	50 (150)	
Cape Town	1999	10	2002 (low attendance 2000/1)
Durban	1999	40 (50)	
Polokwane	2000	20 (40)	
Umtata	2001	10	2004 (low attendance 2002/3)

Attendance was affected by the time of the year that the classes were presented (which depended on lecturer and venue availability) as well as by demographic factors such as the concentration of students living in the area. The largest classes each year were those held in Pretoria.

8.3.2 Contact with tutors

Initially tutorial classes were only provided at the Learning Centres in Pretoria, Johannesburg, Polokwane, Cape Town and Durban. Increased student demand led to the introduction of classes at additional Learning Centres and Satellite Learning Centres, once these were established. Details of tutorial class provision are shown in Table 8.6.

[12] Explained in Chapter 7

Table 8.6:

Provision of tutorial classes

Centre	Year classes were introduced
Pretoria	1999
Johannesburg	1999
Polokwane	1999
Shingwedzi (Satellite to Polokwane)	2001
Cape Town (Parow)	1999
Worcester (Satellite to Cape Town)	2002
Durban	1999
Stanger (Satellite to Durban)	2002
Umtata	2001

8.3.3 Peer support

Not all students can or want to attend tutorial classes, but many nevertheless find it difficult to study in isolation. A growing support option for all students was the creation of peer groups, which could meet regularly, on campus or elsewhere. The Bureau for Student Counselling and Career Development (BSCCD)[13] at UNISA became involved in establishing a more formal peer-learning system. Volunteer students can be trained as peer helpers, and the programme has evoked considerable general interest among students.

Together with the module leaders for the Mathematics and English Access Modules, BSCCD staff developed a generic peer-help brochure, which was made available to all interested students. A similar set of brief guidelines was developed for lecturers to include in the first tutorial letter for each module, explaining how peer groups could benefit students, and how they should function. For the Mathematics Access Module this information was included in Tutorial Letter 101 as from 2002. The use of peer-help groups was encouraged, since such activities can assist in motivating and encouraging dispersed students.

Much has been written about the potential benefits of collaborative learning, and effective peer group structures (see for example Houston, 1998). Trying to solve problems together helps students understand concepts more clearly; 'talking mathematics' helps them articulate their

[13] The Bureau for Student Counselling and Career Development (BSCCD) provides general information on study skills, time-management skills, and other matters related to effective study. Some of the information is in written form, and may be included in the tutorial letters written within subject departments. Much of this information is of a generic nature, and does not necessarily relate to the study of mathematics.

thoughts and exposes weak points. Peer groups may also have negative results, in that it is easy for students to become passive adherents to a group without realising that little active individual learning is taking place. Although social interaction is recognised as an effective means of improving the quality of students' mathematical thinking as well as their ability to express themselves mathematically, there is always the chance that some members of the group may play a limited role (Orton, 1994).

8.4 Impact of study material and assessment activities

We now consider the impact of the introduction of different aspects of assessment and support, introduced over several years[14], and note the impact of these changes on the pass rate. Tables 4.2 (in Section 4.1 of Chapter 4) 8.7 and 8.8 show the pass rate, calculated in two ways: firstly the ratio of those who passed to those who registered, and secondly the ratio of those who passed to those who wrote. (For reference purposes the results in the years 1997 and 1998 are also included in Table 8.7. There were no supplementary examinations in these two years. Table 8.8 only reflects results from 1999 onwards.)

Table 8.7:

Consolidated pass rate (1997 to 2003)

Year	Registered	Admitted to exam	Number passed / number registered	Number passed / number wrote	Number admitted but did not write
1997	116	116	15/ 116 = 12,9%	15/ 85 = 17,6%	31
1998	293	293	21/ 293 = 7,2%	21/ 214 = 9,8%	79
1999	799	727	141/ 799 = 17,6%	141/ 575 = 24,5%	152
2000	800	653	189/ 800 = 23,6%	189/ 616 = 30,7%	37
2001	1 279	868	179/ 1 279 = 10,9%	179/ 726 = 24,7%	142
2002	1 425	812	104/ 1 425 = 7,3%	104/ 700 = 14,9%	112
2003	1 619	651	154/ 1 619 = 9,5%	154/ 571 = 27,0%	80

[14] An overview of the development process is given in Table 4.1, at the beginning of Chapter 4.

Table 8.8:

Expanded pass rate (1999 to 2003)

Exam period	Registered	Admitted to exam	Number passed / number registered	Number passed / number wrote	Number admitted but did not write
Oct 1999	799	727	122/799 = 15%	122/575 = 21%	152
Jan 2000	58	58	19/58 = 33%	19/40 = 48%	18
Oct 2000	800	653	141/800 = 18%	141/616 = 23%	37
Jan 2001	215	214	48/215 = 22%	48/139 = 35%	75
Oct 2001	1 279	869	139/1 279 = 11%	139/726 = 19%	143
Jan 2002	265	265	40/265 = 15%	40/181 = 22%	84
Nov 2002	1 425	812	60/1 425 = 4%	60/700 = 9%	112
Jan 2003	220	219	45/220 = 20%	45/145 = 31%	75
Oct 2003	1 619	651	135/ 1619 = 8%	135/571 = 24%	80
Jan 2004	260	252	19/260 = 7%	19/153 = 12%	99

In the rest of this chapter 'pass rate' will relate to those who *wrote* the examination, and not to those who registered but did not write. Table 8.9 summarises the results for the period after study material was introduced. It highlights the attrition rate, which increased over the years, and the fact that each year many of those who were eligible to write the examination did not do so.

Table 8.9:

Trend in Mathematics Access Module examination admission and pass rates after the provision of study material

Year	No. students who passed	Pass rate (wrt no. who wrote) (Factor increase from previous year)	No. students not admitted (% wrt no. registered)	No. admitted who did not write (% wrt no. registered)	No. wrote/ No. registered (%)
1999	141	24,5% (2,5)	72 (9,0%)	152 (19,0%)	575/799 = 71,9%
2000	189	30,7% (1,3)	147 (18,3%)	37 (4,6%)	616/800 = 77%
2001	179	24,7% (0,8)	410 (32,1%)	142 (11,1%)	726/1 279 = 56,8%
2002	104	14,9% (0,6)	613 (43,0%)	112 (7,9%)	700/1 425 = 49,1%
2003	154	27,0% (1,8)	968 (59,8%)	80 (4,9%)	571/1 619 = 35,3%

8.4.1 Impact of study material

With the provision of study material, student numbers increased. Although there was initially an increase in the pass rate, the trend did not continue, as can be seen from Table 4.2 (in Chapter 4) and Table 8.9 above. At the end of 1999 the pass rate more than doubled, it increased again in 2000 but by 2003 had not again reached the same level as in 2000. The number of students who did not qualify for examination admission increased each year; the ratio of the number of

students who wrote to the number of registered students decreased from over 70% to half that figure.

8.4.2 Impact of changes in assessment

In 1999 and 2000 assignments were provided in MCQ format. The pass rate improved in 2000: it increased from 24,5% to 30,7%. There were however many failures (427, or 55% of the students who registered), and 184 of the students who registered (23%) did not even write the examination. Of the students who qualified to write the examination, 37 did not do so (5% of those who registered). The 1999 examination paper was given as one of the assignments and was the only assignment for which credit was dependent on performance.

In 2001 and 2002 assignments and examinations consisted of LMQs. Examination admission was based on assignment credits. In 2001 the pass rate decreased from 30,7% to 24,7%, the attrition rate increased, and 142 students who were admitted to the examination elected not to write (representing 11% of the registered students). In 2002 the pass rate decreased further, from 24,7% to 14,9%, and the attrition rate increased. Of the students who registered 57% were admitted to the examination. Of the students who obtained examination admission, 112 elected not to write (8% of the registered students) and 49% of the registered students wrote the examination. In 2003 the pass rate increased but the attrition rate continued to increase. In 2001, 2002 and 2003 the marks of one of the assignments were used in the calculation of the final marks, but this appeared to be of little benefit.

As from the January 2001 the criterion for admission to the supplementary examination was a fail with a mark above 30%, instead of above 45% as it had previously been. Table 8.10 shows the impact of the practice of changing the threshold for admission to the supplementary examinations.

Table 8.10:

Admission of students with 30% - 44% to supplementary examination

Exam period	Number of students with 30% - 44% admitted to supplementary examination	Number of students with 30% to 44% who wrote the supplementary examination	Number of students who passed	% passed (wrt number admitted)	% passed (wrt number who wrote)	% of total passes for year
2000-1	183	120	43	23,5	35,8	22,8
2001-2	192	131	25	13,0	19,1	14,0
2002-3	165	115	37	22,4	32,2	35,6
2003-4	191	115	11	5,8	9,6	7,1

In 2001, 63 of the students in the 'new' supplementary category were absent and did not write the examination, and 43 students passed. For the October 2000/January 2001 examination period there were 189 passes, hence the new category contributed nearly a quarter (22,8%) of the total number of passes.

In 2002, three students were not admitted to the examination, and 58 were absent. Since there were altogether 179 passes in the October 2001/January 2002 examination, 14% of the total number of passes resulted from the change in practice.

In 2003, 50 students were absent. About 22% of those who qualified to write as a result of the change in practice (almost one third of those who actually wrote) passed. Considering the total number of passes (104 in the 2002/2003 examination period), the practice resulted in a significant increase in the pass rate.

In January 2004, three students were not admitted to the examination and another 73 were absent. It appears that the practice had relatively little impact on the pass rate in the October 2003/January 2004 examination period. Only 11 students in this category passed, out of a total of 154 passes.

In general this practice appears to have increased the number of passes each year. No change in this practice is anticipated in the near future.

8.5 Discussion of results

The philosophical and pedagogical approaches selected in the design of the Mathematics Access Module were chosen with the background and characteristics of the target student group in mind. Pass rates were low, and various support mechanisms were introduced. However, large numbers of students either dropped out or did not obtain examination admission. Of those who obtained examination admission, many did not write the examination and relatively few passed. Table 8.7 shows the consolidated pass rate for each year, i.e. it combines the year-end and supplementary examination results. The information in Table 8.7 is expanded in Table 8.8, showing the effect on the pass rate of the supplementary examination results[15].

Table 8.7 shows the examination results over the years 1997 to 2003. Apart from the deliberate attempt to make no changes between 2001 and 2002 (discussed in Chapter 6) the poor results each year led to renewed efforts to improve the situation in the following year, either by implementing a particular intervention or by improving the teaching in some way (for example by providing more feedback after assignments, or more support, etc.). As was pointed out before, the pass rate was lowest in the year in which the greatest amount of scaffolding was provided (2002). The only difference in the way the module was taught, supported and assessed between 2002 and 2003 was the improved video, together with a decreased video-related assessment load (see Chapter 6). It is however not possible to conclude that this led to the improvement; more significantly, the level of attrition was greater in 2003 than it had been in 2002.

8.6 Summary

This chapter has outlined the changes that were made in order to try to improve the way in which the Mathematics Access Module was taught from the time study material was first provided. A number of aspects have been considered, such as changes in assessment practices, and increased support. Examination participation rates and pass rates were investigated, to try to gauge whether any of the changes that were implemented over the years had any impact on student success. None of the attempts at improving the teaching, and none of the interventions described in Chapters 6 and 7 led to any significant improvement in the pass rate, and the continuation of poor results led to the final action research cycle, which will be described in the next chapter. It seemed that too many students needed more assistance than is practically possible within the UNISA distance learning environment, and such students needed to be identified. It also seemed

[15] No supplementary examinations were held during 1997 and 1998, as the access examination was written twice each year.

that many students were unaware of areas of academic need which could possibly be remedied. Here too an identification process seemed to be called for. Ongoing attempts to improve the way in which the Mathematics Access Module was taught, and the two parallel sets of action research cycles that took place from 2000 to 2003, all converged to a final intervention. This intervention dealt with the introduction of a diagnostic assessment for all potential Mathematics Access Module students. A final action research cycle associated with this intervention involved some preliminary attempts to investigate the implementation and impact of the assessment for all potential Mathematics Access Module students. This is the topic of Chapter 9.