

# **SOMDEL**

## **Somali Distance Education Literacy Programme**

### *Macallinka Raddiya*

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May, 2003**

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## **Acknowledgements**

During the evaluation, several people assisted me and I would like to thank them for their time and support. I would like to thank staff at the Africa Educational Trust in London, in particular, Michael Brophy, Emily Oldmeadow, Carolyne Dennis and Jill Landymore. I would also like to thank staff at Africa Educational Trust Office in Hargeisa and Somaliland for their support and contribution. In particular, Hassan “Embassy” Ahmed Ibrahim, Habiba Ahmed, Ali Jama, Sara, Ishmail, Mohammed Wafir, Ahmed, Mohammed Abdi Omer, Yassein Haji Dualeh, Abdi, and Daaud Ahmed from the Ministry of Education. AET Staff at Bossasso, Puntland: Hawa Ali Farah (AET Co-ordinator), Abdi Hakim Abdullai and Firdowsa Hassan Warsame. At the BBC, John Tuckey and Abdinur and Ruquya (course writer). I would also like to thank my colleagues at IRFOL, especially Terry Allsop and Kate Crofts for their support and encouragement.

I would like to thank all the AET staff, teachers and learners in Somaliland, Puntland and Somalia who were willing to speak with me and to share their views and experiences.

## Summary

The Africa Educational Trust in conjunction with the BBC World Trust launched a new and innovative educational programme in March 2002 called SOMDEL – the Somalia Distance Education Literacy programme – Life Skills Approach. The aim of the programme is to provide basic literacy, numeracy and life skills to out-of-school children and adults who missed out or were denied access to conventional schooling. This is especially significant in Somaliland and Somalia where civil war has ravaged the country, and the educational system severely disrupted. A whole generation of people has been excluded from education.

The project is known locally in Somali as *Macallinka Raddiya* (Radio Teacher). It consists of a three way approach which combines radio, print, and face-to-face teaching. Each week on Thursday evenings at 5.30, a thirty minute radio broadcast is aired after the BBC World Service News. The main aims of the programme are:

- To ensure that people in difficult circumstances, particularly girls, have access to literacy, numeracy, and life skills
- To reach thousands of disadvantaged children, young men and women
- To improve the capacity in villages and towns to deliver local literacy and numeracy skills
- To develop distance teaching and audio (broadcast) materials
- To improve the understanding, awareness and discussion of health, human rights, and environment issues

The initial series of 50 radio broadcasts came to an end in March 2003, and the International Research Foundation for Open Learning was commissioned by the Africa Educational Trust to undertake the external evaluation.

The report is divided into 4 Sections. The first section provides the introduction and background of the evaluation. In Section 2, the approach to the evaluation and the research design are discussed. The evaluation uses the log frame of the project as an overview to measure the proposed goal, purpose, outputs and activities against the achievements, with additional comments made during the evaluation. This is supplemented by in-depth and detailed research. The research design, accordingly, includes both quantitative evidence to show the number of people benefiting from the programme throughout Somalia and Somaliland and qualitative evidence about the effectiveness and usefulness of the programme by interviewing a wide range of stakeholders – learners, teachers, listeners and AET local staff. A variety of data collection techniques were used: examination and scrutiny of statistical records and documents, focus group discussions, semi-structured interviews, case studies, surveys and

participant observation. To document regional differences, the evaluation was carried out in Hargeisa, Berbera, Buroa, Borama in Somaliland and Bossasso in Puntland.

In Section 3, the main findings of the research are discussed. A summary of the main findings are:

- 10,908 learners have enrolled in the SOMDEL programme in 351 SOMDEL classes throughout Somaliland, Puntland and southern Somalia.
- The majority of registered learners are female and over-age (older than school age)
- SOMDEL is providing a beneficial service to children of school-age who do not have access to formal schools. In each region, at least 2 remote villages are targeted for SOMDEL classes. Data show that 363 school-age children are currently enrolled in SOMDEL classes in Somaliland.
- Radio is a powerful communication and educational tool.
- The SOMDEL programme is an all-inclusive approach - it reaches a wide audience – not only those learners who are registered for the course but also for those listeners who can access the programmes via radio.
- The content of the life skills messages are culturally specific and transmit knowledge and information about important health, environment, and human rights issues.
- There are regional differences in the way SOMDEL is perceived and operates.

In section 4, Recommendations and Conclusion are discussed.

• **SOMDEL should continue beyond this first year.** The data collected during this evaluation show overwhelming support and commitment for the programme by a wide range of stakeholders. The most significant outcome is the number of people who have gained *access* to education. Thousands of people have benefited from the programme, both registered learners and listeners.

During the evaluation, it was shown that the radio broadcasts in form of “edutainment” make learning a fun and informative experience. It caters to a wide range of people with different needs and aspirations. The broadcast can reach parts of Somalia where conflict and fighting prevent other forms of educational delivery. Throughout the evaluation, various stakeholders were asked if they would like *Maalinka Raddiyaha* to continue, and there was overwhelming support for the programme. The radio teacher is a novel and successful initiative – it provides access to education to some of the most marginalised and excluded from society and raises the public consciousness on very important themes and issues that are crucial to development.

• **A strategy needs to be devised to expand SOMDEL further to target two distinct groups: (i). children of school-age in remote and rural areas with community**

**support.** Special emphasis should be in areas where there are no functioning schools and to devise ways to reach more out-of-school children. Major obstacles to this recommendation are the inaccessibility of communities, lack of transport, the lack of qualified teachers and seasonal migration. More community involvement would instil a greater sense of ownership into the programme.

**(ii.) Male youth who have missed out of formal school.** SOMDEL should also strive to focus on the young men who have not benefited from education. This, however, is a difficult group to target for a variety of cultural reasons.

### **Programme Pointers**

A set of pointers emerges from the evaluation for improving SOMDEL programmes.

These are:

- To provide further training for teachers on the concept of distance education.
- To stress the importance of the audio aspect of the programme as a significant component of the SOMDEL material.
- To emphasise the broadcast component to the learners
- To include a wider range of pronunciations in the broadcasts to cater to the regional variations in accent
- To compile a uniform template in Somaliland, Puntland and southern Somalia for the collection of statistical data on each learner during registration. The learner profile form should include the name, gender, age and date of enrolment. This will provide useful information for the AET database. If possible, teachers should also notify AET of drop-outs.
- To award the volunteer teachers with a certificate for participating in the SOMDEL programme.
- To devise an examination to measure the learner's literacy and numeracy skills.
- To improve the monitoring of SOMDEL classes throughout the country and to keep regular monitoring and evaluation reports.
- To prepare an audio cassette library of the SOMDEL broadcasts so teachers and learners can have regular access to the programmes. This would enable teachers to play the cassette at their convenience and avoid conflict over the timing of the broadcast, the conflict with prayers, and poor transmission of a programme. It would also allow a teacher to go at his or her own pace. In some areas, SOMDEL classes started much later than those in Hargeisa.
- To provide SOMDEL staff with research training skills. Action research could benefit the programme as well as to improve the skills of the individual staff members.

- To improve the distribution of workbooks and to make the materials more robust.
- To distribute the radios more efficiently.
- To improve rapport and communication between the AET office in Hargeisa and offices in Puntland and southern Somalia.
- To provide the learners with basic materials such as pencils and exercise books.
- To promote SOMDEL and to work with other non-government organisations throughout Somaliland, Somalia and in neighbouring countries where there are Somali-speakers and to keep them informed of SOMDEL activities and achievements.

The report concludes that SOMDEL has a lot of promise to deliver literacy, numeracy and life skills to thousands of disadvantaged people. SOMDEL is a flexible and adaptable approach to literacy and empowerment and in the long term it is hoped that SOMDEL will assist in the alleviation of poverty through access to basic education for all.

## Section I: Introduction

The Africa Educational Trust in conjunction with the BBC World Trust launched a new and innovative educational programme in March 2002 called SOMDEL – the Somalia Distance Education Literacy programme – Life Skills Approach. The aim of the programme was to provide basic literacy, numeracy and life skills to out-of-school children and adults who missed out or were denied access to conventional schooling. This was especially significant in Somaliland and Somalia where civil war has ravaged the country, and the educational system severely disrupted. A whole generation of people has been excluded from education.

The project is known locally in Somali as *Macallinka Raddiya* (Radio Teacher). It consists of a three way approach which combines radio, print, and face-to-face teaching. Each week on Thursday evenings at 5.30, a thirty minute radio broadcast is aired after the BBC World Service News. There are two main aims of the programme: firstly, to help registered SOMDEL learners improve literacy and numeracy skills and secondly, to create an awareness and understanding of important issues in health, nutrition, environment and human rights.

The initial series of 50 radio broadcasts came to an end in March 2003, and the International Research Foundation for Open Learning was commissioned by the Africa Educational Trust to undertake the external evaluation.

The evaluation took place from the 22<sup>nd</sup> February – 3rd March, 2003. An outline of the main activities during the evaluation is described in Appendix 1. Several places were visited during the evaluation, and these included Hargeisa, Berbera, Buroa, Borama in Somaliland and Bossasso in Puntland. Because of security reasons, the evaluator was not able to visit the southern part of Somalia. The evaluation does not include information about the impact of SOMDEL among Somali-speaking refugees or the impact of SOMDEL in neighbouring countries. The evaluator was not a Somali-speaker and relied on translation from her trained research assistants.

Fortunately, the evaluation coincided with two SOMDEL broadcasts, so the evaluator was able to observe first-hand the broadcasts in two different regions – Haregisa, Somaliland and Bossasso, Puntland. The specific aims of the evaluation were to analyse the effectiveness of the SOMDEL programme in terms of reaching its target beneficiaries; to examine the impact of this three-way approach which incorporates printed materials, radio broadcasts and face-to-face instruction; to discuss the strengths and weaknesses of this approach with a variety of stakeholders; and to make recommendations or suggestions for future programmes.



## Section II: Study Design and Implementation

The evaluation uses the log frame of the project as an overview to measure the proposed goal, purpose, outputs and activities against the achievements, with additional comments made during the evaluation. This approach was supplemented by in-depth and detailed research. The research design, accordingly, included both quantitative evidence to show the number of people benefiting from the programme throughout Somalia and Somaliland, and qualitative evidence about the effectiveness and usefulness of the programme by interviewing a wide range of stakeholders – learners, teachers, listeners and AET staff. During the evaluation, a variety of data collection techniques were used: examination and scrutiny of correspondence, records, monitoring reports, focus group discussions, semi-structured interviews, case studies, surveys, and participant observation. To document regional differences, the evaluation was carried out in Hargeisa, Berbera, Buroa and Borama in Somaliland and Bossasso in Puntland. In addition, a small research team in Hargeisa was formed and trained in interview techniques. Two surveys were conducted on SOMDEL learners and listeners in Hargeisa. The following instruments, which are the basis of our findings, were developed and used for the various stakeholders.

### Learners

- Informal Group discussions and interviews with over 700 learners in 25 SOMDEL classes were held in Hargeisa, Berbera, Buroa, Borama and Bossasso. This provided feedback about the current SOMDEL programme and proposed recommendations for future programmes from the learners' perspective.
- Detailed case studies of SOMDEL learners.
- Visit to a remote village community where SOMDEL is providing basic education for school-age children who do not have access to formal school.
- A learner survey was conducted in Hargeisa on a random sample of 42 SOMDEL learners using semi-structured interviews and questionnaires.

### Teachers

- Focus group discussions with 76 SOMDEL teachers in 4 locations: Hargeisa, Buroa, Bossasso and Borama. This allowed us to examine the regional variations in the approach of the comprehension of the SOMDEL programme and the ways in which the instruction and materials were delivered. By comparing and contrasting the various experiences of the teachers, it allowed us to look at the similarities as well as the differences according to region.
- Participant observation in 25 SOMDEL classes allowed the evaluator to examine the pedagogical and organisational structure of SOMDEL classes. Observations also

recorded where the class took place (i.e. in a formal school or private house), the target audience, and the use and presence of SOMDEL materials.

- Participant observation during two live radio broadcasts for the SOMDEL programme in 6 classes in two areas – Hargeisa and Bossaso. This allowed the evaluator to see first hand the interaction between learners and teachers during the classroom situation and to examine the quality of the transmission of the BBC broadcast.

#### **Listeners**

- A Listener survey was also conducted in Hargeisa on a random sample of 35 people in a variety of occupations throughout the town to see how many people knew about the programme. One aim of this survey was to see how many listen to the programme and why.

#### **AET staff**

- In-depth semi structured interviews with Africa Educational Trust regional coordinators. This was extremely important especially in interviews with the regional coordinator of Puntland and southern Somalia. Because of political instability and security concern, it was impossible to travel beyond Bossaso to other areas within Puntland and to southern Somalia.
- Telephone interviews with BBC staff - including the Director the BBC World Service Trust.

#### **Limitations**

The security situation in the southern part of Somalia did not permit the evaluator to visit Mogadishu. However, structured face-to-face interviews with key SOMDEL officials from the south provided sufficient information to make the evaluation representative. The evaluator was not a Somali-speaker and relied on the interpretation from her trained research assistants in the field. As a result, a variety of approaches were employed to cross-check the reliability of data and information.

The evaluator was unable to visit refugee camps in neighbouring countries to examine the impact of the SOMDEL programmes.

Measurements of individual learner's numeracy and literacy skills were not evaluated because an examination had not been implemented at the time of the evaluation.

### Section III: Programme Outcomes

The main findings on the effectiveness and achievements of the SOMDEL programme are presented in this section in two ways. The first is to present the log-frame, remark on the extent of achievement and comment; this provides an overall view of the programme. Secondly, in order to obtain a more detailed understanding of the dynamics of SOMDEL from the stakeholders' point of view, the results from the various data collection activities are discussed.

**Table 1: SOMDEL Logframe, Achievements and Comments**

Narrative Summary	Extent of Achievement	Comments
<p><b>Goal:</b> To help reduce poverty and gender inequality in Somalia by improving access to education for people from rural areas and other areas affected by conflict, especially young people who have not had access to schools.</p>	<p>SOMDEL is providing a beneficial service to children of school-age who do not have access to formal schools. In each region at least two remote villages are targeted for SOMDEL classes. Data for Somaliland show that 363 school-age children are currently enrolled in SOMDEL classes. Increased demand for education, especially by females.</p>	<p>There is a desire to expand SOMDEL classes to more remote areas and to increase the number of rural classes. The main obstacles in remote areas are inaccessibility and lack of transport and resources.</p>
<p><b>Purpose:</b> To ensure that people in difficult circumstances, particularly girls have access to literacy, numeracy and life skills which will improve their opportunities for sustainable livelihoods in rural and post conflict areas in Somalia.</p>	<p>Data show that the majority (70%) of SOMDEL learners are female. In many cases, SOMDEL offers the only access to literacy, numeracy and life skills to over-age females. Trained teachers volunteer to teach the SOMDEL classes.</p>	<p>SOMDEL classes are extremely successful in offering females their only opportunity to education. The classes are adaptable and flexible which complement the diverse needs of its female learners.</p>
<p><b>Outputs:</b> 12,000 disadvantaged children and young men and women with basic literacy and numeracy skills and improved knowledge and understanding of health, human rights and environmental issues.</p>	<p>Enrollment statistics show that over 10,000 learners are registered with SOMDEL. These include both school-age children and over-age adults.</p>	<p>Interviews confirm the success of SOMDEL providing basic education and life skills knowledge. (at the time of the evaluation the examination had not taken place)</p>
<p>Improved capacity in 300 to 500 villages and local communities to deliver local literacy and numeracy programmes.</p>	<p>351 classes are currently being run throughout and the commitment and dedication of the community demonstrate improved capacity. There are 356 volunteer SOMDEL teachers, The majority received in-service training through workshops.</p>	<p>Great demand to expand even further if resources allow.</p>

<p>Distance teaching and audio (broadcast) materials developed and available for refugees and other Somali speaking communities in neighbouring countries, especially children who may have no access to literacy in their mother tongue.</p> <p>Improved understanding, awareness and discussion of health, human rights and environmental issues amongst the large radio listening public in Somalia, refugee camps and Somali speakers in neighbouring countries.</p>	<p>The broadcasts are aired throughout Somalia and Somaliland as well as in neighbouring countries. The course has the potential to reach Somali speakers in neighbouring countries.</p> <p>A unique feature about SOMDEL is that the radio broadcasts can be heard by anyone who has a radio. In a random survey conducted in Hargeisa it was shown that 88% of people listened regularly to the programmes because of their educational content and their entertainment quality.</p>	<p>The evaluator was not able to determine the impact of the SOMDEL broadcasts in refugee camps or outside the country. The evaluator is unaware of material distribution outside of SOMALIA. It is hoped in the second phase, further expansion of SOMDEL will include access for refugees.</p> <p>Surveys showed that listeners retained the information from the broadcasts. Health issues were extremely popular with the listener audience. (The evaluation did not examine the impact of the audio broadcasts outside the listening public in Somalia.)</p>
<p><b>Activities:</b> Participatory planning, monitoring and evaluation involving range of stakeholders</p>	<p>A wide range of planning activities were undertaken for the SOMDEL programme.</p> <p>Participatory impact assessment was conducted in Somaliland from Sept-Dec. 2001</p> <p>AET External monitoring- April 2002; May-June 2002; and October 2002.</p> <p>Interim Report 2002</p> <p>Quarterly workplans for May/June 2002; Aug/Oct 2002; Nov/Jan. 2003.</p>	<p>Excellent planning and monitoring prior to the launch of the SOMDEL programme.</p> <p>Frequent monitoring throughout the SOMDEL programme.</p> <p>During the evaluation it was noted that AET staff outside Hargeisa faced difficulties monitoring the classes. This was often due to lack of transport, funds, and outbreaks of conflict. This can be improved.</p>
<p>Radio information and advertising for course and application procedures</p>	<p>Advertising and publicity about the course with details of application procedure were made in Somaliland, Somalia and Puntland. All ngos and international organisations were notified about the programme via e-mail.</p> <p>Weekly information and publicity announcements were broadcast</p>	<p>Excellent publicity about the course even in areas where conflict has prevented access to formal education.</p>

	<p>on the BBC Somali Service</p> <p>Other BBC programmes, such as Focus on Africa and What’s your Problem also publicised the programme.</p>	
Registration of village and district community groups with nominations for teachers	351 classes were registered for the SOMDEL programme. Every teacher had to be nominated by the community.	Nomination of teachers by the community is an inclusive strategy and helps the community to oversee and participate in the project.
<p>Training workshops:</p> <p>a. trainers</p> <p>b. teachers</p> <p>c. distribution of village literacy</p>	<p>a. one week training of trainers workshop was held in Hargeisa for over 30 trainers from Mogadishu, Bossasso, Garoe and all 5 regions in Somaliland.</p> <p>Additional training workshops were held in southern Somalia by AET Programme Manager, Hassan Embassy.</p> <p>b. A total of 18 Teacher trainer workshops were held throughout Somaliland, Puntland and Southern Somalia and a total of 459 teachers were trained.</p> <p>c. Distribution of materials was done in batches. In some cases there were some delays in receiving the written materials on time to coincide with the broadcasts.</p> <p>Radio distribution was also delayed. During the evaluation in February 2003, 100 radios were distributed.</p>	<p>The training workshops were well attended; however, interviews with teachers revealed that they would like further training in teaching in distance education mode.</p> <p>c. There have been problems with the production and distribution of materials. In some areas the materials were received late or incomplete.</p> <p>Improvements need to be made in the distribution of radios. An inventory of all radio distributed throughout Somalia, Somaliland and Puntland must be kept and up-dated.</p>
Radio broadcasts to support written course and face-face teaching	<p>The first radio broadcast was aired on the 28 March, 2002 and the last was in March, 2003.</p> <p>A total of 50 radio broadcasts were aired to coincide with the written material. Each week a main theme topic and key words were introduced to the learners and listeners.</p> <p>The number of face-to-face classes vary from 2 per week – 6 per week.</p>	<p>The broadcasts were well received. Learners and listeners appear to benefit from the programmes and retain knowledge The themes were culturally specific to the SOMALI community. The content and the format of the production were well designed.</p> <p>Suggestions were made to change the time of the broadcast because it conflicted with prayers. In Puntland it was noted that the broadcasts should be held on a different day because Thursday</p>

		<p>was the “weekend” and teachers did not want to hold classes on Thursdays.</p> <p>Copies of all SOMDEL radio broadcasts should be made available on cassette as it would allow teachers to teach at their own pace and convenience.</p>
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### ***Quantitative data.***

The statistics collected for Somaliland, Puntland and southern Somalia show that over 10,908 learners have enrolled in the SOMDEL programme in 351 SOMDEL classes with 367 teachers. Table 1 displays the breakdown by location. Interestingly, the data reveal that a total of 594 or 6% of SOMDEL learners are disabled. This shows that SOMDEL is making an impact in providing education to those who are often marginalised because of disability.

**Table 2. SOMDEL Learners**

Location	No. students	No.Disabled	No. Classes	No. Teachers
Southern Somalia	4211	276	145	119
Somaliland	4,316	150	133	175
Puntland	2381	168	73	73
Total	<b>10,908</b>	594	351	367

Statistics on the gender ratio of SOMDEL learners are currently being compiled; however, it is estimated that over 70% of the registered learners are female.

Detailed data for each area – Somaliland, Puntland and southern Somalia are shown in the following tables. The data, however, are not collected in a consistent manner in each area. In some cases, the statistical data show discrepancies.

### **Regional Information**

**Table 3. Somaliland**

Region	No of classes	No. of Students
Hargeisa/Waquoy Galbed	49	1495
Borama/Awdal	11	249
Berbera/Sahil	19	487
Buroa/Togdher	34	793
Erigavo/Sanaag	20	359
Total	133	3383

**Table 4. Puntland**

Region	Classes	Students	Disabled	Teachers
Mudug Sheikhunaa	34	1016	69	34
Nugal	20	744	45	20
Bari – Qardho	11	368	28	11
Bari – Bossasso and Sanag	8	253	26	8
Total	73	2381	168	73

**Table 5. Southern Somalia**

Region	Classes	Students	Teachers
Waaajid	10	309	11
Jowhar	19	473	25
Qoryooley	17	549	22
Baydhaba	22	645	28
Marka	47	1849	52
Muqdisho	14	386	19
Total	128	4211	157

During the evaluation, a total of 25 SOMDEL classes were visited in Hargeisa, Berbera, Buroa, Borama and Bossasso. Significantly, 17 of the classes were exclusively female. The high number of female learners enrolled in SOMDEL classes was also confirmed by teachers and AET outreach officers. The demand for education by females, especially over-age females, is very encouraging. In many cases, the evaluation has shown that SOMDEL provides the only alternative for them to become numerate, literate and to learn about life skills.

### Children of School-age

Another group that the SOMDEL programme is reaching are the non-enrolled children of school age. A specific aim of the SOMDEL programme, as depicted in the log-frame, is to target remote, rural areas where children of school age do not have access to formal or conventional schools. As shown in Table 2, there are 10 remote villages in Somaliland where children are benefiting from SOMDEL classes. In each of the 5 regions, 2 classes are targeted exclusively for school-age children. Presently, a total of 363 children – 274 boys and 89 girls are enrolled in SOMDEL classes. (Data for Puntland and Southern Somalia will be forthcoming)

**Table 6. SOMDEL- village school-age children in Somaliland**

<i>Region</i>	<i>Location</i>	<i>Learners</i>		<i>Total</i>
		<i>Male</i>	<i>Female</i>	
Awdal	Halimale	30	10	40
Awdal	Ruqi	22	9	31
Sahil	Hagal	20	6	26
Sahil	Rari-bul	18	3	21
Togdher	War-cimraan	45	15	60
Togdher	Qaybta	30	10	40
Hargeisa	Bend-Amaan	21	9	30
Hargeisa	Habsweyn	24	9	33
Sanaag	Kal-Sheikh	25	7	32
Sanaag	Shimbirale	39	11	50
Total		274	89	363

#### **SOMDEL Learner with AET Outreach officer, Ahmed**

During the evaluation, one of these communities, Qaybta Village in Togdher Region was visited to see how SOMDEL operated for out-of-school children. Qaybta does not have a school and the closest school is about 20 kilometres away. The classes take place in a mud block room with a thatched roof; there is no furniture and the children sit on the dirt floor.

#### **Village School, Togdher Region – SOMDEL class for children of “school-age”**

During an informal discussion with the children, they expressed their desire to be able to read and write and welcomed the SOMDEL initiative. A detailed interview with the SOMDEL teacher revealed that 30 students were enrolled aged 7-13 years. There is no primary school nearby. SOMDEL offers the only access to education for the community. The teacher holds 6 SOMDEL classes per week for two hours per day from 8-10am. Some of the problems he encountered were the lack of exercise books and pencils for the children; the lack of money to purchase batteries for his radio; and the timing of the broadcasts. Some of the children live several kilometres away and the evening broadcast



is not suitable for them. Therefore, he suggested a copy of the broadcasts on audio cassette which would enable his learners to benefit from the programme.

The major constraints of reaching out-of-school children in rural areas are:

- The lack of trained, qualified volunteer teachers in the community
- The lack of transport and remoteness of the communities
- Difficulties of AET staff to get materials to these areas
- Seasonality of some of the communities
- Drought and poverty
- Security risk for AET staff

During the evaluation 25 classes were visited as depicted in the following table.

**Table 7– SOMDEL Classes Visited During Evaluation**

Location	Name of School/Venue	No. of learners present*	Type of venue	No. of Tutorials/week
Hargeisa	Ayaan Women's Centre	25 females	NGO - room	4 days/week
Hargeisa	SOCSA	19 females	SOSCA	2 days/week
Hargeisa	State House	21 females	Private house	2 days/week 30 minute shifts
Hargeisa	Malco/DurDur	All male- 22 soldiers and students	Formal classroom	2 days/week
Hargeisa	Malco/DurDur	50 females	Private class	6 days/week
Hargeisa	Hovoyoco	20 15F/5M	Ngo	2 days/week
Berbera	Women's centre	13 females	Ngo	6days/week
Berbera	"	15 females	Ngo	6 days/week
Berbera	"	32 females	Ngo	6 days/week
Berbera	Sahil Primary	23-18F/4M	Formal classroom	6 days/week
Berbera	Sahil Primary	24 girls	Formal Classroom	6 days/week
Berbera	Police Line School	35 females	Formal classroom	6 days/week
Buroa	Qaytab village school	10- 4F/6M	Mud/thatch room-village	6 days/week
Buroa	Local primary	19 females	Formal school	6 days/week
Buroa	Local primary	17 females	Formal school	6 days/week
Bossasso	Ngo	56 females	Private school	4 days/week
Bossasso	Ngo	28- 12F/16M	Private school	4 days/week

			NGO	
Bossasso	Ngo	39-30F/9M	Private school Ngo	4 days/week
Bossasso	Ngo	40-29F/11M	Private School Ngo	4 days/week
Bossasso	Ngo	18 11 females/7 boys	Private school Ngo	4 days/week
Bossasso	AET office	33 females	AET office	4 days/week
Borama	NGO	26 females	NGO -SOWDA	6 days/week
Borama	Local primary	20 females	Formal school	6 days/week
Borama	NGO – Awdal	30 females	Ngo room	6 days/week
Borama	Room	40+Females	Private House	6 days/week

Some of the main findings from our observations of classrooms and meetings are as follows. In our sample of 25 classes, 670 learners were present- most of the learners were female 594 (89%) compared with 76 (11%) male. In some classes they were notified in advance of our visit so it is difficult to know how “genuine” the attendance was; however, the majority of classes we visited were on spec so the learners we met would have been there irrespective of our visit.

#### **SOMDEL student – Amina, 16 years old, Berbera.**

The photograph above shows Amina, a 16 year old vegetable seller. She sells foodstuffs in the morning and in the afternoon she attends SOMDEL classes. During an interview with her, we asked her why she enrolled with SOMDEL. She replied, *“I want to be literate and numerate so I can keep a list of my debtors and to improve my business.”*

The location of where SOMDEL classes are held vary considerably- from a formal classroom in a school, a room in a private house, or a room in a local ngo. This flexible and adaptable approach allows SOMDEL classes to take place in a variety of locations.

Another significant finding is the regional differences of how SOMDEL operates. For example, the number of tutorials or face-to-face classes that are held vary. In Hargeisa, the usual pattern is to hold two classes per week and at least one of these classes is held on a Thursday evening to coincide with the BBC broadcast. Whereas outside of Hargeisa, the SOMDEL classes took on a different form, and most of the classes were held in the afternoons, six days per week in Buroa, Berbera and Borama. The reason for this is because the learners want to go to a class six days per week because it “mirrors” the formal school. They want the SOMDEL classes to be viewed and regarded just as important as the classes in conventional schools. In contrast, in Puntland SOMDEL classes are held 4 days per week, Saturday to Wednesday. They do not hold classes on Thursday evenings because it is the beginning of their weekend. Evidently, they record the broadcasts on audio cassettes and then play them on another day. When SOMDEL

first started the local radio station use to record the broadcasts and play them twice a week; however, the station has been shut down by the local warlord.

Informal discussions with learners in the various classes revealed the following points.

### **Perspective of SOMDEL Learners**

- *Reasons for enrolment*

- The majority of learners found SOMDEL classes compatible with their domestic responsibilities and commitments. As shown in Table 7, Enrolment in 17 classes was exclusively female.

- The majority enrolled because they do not have to pay fees.

- They receive free materials and free face-to-face instruction (it was noted; however, that in most classes learners have to share materials)

- The time of the classes (usually afternoons) was convenient especially for the female learners

- They found the topics interesting and relevant to their life. The favourite topics in the workbooks were female genital mutilation, breastfeeding and khat chewing.

- The most popular topic in all the classes was the theme on female genital mutilation and other health issues such as Khat chewing, and breast-feeding followed by the programmes on the environment.

- They enjoyed the broadcast and remarked, “Broadcast is a good teacher” ; “We are learning a lot of knowledge we did not know before” and they particularly liked the drama aspect of the radio production and the way in which the theme topics are debated and the various perspectives between traditional and modern views.

If the programme were to continue, additional suggested topics for new programmes include: family planning, environment, breast feeding, English and Arabic, history, drama, and literature.

- *Problems encountered:*

- Some of the learners did not understand the distance component and some did not listen to the radio broadcasts. When asked about the broadcast from the previous week, very few learners could remember the topic of the last radio broadcast that they heard. (This problem was highlighted in the AET interim report when it was remarked, “that the radios and broadcasts were seen as the symbol and glue rather than the main teaching tool” *Interim report*, April, 2002)

- Many viewed the SOMDEL class as a conventional class and wanted to attend classes 6 days per week like a formal class operates.

- Seasonal migration during the summer period disrupted studies.
- *Suggestions*
- The learners want to take an examination at the end of the course.
- Others suggested a certificate to acknowledge their success. As shown in the picture below a SOMDEL learner displays her numeracy skills.

***Somdel learner, Borama***

To cross-check the validity of the group discussions, learners were also interviewed individually. A small study was conducted in Hargeisa and the suggestions and comments made in the group discussions were confirmed.

## Perspective of the SOMDEL teachers

During the evaluation, a series of focus group discussions were held with teachers in four locations: Hargeisa, Buroa, Bossasso and Borama. Detailed findings from each focus group discussion are found in Appendix 2. The main findings from the focus group discussions are as follows:

- *What do you think of SOMDEL?*
- Unanimous support for the SOMDEL programme. All teachers commended the initiative and thought SOMDEL should continue beyond this year.
- Teachers volunteered to be SOMDEL teachers because they want to “help their people” and to help their country become literate. Many volunteers believe it is their duty to help.
- Majority of teachers had received formal training through a workshop.
- *Materials*
- The content of the material and the lay-out of the workbooks were fine overall. The majority believed that the topics were relevant and culturally important. The topics they enjoyed the most were health issues. In particular, the favourite topics were female genital mutilation, breastfeeding and HIV/Aids awareness and human rights. Other suggested topics for future programmes included – topics on sports, children’s rights, corruption, infectious diseases, literature and history. All liked the drama aspect of the programmes.
- Some teachers mentioned that they use the SOMDEL materials in other classes that they teach. As shown in Table 7 many of the classes are taught in private homes.
- It was suggested to combine some of the workbooks together and to only have 2-3 books and not 7. It was also suggested to make the materials more durable and robust with better covers and binding.
- *Broadcast*
- Timing of the broadcast provoked discussions. Some teachers thought it was fine as it is whilst others said it should be changed because it conflicted with prayers. In Bossasso, it was suggested to broadcast on a different day because it conflicted with the “weekend.”
- The quality of transmission varied throughout the regions. In particular, teachers in Bossasso said the broadcast was very poor. (This was observed during my visit to Puntland)
- The majority of teachers did not like the music and thought it should be improved. It was suggested to have a better “theme” tune for SOMDEL.

- Some teachers complained about the use of southern Somalia speakers and did not like the accents. They also complained about southern Somalia spelling for certain words.
- Some teachers did not fully comprehend the importance of the distance component and some used the materials without listening to the radio broadcasts.
- It was commented that the radios they received are cheap and do not last very long. They were described as “one time use and throw them away”
- *Suggestions for Improvement*
- More training workshops, especially to focus on the concept of distance education.
- More information on certain topics. The male teachers said they felt inadequate to teach about breastfeeding and would like more training in subjects that they didn't understand properly.
- Flexible enrolment of learners at different times and of different abilities caused difficulty for some teachers. (though they coped with this by using two blackboards in the room and dividing the learners by ability and date of enrolment).
- They would like some guidelines on how to cater for the diverse abilities of their learners and how to teach learners who enrolled late
- More visual aids such as posters and maps
- Incentives. Most said they would like to receive a certificate to acknowledge their participation in the SOMDEL programme. They would also like to receive a financial award. Some of the teachers were confused as to why other programmes offered by AET the teachers were paid and they were not.

### **Listener Survey**

A listener survey was conducted in Hargeisa to see whether those who were not registered SOMDEL learners listened to the BBC broadcasts. A total of 35 people were interviewed randomly, and 88% knew about the programmes and listened regularly. This is encouraging because it confirms that the programme reaches not only those enrolled but also listeners. Further research is needed to examine the impact that SOMDEL has on the “listeners” especially outside Hargeisa in other regions and throughout Somalia and in neighbouring countries.

### **Perspective of AET staff – including regional coordinators and outreach officers**

Many of the Africa Educational Trust staff work on different programmes, and not solely on the SOMDEL programme. During interviews and discussions I obtained their views about the SOMDEL programme.

- **Teacher Incentives:** A prime concern of the staff was the lack of incentives for teachers. They thought that teachers should receive an honorarium or some sort of incentive. They remarked that there was some confusion about why teachers for other AET programmes were paid, and SOMDEL teachers were not. Clarification needs to be provided to the teachers and to the AET staff.
- The justification as to why the majority of SOMDEL classes are held in towns was because there is a great demand for the programme because a significant number of people are illiterate. Towns are more accessible, reach a larger number of people, and there are more qualified volunteer teachers.
- The outreach offices found it difficult to expand SOMDEL classes to remote and rural areas because of inaccessibility, lack of transport, the lack of qualified people to volunteer and security concerns.
- There are problems in monitoring classes because of lack of transport and because of their other duties and responsibilities. (Monitoring varied from area to area.)
- They have experienced problems in receiving enough materials and in the distribution of materials and late arrival of radios.

In an in-depth interview with the Regional Co-ordinator for southern Somalia, he discussed the success of the SOMDEL programme. Despite the political instability and the constant bouts of clan warfare, there are over 4,500 registered SOMDEL learners. This is encouraging because it shows that even where conflict and fighting prevents other forms of educational delivery - SOMDEL provides an alternative strategy.

### **Observations during Class visits and Broadcast**

The evaluation coincided with two Thursday evening broadcasts in two different localities – Hargeisa, Somaliland and Bossasso, Puntland.

1. In Hargeisa – Two SOMDEL classes were visited during the broadcasts. In each class, there was a radio and SOMDEL materials were present. The topic of the Broadcast was Female Genital Mutilation. The transmission was good and the learners listened to the broadcasts.

2. In Bossasso – Two SOMDEL classes were visited during the broadcast. In each class, there was a radio, and SOMDEL materials were present. The transmission of the broadcast was very poor and the interference made it difficult for learners to listen. In both classes, the teacher held the radio and tried to get a clear transmission. It was very difficult to hear the broadcast. Learners were not paying attention and did not seem to understand the topics. The learners in Bossasso do not normally attend SOMDEL classes on Thursday evenings. Teachers informed me that they record the broadcasts and listen to them on Saturday with their learners.

The various perspectives from learners, teachers and AET staff members confirm that SOMDEL is succeeding in providing access to a large number of people throughout Somaliland, Puntland and Southern Somalia. There is overwhelming support and commitment for the programme. The following section incorporates some of the remarks and findings from these stakeholders and suggests ways to strengthen and improve SOMDEL.



## Section V: Recommendations and Conclusion

**1. SOMDEL should continue beyond this first year.** The data collected during this evaluation show overwhelming support and commitment for the programme by a wide range of stakeholders. The most significant outcome of the evaluation is the finding that thousands of people throughout Somaliland and Somalia have *access* to education. Distance education and open learning provide a realistic and viable alternative when more conventional modes of delivery are not available.

During the evaluation, it was shown that the radio broadcasts in form of “edutainment” make learning a fun and informative experience. It caters to a wide range of people with different needs and aspirations. The broadcast can reach parts of Somalia where conflict and fighting prevent other forms of educational delivery. Throughout the evaluation, various stakeholders were asked if they would like *Maallinka Raddiyaha* to continue, and there was overwhelming support for the programme. The radio teacher is a novel and successful initiative – it provides access to education to some of the most marginalised and excluded from society and raises the public consciousness on very important themes and issues that are crucial to development.

**2. A strategy needs to be devised to expand SOMDEL further to target two distinct groups:**

- (i.) Children of school-age in remote and rural areas with community support. Special emphasis should be in areas where there are no functioning schools and to devise ways to reach more out-of-school children. Major obstacles to this recommendation are the inaccessibility of communities, lack of transport and the lack of qualified teachers. More community involvement would instil a greater sense of ownership into the programme.
- (ii.) Male youth who have missed out on education. SOMDEL should also strive to focus on the young men who have not benefited from education. This, however, is a difficult group to target for a variety of cultural reasons.

**3. Programme Pointers**

A set of pointers emerges from the evaluation for improving SOMDEL programmes. These are:

- To provide further training for teachers on the concept of distance education.
- To stress the importance of the audio aspect of the programme as a significant component of the SOMDEL material to the learners.
- To compile a uniform template in Somaliland, Puntland and southern Somalia for the collection of statistical data on each learner during registration. The learner profile form should include the name, gender, age and date of enrolment. This will provide useful information for the AET database. If possible, teachers should also notify AET of drop-outs.

- To award the volunteer teachers with a certificate for participating in the SOMDEL programme.
- To devise an examination to measure the learner's literacy and numeracy skills.
- To improve the monitoring of SOMDEL classes throughout the country and to keep regular monitoring and evaluation reports.
- To prepare an audio cassette library of the SOMDEL broadcasts so teachers and learners can have regular access to the programmes. This would enable teachers to play the cassette at their convenience and avoid conflict over the timing of the broadcast, the conflict with prayers, and poor transmission of a programme. It would also allow a teacher to go at his or her own pace. In some areas, SOMDEL classes started much later than those in Hargeisa.
- To provide SOMDEL staff with research training skills. Action research could benefit the programme as well as to improve the skills of the individual staff members.
- To improve the distribution of workbooks and to make the materials more robust.
- To distribute the radios more efficiently.
- To provide the learners with pencils and exercise books.
- To improve rapport and communication between the AET office in Hargeisa and offices in Puntland and southern Somalia.
- To promote SOMDEL and to work with other non-government organisations throughout Somaliland, Somalia and in neighbouring countries where there are Somali-speakers and to keep them informed of SOMDEL achievements.
- To conduct further research to examine the impact of SOMDEL in refugee camps and among the "listeners" throughout Somalia and Somaliland.

The report concludes that SOMDEL has a lot of promise to deliver literacy, numeracy and life skills to thousands of disadvantaged people. SOMDEL is a flexible and adaptable approach to literacy and empowerment, and in the long term it is hoped that SOMDEL will assist in the alleviation of poverty through access to basic education for all.

**Appendix 1 – Schedule of Activities**

Date	Activity	Key personnel
20/02/03 Hargeisa	Arrive from London Meet with Emily Oldmeadow Visit 2 SOMDEL classes	AF, EO Ali Jama and Ismail
21/02/03 Hargeisa	Lunch with Hassan Plan of Action with EO Meeting with Hassan	AF, EO,
22/02/03 Hargeisa	Meeting with SOMDEL Regional Managers  Meeting with AET research officer  DIY solar presentation  Meeting with Research assistant- MoE	AF, Ali Jama, Ahmed, Ismail, Mohammed W.
23/02/03 Hargeisa	FG with teachers from Hargeisa (23)  Visit to 4 SOMDEL classes	AF, Ali Jama and teachers  Dauud
24/02/03 Berbera	Meeting with Regional Education Manager and SOMDEL regional officer  In-depth interviews with 2 learners – case studies  Visit 8 SOMDEL classes: discussions with Learners	AF, Ahmed, Jama
25/02/03 Buroa	FG with teachers from Buroa  Visit to 2 SOMDEL classes	AF, Ahmed
26/02/03 Hargeisa	Meeting with Ali Jama  Plan trip to Puntland	

	<p>Meeting with Hargeisa research team</p> <p>Interviews with female prospective listeners</p>	Ali Jama, Dauud and Habiba
27/02/03 Bossasso, Puntland	<p>Travel to Puntland</p> <p>Meeting with AET staff in Bossasso</p> <p>Visit to 7 SOMDEL classes</p> <p>Listen/Observe BBC Broadcast</p> <p>In-depth interview with Ismail</p> <p>About Southern Somalia</p>	Hawa and Abdi
28/02/03 Bossasso, Puntland	<p>Meeting at AET office</p> <p>Focus group discussion with SOMDEL teachers</p>	
1/03/03 Hargeisa	<p>Echo flight to Hargeisa</p> <p>meet with Hargeisa research team</p> <p>Discussion with Michael Brophy, Director AET</p>	
2/03/03 Borama	<p>FGD with SOMDEL teachers</p> <p>Visit 4 SOMDEL classes</p>	
3/03/03	<p>Meeting with outreach officer from Erigavo</p> <p>Briefing of main findings with AET staff</p>	

## **Appendix 2 : Focus Group Discussions with Teachers**

### ***1. Focus Group Discussion with Teachers in Hargeisa***

#### Why do girls come to SOMDEL classes?

Because there is no school fee and that it is the afternoon (a convenient time).

SOMDEL learners are mostly female because of the cultural belief against female education. Most boys went to conventional schools

#### Why do girls drop out?

No textbooks, too old and want to sit around, marriage, domestic house-work and family problems and some are “ashamed”

#### Training workshop:

2 days/2 workshops

Most of the teachers had received some training and had attended a workshop. The male teachers suggested more training which included seminars on specific topics such as breastfeeding and nutrition.

Unanimously they said that the training they received was not sufficient.

When probed and I asked why?

They want more skills, experience and basic pedagogy

More technical knowledge of distance education mode and how to teach with this mode.

They would also like to receive payment for attending a meeting.

Curriculum to be expanded and to include the following topics:

Economy, corruption, literature, stories, infectious diseases and prevention

Role play in order to teach a concept

Sanitation and HIV-Aids, child rights, human rights and women’s rights

Kat chewing and tobacco

Curriculum enrichment should include conflict resolution and peace

Social exterminated communities ; minority groups; upgrade agriculture

#### BBC Broadcasts

Time is now 5.30; the majority of teachers said it should be changed to 4.30 or 5pm. Or to have it on another day. It was thought that Thursday is not a good day as it is the beginning of the “weekend”.

One teacher mentioned that the students were confused about the programme i.e what is in the books and what is broadcast

All thought that the drama aspect of the programme was very good and that it reached a wide range of listeners.

Teacher guide: main themes

Use of experts and professionals was very important; interviews with real people such as “patients” or those suffering from a particular illness/problem

To add some oral exercises on the programme and to include more songs and drama and radio plays because they were more interesting. (INFOtainment?)

Another topic that came up was that the broadcast should include more from Somaliland and the south and to use more local performers from Somaliland.

The first two programmes were very good and the best. They didn’t think that the programmes were balanced by region

They didn’t think the opening song was very good and that the beat should be better and that it was not “warming up the listener”.

The programme is mad in isolation and there should be more actors/actresses from Somaliland in the broadcast.

What kind of incentives do you need as a SOMDEL teacher?

Money or some kind of reward.

Some said they would not continue in the second phase without remuneration or some sort of incentive. If they do not receive money, they would like to receive more training. They would also like to be involved more at the local level and teachers should also be interviewed and part of the programme.

They would like to receive a certificate that they taught the course for a year. They also suggested that students should also receive a certificate that they completed/did the SOMDEL course.

(Note: Some of the teachers mentioned that they use the SOMDEL materials in other classes that they teach.)

***2. Focus group discussion in Buroa with 23 teachers: 13 male and 10 female.***

How many of the teachers attended a training workshop? 13/23 attended a training workshop; the workshop was useful but the teachers indicated that they would like more training. Some of the teachers started late and missed the training workshop. 12 of the teachers are qualified teachers and teach in government schools.

What do they like about SOMDEL?

Use of radio helps more people to be informed and learn

The issues are good and provoke discussion

Materials and BBC broadcasts are parallel and complementary

Broadcasts can be heard everywhere

The course attracts more females, esp. over-age

Easy to understand

People who missed out when young now have an opportunity  
Project useful for nomadic people  
Project helps disabled people to learn

How to improve the broadcasts?

Time is too short; it should be longer  
If radios were distributed earlier, it would have helped  
Visual aids should complement the materials  
No one was given a radio  
Time is inconvenient for female learners  
To cope with regional differences the actors should come here or use local actors from this region

What do you think about the topics?

The topics are all good especially health, human rights and security  
“The topic on female genital mutilation was particularly interesting because it is a subject that is not usually discussed openly and the argument was very persuasive and convincing”  
Suggestions for new topics: agriculture, economic related issues, human rights, drugs, women’s rights .

Only 8 of the 21 teachers have a class on Thursdays to coincide with the broadcasts

Have you encountered any problems with the Materials?

All teachers experienced a problem with books arriving late  
Workbooks were distributed late and there is a scarcity of books  
5 teachers have not received copies of book 7

How is the quality of the SOMDEL material?

The books are fragile and split  
Print is not good  
There are mistakes and errors  
Pictures referred to in the text are not there  
Binding is not good  
Some are photocopied and the quality is very poor.  
In book 6, the font is too small  
Problem with the Somali language – there is a difference between the north and south  
And the writing is different – for example – the word Adhi is referred to as Ari  
They would prefer the Somaliland script

Why did you become a SOMDEL teacher?

Starting from grassroots and we must help our people  
All volunteers  
“to help our people” and “to share the word with the people”  
“We must bring the old and the young together after the civil war”  
“Those of us who know something should work together to help each other”

“For society to understand and to be peaceful and to see and observe us. What we are doing is right.”

Do you experience any problems?

Lack of chalk

Lack of equipment- chairs, tables, blackboards

Financial incentive – 1 year voluntary but feel they should receive an honorarium

10 of the teachers present rent a private room to hold the classes and would like some money to pay for the room (others hold classes at government schools)

If a teacher falls ill, there is no one to replace him/her

Students come and go as they please

Flexibility in enrolment causes difficulties

Who are your learners?

The majority of learners are female and over-age

They did not go to formal school because of the war and poverty.

They come to SOMDEL because it is free

How many classes do you hold per week?

6 classes/week in the afternoons because our learners are working in the mornings

How can SOMDEL be improved?

Issue certificates to those who attend now and to encourage new students to register

Teachers should be given an incentive to continue – an honorarium, radio and school furniture.

Rental of rooms should be paid by AET

All teachers should receive a certificate for teaching the course

(Note: The list of SOMDEL teachers held by the RM was incomplete. Records should be up-dated and maintained during regular monitoring visits.)

**3. Focus Group Discussion in Bossasso, Puntland: 7 teachers – 5 male, 2 female**

Why did you volunteer to be a SOMDEL teacher?

- to help the needs of our community
- to volunteer now and maybe get a job in the future

How many teachers attended the training workshop?

3 out of 7 attended a training workshop.

Was the workshop sufficient?

More training should be given for knowledge and money

How did you hear about SOMDEL?

Through the School Board; Adult Education and the Department of Non-formal Education publicised it. Some heard about it on the radio.



Do you encounter any problems with the materials?

Binding is not good

Not enough books

Cover is stiff and tears easily

Problems with distribution –No 7 book – no teacher guides and No 6. No student workbooks and 500 teacher guides.

What Topics do you like?

All the topics are interesting

Discussion among SOMDEL students of all of Somalia and have them talk on air

Sports and exercise should be included

Literature, songs and poetry

Broadcasts?

Radios were received very late

Quality of radio is poor

Local station has shut down by the local war lord

There is interference and the transmission was not good.

***4. Focus group discussion with teachers in Borama- 11 male and 4 female***

Why did you volunteer to be a SOMDEL teacher?

To help our people

People were displaced and missed out on education

Government collapsed and we need to help

Who are the SOMDEL learners in your area?

Most of the students are over-age females who did not have a chance to go to school

Some are “house girls” who work in the morning and come to class in the afternoon

SOMDEL training workshops

2 days training were sufficient

Radio

Not enough radios

The time of the radio broadcast on Thursday evenings is fine

Structure of broadcast

Too short

The don't like the tune

Debate is good

Language- actors are all the same and monotonous and the same time and same dialect.

\*The dialect does not reflect all of Somalia\*

Topics

All are good especially: the ones of health- hygiene, environment, female genital mutilation, infectious diseases, conflict resolution and land conservation.

Suggested topics for future programmes?

Religious courses

Maths

Environmental issues

Plantations, mobilisation and culturally friendly with the environment



## Programme Manager's Planning Monitoring & Evaluation Toolkit

Division for Oversight Services

March 2004

### Tool Number 1: Glossary of Planning, Monitoring & Evaluation Terms

#### I. Introduction

The toolkit is a supplement to the UNFPA programming guidelines. It provides guidance and options for UNFPA Country Office staff to improve planning, monitoring and evaluation (PM&E) activities in the context of results based programme management. It is also useful for programme managers at headquarters and for national programme managers and counterparts.

The glossary responds to the need for a common understanding and usage of results based planning, monitoring and evaluation terms among UNFPA staff and its partners. In this context, the planning, monitoring and evaluation terminology has been updated to incorporate the definition of terms adopted by the UN Task Force on Simplification and Harmonization.

#### II. The Glossary

##### (A)

**Accountability:** Responsibility and answerability for the use of resources, decisions and/or the results of the discharge of authority and official duties, including duties delegated to a subordinate unit or individual. In regard to programme managers, the responsibility to provide evidence to stakeholders that a programme is effective and in conformity with planned results, legal and fiscal requirements. In organizations that promote learning, accountability may also be measured by the extent to which managers use monitoring and evaluation findings.

**Achievement:** A manifested performance determined by some type of assessment.

**Activities:** Actions taken or work performed through which inputs such as funds, technical assistance and other types of resources are mobilized to produce specific outputs.

**Analysis:** The process of systematically applying statistical techniques and logic to interpret, compare, categorize, and summarize data collected in order to draw conclusions.

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**Appraisal:** An assessment, prior to commitment of support, of the relevance, value, feasibility, and potential acceptability of a programme in accordance with established criteria.

**Applied Research:** A type of research conducted on the basis of the assumption that human and societal problems can be solved with knowledge. Insights gained through the study of gender relations for example, can be used to develop effective strategies with which to overcome, socio-cultural barriers to gender equality and equity. Incorporating the findings of applied research into programme design therefore can strengthen interventions to bring about the desired change.

**Assumptions:** Hypotheses about conditions that are necessary to ensure that: (1) planned activities will produce expected results; (2) the cause effect relationship between the different levels of programme results will occur as expected. Achieving results depends on whether or not the assumptions made prove to be true. Incorrect assumptions at any stage of the results chain can become an obstacle to achieving the expected results.

**Attribution:** Causal link of one event with another. The extent to which observed effects can be ascribed to a specific intervention.

**Auditing:** An independent, objective, systematic process that assesses the adequacy of the internal controls of an organization, the effectiveness of its risk management and governance processes, in order to improve its efficiency and overall performance. It verifies compliance with established rules, regulations, policies and procedures and validates the accuracy of financial reports.

**Authority:** The power to decide, certify or approve.

## (B)

**Baseline:** Facts about the condition or performance of subjects prior to treatment or intervention.

**Baseline Study:** An analysis describing the situation prior to a development intervention, against which progress can be assessed or comparisons made.

**Benchmark:** Reference point or standard against which progress or achievements can be assessed. A benchmark refers to the performance that has been achieved in the recent past by other comparable organizations, or what can be reasonably inferred to have been achieved in similar circumstances.

**Beneficiaries:** Individuals, groups or entities whose situation is supposed to improve (the target group), and others whose situation may improve as a result of the development intervention.

**Bias:** Refers to statistical bias. Inaccurate representation that produces systematic error in a research finding. Bias may result in overestimating or underestimating certain characteristics of the population. It may result from incomplete information or invalid data collection methods and may be intentional or unintentional.

## (C)

**Capacity:** The knowledge, organization and resources needed to perform a function.

**Capacity Development:** A process that encompasses the building of technical abilities, behaviours, relationships and values that enable individuals, groups, organizations and societies to enhance their performance and to achieve their development objectives over time. It progresses through several different stages of development so that the types of interventions required to develop capacity at different stages vary. It includes strengthening the processes, systems and rules that shape collective and individual behaviours and performance in all development endeavours as well as people's ability and willingness to play new developmental roles and to adapt to new demands and situations. Capacity development is also referred to as capacity building or strengthening.

**Causality Analysis:** A type of analysis used in programme formulation to identify the root causes of development challenges. Development problems often derive from the same root causes (s). The analysis organizes the main data, trends and findings into relationships of cause and effect. It identifies root causes and their linkages as well as the differentiated impact of the selected development challenges. Generally, for reproductive health and population problems, a range of causes can be identified that are interrelated. A “causality framework or causality tree analysis” (sometimes referred to as “problem tree”) can be used as a tool to cluster contributing causes and examine the linkages among them and their various determinants.

**Chain of Results:** The causal sequence in the planning of a development intervention that stipulates the possible pathways for achieving desired results beginning with the activities through which inputs are mobilized to produce specific outputs, and culminating in outcomes, impacts and feedback. The chain of results articulates a particular programme theory.

**Conclusion:** A reasoned judgement based on a synthesis of empirical findings or factual statements corresponding to a specific circumstance.

**Cost-Benefit Analysis:** A type of analysis that compares the costs and benefits of programmes. Benefits are translated into monetary terms. In the case of an HIV infection averted, for instance, one would add up all the costs that could be avoided such as medical treatment costs, lost income, funeral costs, etc. The cost-benefit ratio of a programme is then calculated by dividing those total benefits (in monetary terms) by the total programme cost (in monetary terms). If the benefits as expressed in monetary terms are greater than the money spent on the programme, then the programme is considered to be of absolute benefit. Cost-benefit analysis can be used to compare interventions that have different outcomes (family planning and malaria control programmes, for example). Comparisons are also possible across sectors. It is, for instance, possible to compare the cost-benefit ratio of an HIV prevention programme with that of a programme investing in girls' education. However, the valuation of health and social benefits in monetary terms can sometimes be problematic (assigning a value to human life, for example).

**Cost-Effectiveness Analysis:** A type of analysis that compares effectiveness of different interventions by comparing their costs and outcomes measured in physical units (number of children immunized or the

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number of deaths averted, for example) rather than in monetary units. Cost-effectiveness is calculated by dividing the total programme cost by the units of outcome achieved by the programme (number of deaths averted or number of HIV infections prevented) and is expressed as cost per death averted or per HIV infection prevented, for example. This type of analysis can only be used for programmes that have the same objectives or outcomes. One might compare, for instance, different strategies to reduce maternal mortality. The programme that costs less per unit of outcome is considered the more cost-effective. Unlike cost-benefit analysis, cost-effectiveness analysis does not measure absolute benefit of a programme. Implicitly, the assumption is that the outcome of an intervention is worth achieving and that the issue is to determine the most cost-effective way to achieve it.

**Coverage:** The extent to which a programme reaches its intended target population, institution or geographic area.

### (D)

**Data:** Specific quantitative and qualitative information or facts.

**Database:** An accumulation of information that has been systematically organized for easy access and analysis. Databases are usually computerized.

### (E)

**Effectiveness:** A measure of the extent to which a programme achieves its planned results (outputs, outcomes and goals).

**Effective Practices:** Practices that have proven successful in particular circumstances. Knowledge about effective practices is used to demonstrate what works and what does not and to accumulate and apply knowledge about how and why they work in different situations and contexts.

**Efficiency:** A measure of how economically or optimally inputs (financial, human, technical and material resources) are used to produce outputs.

**Evaluability:** The extent to which an activity or a programme can be evaluated in a reliable and credible fashion.

**Evaluation:** A time-bound exercise that attempts to assess systematically and objectively the relevance, performance and success, or the lack thereof, of ongoing and completed programmes. Evaluation is undertaken selectively to answer specific questions to guide decision-makers and/or programme managers, and to provide information on whether underlying theories and assumptions used in programme development were valid, what worked and what did not work and why. Evaluation commonly aims to determine the relevance, validity of design, efficiency, effectiveness, impact and sustainability of a programme.

**Evaluation Questions:** A set of questions developed by the evaluator, sponsor, and/or other stakeholders, which define the issues the evaluation will investigate and are stated in such terms that they can be answered in a way useful to stakeholders.

**Evaluation Standards:** A set of criteria against which the completeness and quality of evaluation work can be assessed. The standards measure the utility, feasibility, propriety and accuracy of the evaluation. Evaluation standards must be established in consultation with stakeholders prior to the evaluation.

**Execution:** The management of a specific programme which includes accountability for the effective use of resources.

**Ex-ante Evaluation:** An evaluation that is performed before implementation of a development intervention. Related term: appraisal.

**Ex-post Evaluation:** A type of summative evaluation of an intervention usually conducted after it has been completed. Its purpose is to understand the factors of success or failure, to assess the outcome, impact and sustainability of results, and to draw conclusions that may inform similar interventions in the future.

**External Evaluation:** An evaluation conducted by individuals or entities free of control by those responsible for the design and implementation of the development intervention to be evaluated (synonym: independent evaluation).

## (F)

**Feasibility:** The coherence and quality of a programme strategy that makes successful implementation likely.

**Feedback:** The transmission of findings of monitoring and evaluation activities organized and presented in an appropriate form for dissemination to users in order to improve programme management, decision-making and organizational learning. Feedback is generated through monitoring, evaluation and evaluative activities and may include findings, conclusions, recommendations and lessons learned from experience.

**Finding:** A factual statement on a programme based on empirical evidence gathered through monitoring and evaluation activities.

**Focus Group:** A group of usually 7-10 people selected to engage in discussions designed for the purpose of sharing insights and observations, obtaining perceptions or opinions, suggesting ideas, or recommending actions on a topic of concern. A focus group discussion is a method of collecting data for monitoring and evaluation purposes.

**Formative Evaluation:** A type of process evaluation undertaken during programme implementation to furnish information that will guide programme improvement. A formative evaluation focuses on collecting data on programme operations so that needed changes or modifications can be made to the programme in its early stages. Formative evaluations are used to provide feedback to programme managers and other personnel about the programme that are working and those that need to be changed.

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### (G)

**Goal:** The higher order objective to which a development intervention is intended to contribute.

### (I)

**Impact:** Positive and negative long term effects on identifiable population groups produced by a development intervention, directly or indirectly, intended or unintended. These effects can be economic, socio-cultural, institutional, environmental, technological or of other types.

**Impact Evaluation:** A type of outcome evaluation that focuses on the broad, longer-term impact or results of a programme. For example, an impact evaluation could show that a decrease in a community's overall maternal mortality rate was the direct result of a programme designed to improve referral services and provide high quality pre- and post-natal care and deliveries assisted by skilled health care professionals.

**Indicator:** A quantitative or qualitative measure of programme performance that is used to demonstrate change and which details the extent to which programme results are being or have been achieved. In order for indicators to be useful for monitoring and evaluating programme results, it is important to identify indicators that are direct, objective, practical and adequate and to regularly update them.

**Inputs:** The financial, human, material, technological and information resource provided by stakeholders (i.e. donors, programme implementers and beneficiaries) that are used to implement a development intervention.

**Inspection:** A special, on-the-spot investigation of an activity that seeks to resolve particular problems.

**Internal Evaluation:** Evaluation of a development intervention conducted by a unit and /or individual/s reporting to the donor, partner, or implementing organization for the intervention.

### (J)

**Joint Evaluation:** An evaluation conducted with other UN partners, bilateral donors or international development banks.



**(L)**

**Lessons Learned:** Learning from experience that is applicable to a generic situation rather than to a specific circumstance. The identification of lessons learned relies on three key factors: i) the accumulation of past experiences and insights; ii) good data collection instruments; and iii) a context analysis.

**Logical Framework Approach:** A specific strategic planning methodology that is used to prepare a programme or development intervention. The methodology entails a participatory process to clarify outcomes, outputs, activities and inputs, their causal relationships, the indicators with which to gauge/measure progress towards results, and the assumptions and risks that may influence success and failure of the intervention. It offers a structured logical approach to setting priorities and building consensus around intended results and activities of a programme together with stakeholders.

**Logical Framework (log frame):** A dynamic planning and management tool that summarizes the results of the logical framework approach process and communicates the key features of a programme design in a single matrix. It can provide the basis for monitoring progress achieved and evaluating programme results. The matrix should be revisited and refined regularly as new information becomes available.

**(M)**

**Management Information System:** A system, usually consisting of people, procedures, processes and a data bank (often computerized) that routinely gathers quantitative and qualitative information on pre-determined indicators to measure programme progress and impact. It also informs decision-making for effective programme implementation.

**Means of Verification (MOV):** The specific sources from which the status of each of the results indicators in the Results and Resources Framework can be ascertained.

**Meta-evaluation:** A type of evaluation that aggregates findings from a series of evaluations. Also an evaluation of an evaluation to judge its quality and/or assess the performance of the evaluators.

**Methodology:** A description of how something will be done. A set of analytical methods, procedures and techniques used to collect and analyse information appropriate for evaluation of the particular programme, component or activity.

**Monitoring:** A continuous management function that aims primarily at providing programme managers and key stakeholders with regular feedback and early indications of progress or lack thereof in the achievement of intended results. Monitoring tracks the actual performance against what was planned or expected according to pre-determined standards. It generally involves collecting and analysing data on programme processes and results and recommending corrective measures.

**Multi-Year Planning, Management and Funding Framework (MYFF):** A four-year framework that is composed of three interlinking components: (1) a results framework, which identifies the major results that UNFPA aims to achieve, its key programme strategies, and the indicators that will be used to measure progress; (2) an integrated resources framework that indicates the level of resources required to achieve

the stated results; and (3) a managing for results component that defines the priorities for improving the Fund's organizational effectiveness.

## (O)

**Objective:** A generic term usually used to express an outcome or goal representing the desired result that a programme seeks to achieve.

**Objectively Verifiable Indicator (OVI)** (in Results and Resources Framework): See **Indicator**.

**Operations Research:** The application of disciplined investigation to problem-solving. Operations research analyses a problem, identifies and then tests solutions.

**Outcome:** The intended or achieved short and medium-term effects of an intervention's outputs, usually requiring the collective effort of partners. Outcomes represent changes in development conditions which occur between the completion of outputs and the achievement of impact.

**Outcome Evaluation:** An in-depth examination of a related set of programmes, components and strategies intended to achieve a specific outcome. An outcome evaluation gauges the extent of success in achieving the outcome; assesses the underlying reasons for achievement or non achievement; validates the contributions of a specific organization to the outcome; and identifies key lessons learned and recommendations to improve performance.

**Outputs:** The products and services which result from the completion of activities within a development intervention.

## (P)

**Participatory Approach:** A broad term for the involvement of primary and other stakeholders in an undertaking (e.g. programme planning, design, implementation, monitoring and evaluation).

**Performance:** The degree to which a development intervention or a development partner operates according to specific criteria/standards/guidelines or achieves results in accordance with stated plans.

**Performance Measurement:** A system for assessing the performance of development interventions, partnerships or policy reforms relative to what was planned in terms of the achievement of outputs and outcomes. Performance measurement relies upon the collection, analysis, interpretation and reporting of data for performance indicators.

**Performance Indicator:** A quantitative or qualitative variable that allows the verification of changes produced by a development intervention relative to what was planned.

**Performance Monitoring:** A continuous process of collecting and analysing data for performance indicators, to compare how well development interventions, partnerships or policy reforms are being implemented against expected results.

**Process Evaluation:** A type of evaluation that examines the extent to which a programme is operating as intended by assessing ongoing programme operations. A process evaluation helps programme managers identify what changes are needed in design, strategies and operations to improve performance.

**Programme:** A time-bound intervention similar to a project but which cuts across sectors, themes or geographic areas, uses a multi-disciplinary approach, involves multiple institutions, and may be supported by several different funding sources.

**Programme Approach:** A process which allows governments, donors and other stakeholders to articulate priorities for development assistance through a coherent framework within which components are interlinked and aimed towards achieving the same goals. It permits all donors, under government leadership, to effectively contribute to the realization of national development objectives.

**Programme Theory:** An approach for planning and evaluating development interventions. It entails systematic and cumulative study of the links between activities, outputs, outcomes, impact and contexts of interventions. It specifies upfront how activities will lead to outputs, outcomes and longer-term impact and identifies the contextual conditions that may affect the achievement of results.

**Project:** A time-bound intervention that consists of a set of planned, interrelated activities aimed at achieving defined programme outputs.

**Proxy Measure or Indicator:** A variable used to stand in for one that is difficult to measure directly.

## (Q)

**Qualitative Evaluation:** A type of evaluation that is primarily descriptive and interpretative, and may or may not lend itself to quantification.

**Quantitative Evaluation:** A type of evaluation involving the use of numerical measurement and data analysis based on statistical methods.

## (R)

**Reach:** the coverage (e.g., the range or number of individuals, groups, institutions, geographic areas; etc.) that will be affected by a programme.

**Recommendation:** Proposal for action to be taken in a specific circumstance, including the parties responsible for that action.

**Relevance:** The degree to which the outputs, outcomes or goals of a programme remain valid and pertinent as originally planned or as subsequently modified owing to changing circumstances within the immediate context and external environment of that programme.

**Reliability:** Consistency and dependability of data collected through repeated use of a scientific instrument or data collection procedure under the same conditions. Absolute reliability of evaluation data

is hard to obtain. However, checklists and training of evaluators can improve both data reliability and validity.

**Research:** The general field of disciplined investigation.

**Result:** The output, outcome or impact (intended or unintended, positive and /or negative) derived from a cause and effect relationship set in motion by a development intervention.

**Results Based Management (RBM):** A management strategy by which an organization ensures that its processes, products and services contribute to the achievement of desired results (outputs, outcomes & impacts). RBM rests on stakeholder participation and on clearly defined accountability for results. It also requires monitoring of progress towards results and reporting on performance/feedback which is carefully reviewed and used to further improve the design or implementation of the programme.

**Results Framework:** The logic that explains how results are to be achieved, including causal relationships and underlying assumptions. The results framework is the application of the logical framework approach at a strategic level, across an entire organization, for a country programme, a programme component within a country programme, or even a project.

**Risks:** Factors that may adversely affect delivery of inputs, completion of activities and achievement of results. Many risk factors are outside the control of the parties responsible for managing and implementing a programme.

**Risk Analysis:** An analysis or assessment of factors that affect or are likely to affect the achievement of results. Risk analysis provides information that can be used to mitigate the impact of identified risks. Some external factors may be beyond the control of programme managers and implementers, but other factors can be addressed with some slight adjustments in the programme strategy. It is recommended that stakeholders take part in the risk analysis as they offer different perspectives and may have pertinent and useful information about the programme context to mitigate the risks.

## (S)

**Stakeholders:** People, groups or entities that have a role and interest in the aims and implementation of a programme. They include the community whose situation the programme seeks to change; field staff who implement activities; and programme managers who oversee implementation; donors and other decision-makers who influence or decide the course of action related to the programme; and supporters, critics and other persons who influence the programme environment (see target group and beneficiaries).

**Strategies:** Approaches and modalities to deploy human, material and financial resources and implement activities to achieve results.

**Success:** A favourable programme result that is assessed in terms of effectiveness, impact, sustainability and contribution to capacity development.

**Summative Evaluation:** A type of outcome and impact evaluation that assesses the overall effectiveness of a programme.

**Survey:** Systematic collection of information from a defined population, usually by means of interviews or questionnaires administered to a sample of units in the population (e.g. person, youth, adults etc.). *Baseline surveys* are carried out at the beginning of the programme to describe the situation prior to a development intervention in order to assess progress; *Mid line surveys* are conducted at the mid point of the cycle to provide management and decision makers with the information necessary to assess and, if necessary, adjust, implementation, procedures, strategies and institutional arrangements, for the attainment of results. In addition, the results of midline surveys can also be used to inform and guide the formulation of a new country programme. *End line surveys* are conducted towards the end of the cycle to provide decision makers and planners with information with which to review the achievements of the programme and generate lessons to guide the formulation and/or implementation of a new programme/projects.

**Sustainability:** Durability of programme results after the termination of the technical cooperation channelled through the programme. Static sustainability – the continuous flow of the same benefits, set in motion by the completed programme, to the same target groups; dynamic sustainability – the use or adaptation of programme results to a different context or changing environment by the original target groups and/or other groups.

### (T)

**Target Group:** The main stakeholders of a programme that are expected to gain from the results of that programme. Sectors of the population that a programme aims to reach in order to address their needs.

**Time-Series Analysis:** Quasi-experimental designs that rely on relatively long series of repeated measurements of the outcome/output variable taken before, during and after intervention in order to reach conclusions about the effect of the intervention.

**Thematic Evaluation:** Evaluation of selected aspects or cross-cutting issues in different types of interventions.

**Transparency:** Carefully describing and sharing information, rationale, assumptions, and procedures as the basis for value judgments and decisions.

### (U)

**Utility:** The value of something to someone or to an institution. The extent to which evaluations are guided by the information needs of their users.

### (V)

**Validity:** The extent to which methodologies and instruments measure what they are supposed to measure. A data collection method is reliable and valid to the extent that it produces the same results

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repeatedly. Valid evaluations are ones that take into account all relevant factors, given the whole context of the evaluation, and weigh them appropriately in the process of formulating conclusions and recommendations.

(W)

**Work Plans:** Quarterly, annual, or multiyear schedules of expected outputs, tasks, timeframes and responsibilities.

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*This tool is subject to constant improvement. We welcome any comments and suggestions you may have on its content. We also encourage you to send us information on experiences from UNFPA funded and other population programmes which can illustrate the issues addressed by this tool. Please send your inputs to:*

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## WHAT IS PROGRAMME EVALUATION?

A Workbook by C S Potter  
June 1998

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This workbook is designed to support an oral presentation. The presentation will attempt to answer three questions:

1. What is evaluation?
2. Who is evaluation for?
3. How is evaluation conducted?

The workbook is designed to be used by you during the presentation. Use the spaces provided to make your own notes during the presentation.

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## 1. What is Evaluation?

Various authors have attempted to define evaluation. The following are some of the definitions found in the literature:

Tyler (1950) The process of determining to what extent educational objectives are actually being realised.

Harris (1963) The systematic attempt to gather evidence regarding changes in student behaviour that accompany planned educational experiences.

Cronbach (1963); Stufflebeam (1971); Alkin (1969): Providing information for decision-making.

Wiley (1970): The collection and use of information concerning changes in pupil behaviour to make decisions about an educational programme.

Scriven (1969); Glass (1969): The assessment of merit or worth.

Stufflebeam (1974); Joint Committee on Standards for Evaluation (1981): The systematic investigation of the worth or merit of some object.

Nevo (1983): Evaluation is the systematic investigation of various aspects of professional development and training programmes to assess their merit or worth.

Posavac and Carey (1997): A collection of methods, skills and sensitivities necessary to determine whether a human service is needed and likely to be used, whether it is sufficiently intense to meet the identified, whether the service is being offered as planned, and whether the human service actually does help people in need without undesirable side effects.

The above range of definitions would suggest that there are different perspectives on the roles of evaluation and its purposes, as well as the role of the evaluator in relation to other participants in the evaluation process.

**ACTIVITY 1: THE CONCEPT OF EVALUATION**

a) Formulate a definition of evaluation.

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b) Choose a partner and write down his or her definition of evaluation.

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c) Compare this definition with yours. Do both definitions include the same key concepts?

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d) Are both definitions suitable working definitions for use in the evaluation of the programme in which you are working?

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**2. WHO IS EVALUATION FOR?**

The object of an educational evaluation is normally the development of a course or programme. Evaluation affects both the course or programme and those who have a stake in its development.

Different groups are thus likely to be interested in the evaluation for different reasons.

In designing an evaluation to suit a particular context, it is important to identify the different 'stakeholders' in the evaluation, their relationship to the course or programme (the object of the evaluation) and the reasons why they will be interested in the evaluation.

If this process is undertaken correctly, it is likely that an evaluation design can be negotiated,

which is useful to those who have a stake in the course or programme, and which takes their relationships and interests into account.

#### ACTIVITY 2: FORMULATE YOUR OWN DEFINITION OF THE FOLLOWING KEY CONCEPTS

Stakeholder:

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Evaluation: object

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Context:

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Utility / Usefulness

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Discuss your answers with your partner and then with the wider group.

### 3. HOW IS EVALUATION CONDUCTED?

In order to be most useful, evaluations need to explore issues which are relevant to the different interest groups who have a stake in a project or programme. These issues are normally broad, and cover a number of different aspects of the project or programme.

In order to provide useful information relating to these broad issues, the evaluator will normally focus on a series of questions which he or she formulates about each broad issue. The evaluator usually formulates his or her evaluation questions working with the major stakeholders in the evaluation. This is done so that the different stakeholders can participate directly in the

evaluation process.

Data are then gathered from various sources and analysed. The evaluator then communicates the findings to the different stakeholders. This is normally done orally, in a meeting or series of meetings held with different stakeholder groups. The evaluator usually supports the oral presentation with a written report, which may be produced simultaneously or after the oral presentation.

The evaluation issues and related evaluation questions normally form the sections and subsections of the evaluator's final written report. They are also used to focus the oral presentations to different stakeholders in the project or programme.

**ACTIVITY 3: FORMULATE YOUR OWN DEFINITIONS OF THE FOLLOWING KEY CONCEPTS**

Evaluation issues:

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Evaluation questions:

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Participatory research:

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Data collection:

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Oral presentation:

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Written report:

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Discuss your answers with your partner and then with the wider group.

**ACTIVITY 4: UNDERTAKING A STAKEHOLDER ANALYSIS**

Choose a partner

- a) Identify the different groups (stakeholders) who have an interest or stake in your programme.
- b) Try and identify the reasons why you feel each different group of stakeholders has an interest in your programme.

List these in the columns below:

Stakeholder Group	Nature of Interest in the Programme
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<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>
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- c) Are all the stakeholders interested in the development of the programme for the same reasons?

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d) What type of questions do you feel each group of stakeholders will have about the programme?

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e) What type of answers do you feel each group of stakeholders will want from the evaluation of the programme?

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Discuss your answers with your partner and then with the wider group.

### SUMMARY

The different stages followed in evaluation design and implementation can be summarised as follows:

**ANALYSE CONTEXT:** identify the purposes for which the evaluation is being commissioned and how these relate to the purposes for which the programme has been established.

**DESIGN:** Identify the

- Focuses
- Issues
- Questions which will guide the evaluation.

Then identify a methodology suitable for answering the evaluation questions.

**IMPLEMENTATION:** Collect and analyse the data necessary to answer the evaluation questions. This is likely to involve a combination of

- measurement
- observation
- questionnaires
- interviews
- documentary analysis

**FORMULATE A PROGRAMME DESCRIPTION BASED ON THESE DATA SOURCES**

**DRAW INFERENCES CONCERNING WHETHER THE PROGRAMME IS SUCCESSFUL AND AREAS IN WHICH IT COULD BE IMPROVED**

**FORM A JUDGEMENT RELATING TO THE PROGRAMME'S VALUE OR WORTH**

*NB Inferences and judgement (adjudication) are normally based on a set of evaluation criteria. These relate to both values and standards.*

The values and standards used to judge the programme (i.e. the criteria used by the evaluator in conducting the evaluation) thus need to be identified. In many forms of programme evaluation the aims and objectives of the programme and/or its outcomes form the set of criteria on which adjudication of the programme is based. In others the values and standards are those of the evaluator. In others, the values and standards are those of the programme's stakeholders.

How the evaluation criteria are established and applied will usually be determined by the nature of programme being evaluated and the purposes of the evaluation. It is thus important to consider not only which issues and questions are being addressed in an evaluation but also whose questions are addressed in an evaluation.

The term evaluation implies a focus on value, in relation to a set of values. These include the values of sponsors, programme staff, programme participants and beneficiaries as well as the evaluator's own values. These form the context of an evaluation, in which it is usually necessary to consider whether all stakeholders in a programme are likely to benefit equally from the evaluation process. It is also important to design both programmes and evaluations in such a way that maximum benefit can be derived by all participants in the course or programme which is the object of the evaluation.

**ACTIVITY 5: YOUR OWN ROLE IN THE PROGRAMME BEING EVALUATED**

Write a short account in your own words of how an evaluation could be designed, which would have value to a programme which you know, or in which you are involved.

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Would you be an evaluator or stakeholder in the evaluation of the programme? Could you be both? Give reasons for your answer.

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If you were an evaluator, describe how you would attempt to work with the various stakeholders in the programme in designing and implementing the evaluation.

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If you were a stakeholder in the programme, how would you want other participants in the evaluation process to work with you so that you were kept fully informed?

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What type of meetings and committee structures would be necessary to ensure the communication necessary to ensure that the evaluation of your programme was valid and useful? How often would these meetings need to take place?

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Discuss your answers with your partner and then with the wider group.

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## Case study

## Australia

### Open Access College

Prepared by:  
Marg Beagley

#### Brief description of the programme

The Open Access College (OAC) opened in January 1991, replacing the former South Australian Correspondence School. The college's vision is to 'recognise, value, and celebrate its uniqueness and the diversity of its people. It is an organisation whose business is teaching and learning ... and as its very title suggests, all of its operations will be founded on the core values of access and openness'.

The teaching and learning programme involves interaction with students using a range of technologies, including high-frequency radio, telephone, facsimile, and electronic classroom techniques, as well as through a visiting programme, mini-schools, camps, and school experience weeks.

The college has the responsibility of redressing the educational disadvantage for children which arises from remoteness and isolation. It provides opportunities for students in metropolitan, rural, and remote areas of South Australia to gain access to a broader curriculum.

#### What is the Open Access College?

The establishment of the Open Access College was a key strategy in the management and co-ordination of the increased demand for distance education in South Australia. The college is a multi-campus organisation consisting of:

##### Three Schools of Distance Education

- reception to year 10 (Marden site, metropolitan Adelaide),
- senior secondary (Marden), and
- reception to year 12 (Port Augusta site, 300 kilometres by road from the Marden site);

##### Open Access Materials Unit

- responsible for refinement, development, and production of open access course materials; and

##### Outreach Education Services

- providing educational support for a range of cultural and scientific institutions, for example, the State Zoo, Museum, Botanical Gardens.

##### Student profile

Students for whom services are provided by the schools of distance education come from the following groups:

- students in government schools and non-government schools;

- remote and isolated students, including some South Australians who are resident or travelling interstate or overseas;
- post-secondary age students, including prisoners, adult re-entry students, and students in full-time vocational courses; and
- special needs students, including medical-based and student behaviour management enrolments.

## Problems encountered

### Planning and managing distance education

- Although close liaison between course developers and teachers is needed, it is at times difficult due to different tenure of employment.
- Teaching through course packages is supplemented by telephone, radio lessons, or both; teleconferencing; and visits.
- The range of clients at any given year level is very wide, with a high turnover of students, particularly in the reception to year 10 levels. Continuity and short-term enrolments can present difficulties in the management of learning activities.

### Implementing quality assurance

- Quality checks are built in at the course development level — writers are selected on merit; reference groups provide feedback at all stages of course development.
- Feedback and liaison between teachers and course developers are vital parts of the writing process.
- Quality checks are built into the materials production process.
- Using and integrating media in distance education
- The use of media varies widely — audio and video are considered integral components of course development.
- The use of other media is optional where possible — videoconferencing, teleconferencing, facsimile, Electronic Classroom™, as facilities for students permit.
- Internet resources are being developed as an option for those students with access.

### Instructional design and production for distance education

- Principles for course development include teaching and learning methodologies, course structure, and presentation elements.
- Course structure, design, and layout are based on 12 learning principles developed by the Open Access College.
- Course materials are developed on-site at the Open Access College in the Materials Unit; artists, keyboarders, electronic media studio, printing, and distribution facilities are utilised.

### **Learner support system**

- Learners are provided with high-quality course materials for distance education, supported by teacher contact, and electronic learning strategies. Itinerant teachers visit primary students in remote areas.
- Counselling and resource centre services are available from the Marden site to support students in enrolment, personal concerns, and future option decisions.
- Supervisors work with school- and home-based students, particularly primary students and those in remote areas.

### **The most important issue: Using and integrating media in distance education**

While the print medium is central to the delivery of courses through distance education from reception to year 12 levels, the use of other media is rapidly becoming an integrated part of all course development. It is expected that aural and visual media will be used in all courses so that different styles of learning can be addressed.

- Students are provided with audio and video cassettes to provide stimuli for the work that they do alone or with the assistance of a supervisor.
- Teachers and students have print material from which to work, and this is augmented by aural and oral contact with the teacher through high-frequency radio, telephone links, or both, varying from daily to weekly lessons.
- The most basic form of electronic media is the teleconference in which several students may be linked with the teacher by telephone for their weekly lesson. Interaction between students and teacher is possible, although clearly the group dynamic takes time to establish using this type of communication.
- Where students have access, videoconferencing is possible giving the visual as well as the audio contact; it is generally not available as a multi-point medium but enables closer contact between teacher and student.
- The Electronic Classroom™ allows interactive learning to occur through the use of electronic whiteboard, video, and audio. Using this medium, the teacher and the student are able to exchange work and produce diagrams, maps, and written work in much the same way as they would face to face.

Depending on the availability of student access, each of these electronic media are used daily by teachers in their delivery of lessons to isolated students.

Current developments include the use of the Internet to provide stimulus not previously possible through distance education. The Open Access College has allocated considerable time and resources to the development of its Web site and specific subject pages, enabling course writers to provide Internet options for students who have access to this technology. The range of subjects utilising this medium at present includes the arts, legal studies, social studies, biology, environmental studies, geology, and home economics, as well as languages other than English.

In particular, the languages other than English (French, German, Indonesian, and Spanish) have used this medium to great advantage. Students can be given a selection of Web sites chosen for specific research, or the teacher is able to introduce new learning materials. For example, a student of Spanish is able to view an exhibition of etchings by Francisco Goya, produced co-operatively with the Art Gallery of South Australia. The student can also search for specific resources on aspects of culture — food, dance, and music — researched by the developer, and

included in the subject page. The subject can incorporate a more holistic approach to learning for its student clients and allow them to access current, stimulating events to enhance their learning.

Information on each of the Outreach Education Services provided by the Open Access College as well as on cultural events and activities is also available through the home page.

The inclusion of the Internet resource must be an option at present as many students (particularly those in remote areas) do not have access to the Internet or even, in some case, to telephone communication. Nevertheless, it is a growing area, and one that is providing an exciting and stimulating aspect to distance education in South Australia.

Please visit our home page at [http://www.saschools.edu.au/open\\_acc/open\\_acc.html](http://www.saschools.edu.au/open_acc/open_acc.html)

## **The Development and Implementation of "English in Action" in South Africa 1992-1994**

Charles Potter, Angela Arnott, Ishbel Hingle, John Mansfield, Letta Mashishi, Mandia Mentis and Sbongile Nene

### **1. Radio Learning in the Junior Primary School**

"English in Action" is a radio learning project, developed by the Open Learning Systems Educational Trust (OLSET) for the junior primary level in South African schools. This report provides an overview of the development and evaluation of the programme over a three and a half year period, from May 1992 to December 1994.

The report is arranged chronologically, and picks out themes from a number of evaluations of the programme. Summaries of the major issues raised in these reports are included in the Annexures. The original reports are provided in a separate file, to which the reader is referred for detail. This report aims to present the issues raised by the various evaluators of the programme over the past three years, and provides a product and process evaluation of the status of "English in Action", and its readiness for wider implementation, as at December 1994.

### **2. The Pre-Pilot Phase (March to June 1992)**

During the pre-pilot phase, OLSET trained personnel and produced 15 radio lessons, which were adapted from the Kenyan radio scripts of "English in Action". These were presented in 12 schools in 24 classrooms in a number of regions of the country. The aim was to assess the viability of the interactive radio methodology and model of instruction which underpinned the scripts, and to establish at which grade levels the programme might best be introduced.

The scripts were recorded on cassettes, which were introduced in the schools over a three week period, during which classroom evaluation was conducted. This involved the teachers, the principals of the participating schools, and a number of outside evaluators. The evaluation report on the pre-pilot phase was compiled by Mr Stuart Leigh (Note 1), and included summaries of the evaluation reports of the teachers and principals, as well as individual contributions from the external evaluators.

The indications from the evaluation of the pre-pilot phase were as follows:

The teachers were enthusiastic about the programme, as were the principals. The outside evaluators opinions varied. All of the external evaluators felt that the programme had potential, and could introduce new dimensions into the teaching of English at junior primary level. The music, the text of the scripts and the accompanying workbook, and the pictures were well rated. There was clear evidence that both teachers and principals reacted favourably to their involvement in the programme.

Two of the evaluators raised problems with respect to the role of the classroom teacher vis-a-vis the radio teacher. One evaluator observed that the most successful lessons appeared to be those in which the teachers took an active hand in ensuring that the class proceeded smoothly, and where the teachers were prepared to intervene and modify the instructions on the tape where necessary. The other evaluator felt that the role of the teacher was too passive, and the role of the pupils too circumscribed. The concern was

that the programme, through limiting teacher involvement, would disempower and deskill teachers. This implied that a more active role for the teacher in the radio lessons was necessary.

All of the external evaluators, however, commented on the extra dimensions the radio was able to introduce into the classroom. In relation to their critical comments, suggestions were made that the radio lessons should be designed so as to involve the teachers more, and that greater use should be made of a multi-media approach using pictures and audio-visual aids to support the programme.

### **3. Problems raised at the Pre-Pilot Phase**

The specific problems raised by the evaluators at the pre-pilot phase are highlighted in this section of the report, since similar themes emerged later in the evaluation. One set of difficulties related to pupil participation. Another related to teacher participation.

At the level of the pupils, while the programme was clearly successful in increasing pupil participation in the classroom, the nature of the pupils' communicative involvement was circumscribed, and limited. One of the evaluators commented, for example, that the programme needed to encourage the use of conversational English. The methodology needed to develop greater use of dialogue in pairs, as well as to attempt to cater for the ability range in the class. There was also a need to involve and empower teachers to teach in this way.

On the level of teacher participation, two of the evaluators felt that the methodology did not involve the teachers sufficiently, with the result that they were inactive during the radio lessons. This carried with it the danger that the programme would not develop the teaching skills necessary to lead to improvement of classroom teaching, and that the teachers would be deskilled through the programme. The other evaluators were less concerned about the issue of disempowerment, but suggested that efforts needed to be made to increase the skills of the teachers through in-service training, and to provide opportunities for exchanging ideas and sharing of problems encountered.

Nevertheless, the overall opinion was that the programme had potential, and should be developed further.

### **4. Evaluation in Phase One of the Pilot Phase (July to December 1992)**

In the next phase, the project focused on establishing its administrative, writing and production infrastructure, on hiring staff, and on revision of the Pre-Pilot instructional model. Early in this stage, OLSET held a consultative conference, which included the external evaluators for the Pre-Pilot phase, as well as a number of others who were working in the field.

Based on discussions at the conference, a new design for the radio lessons was arrived at, which included far more teacher-led activities than previously. These activities would be introduced as a complement to the existing songs, games, physical activities and radio-led teaching segments.

In response to the criticisms raised at the pre-pilot stage, the new scripts called for greater teacher involvement in the lessons, and for language teaching involving pairs of pupils, as well as small and large group activities. The aim was to make the programme far more



communicative in its approach, with the broader aim of assisting teachers to become more familiar with communicative language teaching.

Lessons based on this new design were re-trialled in a small number of schools. Also during this period OLSET proceeded with the planning of a year-long pilot test of the revised "English in Action" programme, in classrooms in four regions of South Africa. To support the implementation of the programme in these four regions, OLSET established four regional offices in Durban, East London, Bloemfontein and Johannesburg. Regional coordinators were also hired, and approaches to schools made.

For 1993, the principals of 103 schools agreed to be involved. The programme would be implemented in these schools by teachers in 302 classes. Training of regional coordinators and the writing and production staff was commenced, as well as training of the staff involved in the schools. Plans were also made for evaluation of the pilot stage, using a multi-level, multi-method design. This will be described in the section following.

## **5. Evaluation of Stage Two of the Pilot Stage (January 1993 to December 1993)**

### **5.1 Evaluation Design**

During December 1992 and January 1993, OLSET employed a team of external evaluators to develop a pre and post-test evaluation design, which could be used to monitor the development of the programme in Stage Two of the pilot phase (Note 2). In this phase, 130 scripts would be written, recorded on cassettes, and implemented in schools in the four regions referred to in the previous section.

The pre- and post-test design was discussed at a meeting held in January 1993, at which the need for a broader process of formative evaluation to accompany pre and post-testing was raised (Note 3). A multi-trait multimethod evaluation design was then developed which had both formative and summative elements (Note 4), and which would incorporate the envisaged pre and post-testing as part of a broader analysis of the project's development from conceptualisation and policy levels through to implementation in the field. The evaluation would be conducted over a nine month period (January to September 1993), and would focus on the following issues:

- whether the "English in Action" programme was effective in teaching primary English
- the degree to which teachers were empowered, supported in their jobs and assisted in professionalisation
- acceptance of the series by the community, inclusive of teachers, parents, principals and other stakeholders
- the efficacy of radio and cassette as a delivery medium
- the effect of the project on the school environment in the widest sense of the term
- cost-effectiveness of the programme, and the economies of scale for national implementation.

The evaluation would be both quantitative and qualitative in character. Besides qualitative data based on school visiting, observation of lessons and teacher support groups, interviews with project staff and with teachers in the schools, quantitative data

would be available from pre- and post-testing, conducted in 71 schools. Focus groups and case studies would be conducted in all regions in which the programme operated, involving a range of community stakeholders. An economic analysis of the programmes's implementation would also be undertaken. This would examine various scenarios for programme implementation, and various models for teacher development and support, with the aim of costing the programme's implementation at scale under various conditions.

## 5.2 Results of the 1993 Evaluation

### 5.2.1 Data Analysis and Integration

To answer the various evaluation questions, the evaluators had access to information from tests, classroom visits and observation, the reports of teachers, principals and parents concerning pupil progress and case studies.

Separate analyses of each of these areas of the data were undertaken, and the indications from the analyses then combined into a composite report (Potter, Arnott, Mansfield, Mentis and Nene 1993). A separate report on the pre-testing was also compiled (Arnott, Mansfield and Mentis 1993 (a)), and a separate report on the focus groups (Nene 1993). These analyses were supplemented by an internal evaluation exercise, which culminated in a book of case studies, written by the project team, under the editorship of one of the evaluators (Potter 1993 (c)), and by a report in which pre- and post-test data were analysed (Arnott, Mansfield and Mentis 1993 (b)).

In integrating the various analyses into the final report, a theory-driven evaluation model was used (Note 5), the various data being analysed to establish the congruence between the vision of individual members of the project team, their intentions with respect to the programme they were developing, how these intentions were encapsulated in project policy, and how project policy was implemented in practice. From the analysis, gaps in project theory and conceptualisation, strategic planning and implementation could be identified, and the logic, coherence and feasibility of the project assessed.

In OLSET's case, the main focus of the evaluation lay on the project's curriculum, and its implementation in the field. From the data, there was evidence of learning gains made by the pupils, as well as favourable indications concerning the perceived value of the programme on the part of the teachers, and of the community. Questions were, however, raised concerning the process of curriculum development in the project. These are outlined in the sections following.

### 5.2.2 Evidence from Pre and Post-Testing

The pre- and post-testing of the pupils was conducted using a test of receptive language developed by Arnott, Mentis and Mansfield, who based their instrument on the RLAP test implemented in Imhoof and Christensen's (1986) study of the development of "English In Action" in Kenya. This was found to be reliable, and was implemented as part of a stratified two-stage cluster sample design, based on region, school type, and grouping for experimental and control schools. The test was applied at the pre-test stage in 35 experimental and 36 control schools, 2255 pupils in total being tested, of whom 53,9% were in urban schools, 21,9% in farm schools, 14,5 % in informal settlement schools and 7% in rural schools (Arnott, Mansfield and Mentis 1993 (a)).

Item analysis was conducted of the pre-test instrument, following which the test was

modified. It was then used for post-testing of pupils in both project and comparison schools. The results were then compared with the pretest scores, in both project and comparison schools (Arnott, Mansfield and Mentis 1993 (b)). Learning gains of pupils in the project schools were found to be highly significant ( $p < 0,0001$ ), when compared with pupils in the comparison schools who had not had the benefit of the programme. This suggested that those pupils who had been exposed to English in Action in the project schools had performed significantly better than their counterparts in the comparison schools who had not had the benefit of such exposure.

The performance difference between project and comparison schools was 20%, suggesting that "English in Action" had developed a more comprehensive grounding in English language for project pupils, as compared to pupils in comparison schools. A summary of these findings is included as Annexure One to this report.

### 5.2.3 Issues relating to the Classroom and the Curriculum

The evidence from testing indicated that the programme was having effects on the English language competence of the pupils in the required direction. In addition, favourable results from the testing were supported by qualitative data from teacher interviews, questionnaires, focus groups and case studies of participating schools. This indicated that the programme was having positive effects in all four regions in which it was being implemented. The evidence suggested clearly that the teachers felt that the "English in Action" approach was helpful to their work as teachers, and had benefit for the pupils.

However, observation in the classroom revealed that the programme still provided too little space for the teacher's own contribution. Analysis of the materials, and interviews with the programme writers and production staff also indicated that there were content weaknesses in the scripts. Few of the project team had junior primary school background, or training in second language teaching. Thus, though the scripts were well constructed and had high attentional and motivational value with respect to the pupils, there were problems both in the selection of content, as well as in the conceptualisation and development of the scripts and supporting visual materials as a curriculum for introducing English at junior primary level.

Given the project's aim to develop materials to support the teaching of English as a second language at higher levels in the primary school, the dearth of educational background and curriculum development expertise in the project team was problematic. There was a high level of skill with respect to script-writing and production for radio. In addition, the team worked systematically, was highly task directed, and had established a sound managerial structure for the project as a whole.

In terms of relationships with the educational authorities and others working in the field (Note 6), the project had had a shaky start with respect to establishing credibility in the field. Nevertheless, management had worked to redress these problems, and was networking extensively with other educational projects and with the educational authorities. At management level, the links with both educational authorities as well as with other NGO's working in the field were strong. However, relationships with others working in the field were less well developed at lower levels in the project's hierarchy, and required strengthening.

Overall, despite many assets and the evidence of very hard work, there was a danger that without primary school trained staff and language specialists on the team, the project would not meet its objectives. It was unlikely, in particular, that the project team with its current staffing would produce a language curriculum which could make a major

contribution to the education of South African primary school children. In many ways, the difficulties with staffing and orientation reflected the fact that the project team were working in a new area. There were few other educational projects working at the Sub A level (Note 7). In addition, there was no history of Sub A teachers being involved in teaching English in DET schools, nor was there a developed English language curriculum at this level (Note 8). The result was that there was no existing infrastructure in the schools of Sub A teachers trained in the skills involved in teaching English as a second language (Note 9).

With respect to the context of the programme and of the evaluation, the combination of these factors implied a lack of alternative English language teaching programmes in many of the comparison schools at Sub A level. This was not the case at Sub B level, and at levels higher in the primary school curriculum. At these levels, English language teaching was standard practice in the schools, and was the norm rather than the exception. In addition, other English language projects had been involved in working with the teachers at these levels for many years.

The competition OLSET would face at Sub B level from other existing language teaching approaches, in other words, would be greater than at Sub A level, and the comparisons perhaps more realistic. To meet these challenges, the project team would require greater background in applied English language teaching at primary school level, as well as in curriculum development, than was currently evident.

#### **5.2.4 Issues relating to Teacher Development**

As part of its work in 1993, the project had established a structure of training workshops, a teacher support group structure, and a focus group structure in all regions in which "English in Action" was being implemented. Evidence from school visits, interviews with the teachers in the schools and with the regional coordinators, and evidence from case studies of the participating schools indicated that the training workshops had been well received. In addition, both focus group and teacher support group structures had considerable potential as regards the development of community credibility, and the support of teachers in their work.

However, at the same time there were major gaps in the project in the teacher development area. Management had been unable to make the appointment of a suitably qualified and experienced teacher development coordinator. As a result the various teacher development activities were taking place in the absence of an overall rationale for teacher development, and in absence of a teacher development curriculum. Though it was evident that the work of the project team had considerable potential as regards teacher development and INSET, the work required greater focus, and to be implemented within the framework of an overall curricular and policy structure.

It was thus evident, as at December 1993, that the major gaps in the project lay at the curriculum level. The project's language curriculum needed to be conceptualised in the context of its contribution within the junior primary curriculum, on the one hand. In addition, teacher development activities to support the implementation of the language curriculum needed to relate to a framework for teacher development, and the project's language curriculum on the other.

At a third level, the project team needed to engage with the issues involved in second language teaching, if they were to succeed.

### 5.2.5 Community and Parental Issues

At the community level, there was evidence of strong support for the project. Ssongile Nene's report on OLSET's Focus Group Project (Nene 1993) highlighted overall acceptance of the programme by the teachers, parents and community. The teachers expressed strong support for "English in Action", as assisting them in their work. Parents were supportive of the programme. These indications were supported by evidence from case studies of the participating schools.

The project's work with parents also had great potential. There were clear needs for greater parental involvement in the schools, and it was apparent from the focus groups as well as the teacher support groups, that OLSET could contribute to the process of increasing parental involvement in education. This could also be valuable as regards increasing community advocacy for the programme. Both support on the level of advocacy, as well as financial contribution, might be necessary in the future.

Ssongile Nene thus concluded that it was important for OLSET to continue to involve community and educational department stakeholders with parents. Besides support of the teachers in the schools, community outreach activities through the medium of the programme could be of great value. Nene recommended that OLSET would need to involve both parental groups and other progressive NGO's, in the project's further work in this area.

## 6. Evaluation of Stage Three of the Pilot Stage (January 1994 to December 1994)

### 6.1 Evaluation Design

The evaluation designs relating to the pre-pilot, and the first and second pilot phase of "English in Action" were necessarily formative in character. OLSET's aims, however, were to develop a model for working at scale. This included development of a curriculum for wider implementation, as well as testing of the curriculum under various conditions of delivery (via cassettes as well as via radio).

For this reason, during 1994 the evaluation focused on both product and process issues, relative to the central issue of whether the programme was ready for wider implementation. 1994's evaluation design thus included formative issues, as well as issues relating to potential impact as well as generalizability (Chen and Rossi 1980; 1983; 1987; Rossi and Freeman 1985; Chen 1990) (Note 10). The formative emphasis, encapsulated in the questions which guided the 1993 evaluation, however, remained prominent.

As in 1993's evaluation, pre and post-testing formed one aspect of the design, being implemented at the Sub B level where the programme was introduced at the beginning of 1994 for the first time. As with the 1993 evaluation, the main focus of pre- and post-testing lay on receptive language (Arnott, Mansfield and Mentis 1994) (Note 11). In addition, pilot work was undertaken to develop a more comprehensive procedure for assessing the language proficiency of pupils at the Sub B level (Hingle and Linington 1994). This latter work focused on oral production (ie expressive language).

Classroom observation, interviews with teachers and with programme personnel were again conducted. The emphasis on self evaluation within the project also continued, on two levels. The first was at the level of further case studies from the schools (Potter 1994

(c). The second was at the level of response to the criticisms raised in the 1993 evaluation.

In terms of the criticisms concerning staffing and the curriculum, intensive re-conceptualisation and restructuring took place within the project. The details are reflected in a curriculum development document written by the project team (refer Annexure Three). This encapsulated the project team's conception of the rationale underpinning its approach to teaching language, the rationale underpinning the radio curriculum, and the rationale underpinning the teacher development side of its work. The process of writing the curriculum document involved all staff of the programme, and in addition a number of external curriculum consultants (Note 12).

As with the 1993 evaluation, the aim was that external evaluation would be supplemented with a number of internally generated self evaluation documents written by the project team, reflecting what Chen (1990) has called the descriptive theory underpinning the project's work (Note 13). OLSET's curriculum development document and the case studies of work conducted in the schools (Note 14) are examples of this. The curriculum document reflects the principles underpinning curriculum design and development in the programme, as well as an emphasis on issues relating to policies on implementation and teacher development. The case studies provide perspectives of project staff and teachers on the programme as implemented in the schools. Both documents are included with the other evaluation reports in the separate file which accompanies this report.

Besides a continuing formative emphasis on curriculum and materials development, the 1994 evaluation also focused on issues relating to the status of the project's curriculum as regards wider implementation. The evaluation thus focused on both product and process aspects of implementation, with the aim of reflecting the emerging prescriptive theory of the project (Note 15). This emphasis can be found in those project documents and evaluation reports which focus on issues of wider implementation environment, delivery medium, and issues of scale (Note 16).

James Cobbe's report on the economics of the project, and the scenarios for future development of the project produced by Potter (1994 a)) are examples of this. Both documents reflect an emerging focus in the project on issues relating to the type of INSET, teacher support and project infra-structure necessary to the implementation of "English in Action" beyond the pilot phase, as well as issues relating to costs, affordability and scale. Both of these documents are included in the separate file which accompanies this final report, and are summarised in Annexures Five and Six.

In summary, as in the 1993 evaluation, the main focus of the evaluation design in 1994 was formative in character. The evaluation design was based on the comprehensive theory-driven evaluation approach suggested by Chen and Rossi (1980; 1983; 1987) and Chen (1990), with which the formative evaluation model used in 1993 (Note 17) was compatible. In terms of this design, the remaining sections of this report summarise indications from the various documents written as part of the process of evaluation during 1994. An overall assessment is then provided of the programme's status as at the end of the third pilot phase.

## 6.2 Results of the 1994 Evaluation

### 6.2.1 Data Analysis and Integration

As with the 1993 evaluation, the procedures for analyzing and integrating the data were based on the multi-trait multi-method procedures suggested by Campbell and his co-workers (Note 18), the procedures for triangulation suggested by Denzin (1970; 1978), and the procedures for analyzing and integrating qualitative data suggested by Patton (1980; 1987), Guba and Lincoln (1981; 1983), Miles and Huberman (1984; 1994), Fielding and Fielding (1986) and Sowden and Keeves (1988), and the case aggregative methodologies described by MacDonald and Walker (1974), Lucas (1974 (a) and (b)), and Simons (1987).

In terms of this rationale, indications from analysis of the various data sources and reports from the 1993 evaluation were combined with those from the 1994 evaluation, each being treated as separate "cases" or cells. The analysis was conducted with the overall purpose of examining programme theory in relation to implementation evidence, to reach conclusions as to the potential impact and generalizability of the "English in Action" programme in its intended implementation context.

### 6.2.2 Evidence from the Testing of Receptive Language

Pre and post-testing of the receptive language of pupils was conducted in 1994, in 20 project schools, and 23 comparison schools (Arnott, Mansfield and Mentis 1994). As in 1993, the testing was applied as part of a stratified two-stage cluster sample design, based on region, school type, and grouping for experimental and control schools. The project schools were randomly selected from the 105 schools in which the programme was being implemented nationally. The comparison schools were then matched with the selected project schools by school type (urban, rural and farm schools) and by geographical area.

In all project schools in the sample, the teachers had implemented the programme at Level One in the previous year. They were all attending teacher support group meetings, and some were also implementing other English language programmes (eg "Day by Day") besides "English in Action" as part of the Sub B programme. In the comparison schools, in contrast, the Sub B English language curriculum was being implemented with no support from OLSET staff, but with the support of education department personnel, and, in some cases, support from other language projects.

The pre-test consisted of a 34 item instrument divided into four sections:

- a. Listening comprehension;
- b. Pre-reading skills involving number letter and grapheme- phoneme identification;
- c. Visual matching of words and letters; and
- d. Reading words and sentences.

Each of these sections contained its own practice items. The test as a whole was designed to focus on various aspects of receptive language, in oral and written form.

The pretest was administered in the project and comparison schools between January and April 1994. Based on item analysis, a shortened and more difficult post-test was developed. This consisted of 30 test items, and was divided into three sections. In the first two sections, the pupils were required to listen to a tape-recording, and mark off the correct answer in their test booklets. In the third section, pupils were required to visually



identify the answer corresponding to the test item.

The post-test was administered in the schools in September 1994. Unlike the 1993 analysis, which was based on comparison of the paired responses of individual pupils, analysis of pre- and post-test data was conducted in 1994 by class averages (Note 19).

The analysis revealed that the project school pupils performed significantly better than the comparison school pupils ( $p < .05$ ). This indicated that the superior performance of the project pupils over their comparison school counterparts demonstrated at the end of 1993 (refer Section 5.2.2 above) had been sustained. Though statistically significant, it should be noted that the difference between the performance of project and comparison school pupils at Sub B level was less than had been found in the previous year's analysis at Sub A level (ie 5% advantage of project schools over comparison schools at Sub B level, as compared to the 20% advantage shown by project school pupils over their comparison school counterparts at Sub A level in the 1993 analysis).

Arnott, Mansfield and Mentis suggested in their report that the smaller difference found at Sub B level could be due to a number of factors, of which disturbances during the year of the election, a short period of exposure to "English in Action" Level Two relative to the exposure afforded pupils in the previous year, and the influence of other English language programmes at Sub B level (Note 20) are perhaps relevant.

Viewed together, the 1993 and 1994 analyses would suggest that "English in Action" is able to make a contribution to developing the English language competence of pupils in the early stages of the junior primary school, both at Sub A level as well as at Sub B level. The performance advantage demonstrated at Sub B level in the 1994 analysis, though less than the performance advantage demonstrated at Sub A level in the 1993 analysis, is still an important indicator. The results of the 1994 analysis would suggest that, while pupils in both project and comparison schools gained from their English language programmes, those in the project schools gained more. The results also indicated that the project school pupils sustained the performance advantage they had acquired in the previous year at Sub A level, when compared to their comparison school counterparts.

Both the 1993 and 1994 results quoted in this subsection are based on analysis of a single year's testing of Sub A and Sub B levels respectively, and should if possible be replicated. There would be value in such testing being conducted as part of a broader evaluation of the impact of "English in Action" in the rural as opposed to urban schools, and in combination of the type of paper and pencil tests used in the Arnott, Mansfield and Mentis studies with the more in-depth language analyses reported in the subsection following.

### **6.2.3 Evidence from the Testing of Oral Production**

During 1994, additional language testing was conducted at Sub B level (Hingle and Linington 1994), using a test of oral language production developed specifically for the purpose. The work was conducted with small samples of pupils drawn from 5 project and 5 comparison schools. As with the Arnott, Mansfield and Mentis study (refer previous section), attenuation of the samples between pre and post-testing took place, with the result that a large proportion of pupils pre-tested were not able to be post-tested.

For this reason, group comparison of pre and post-test scores was not attempted. In-depth analysis of the test protocols was conducted. In addition, analysis of pre and post-test scores on a case by case basis was undertaken.

These analyses yielded a number of indications. The first was that gains in language



fluency were made by pupils in both project schools and comparison schools. Viewed on a case by case basis, there were no indications across the sample as a whole that the project pupils had gained in fluency to a greater extent than the pupils in the comparison schools. There were, however, indications that project pupils in rural schools had made greater gains than their comparison school counterparts (Note 21).

There were also indications that pupils in the project schools exhibited a greater variety of grammatical structures in their oral output than pupils in the comparison schools. This was particularly marked in project pupils in the rural schools, who used a greater variety of grammatical structures than their comparison school counterparts. As with the indications on fluency in the previous paragraph, however, these indications are very tentative, and may have been due to sampling or chance factors.

In interpreting these results, the small size of the sample should be borne in mind. The aim of the investigation was exploratory, and no claims can be made beyond this level. The indications reported in this section may have been due to chance factors, and would need to be investigated more fully.

The difficulties implicit in testing oral production, and in conducting analysis of oral language samples should also be noted. Both are labour intensive, and yield indications which may be difficult to replicate at scale. Nevertheless, the value of in-depth analyses should also be noted. The procedures developed in the Hingle and Linton study were able to yield a far more in-depth picture of the language abilities of pupils in the samples than paper and pencil tests.

There would thus be value in supplementing large-scale testing using paper and pencil tests with further in-depth testing of the language of smaller samples of pupils in project and comparison schools. There would also be value in conducting such an investigation as part of a wider analysis of the impact of "English in Action" in rural as opposed to urban schools. Reference has already been made to this earlier in this report (refer previous subsection).

#### **6.2.4 Issues relating to the Classroom and the Curriculum**

Viewed in relation to the 1993 test data, the indications from the 1994 testing indicated that the programme was having positive effects on the English language competence of the pupils, and had potential for wider use. In addition, qualitative data from the schools remained positive. Evidence from the teacher interviews, questionnaires, teacher support groups, focus groups and case studies of participating schools indicated that the teachers felt that the "English in Action" approach was helpful to their work as teachers, and had benefit for the pupils.

One of the problems raised in the 1993 evaluation had been the nature of the curriculum, and its relationship to the teachers' work in the classroom. Another had been the space provided by the radio programme for the teacher's own contribution. Interviews with the programme writers and production staff had indicated that there were content weaknesses in the scripts. Problems with respect to the qualifications of the project team, and their experience in the junior primary phase, had also been raised.

During 1994, there were indications that the project team took these comments seriously. With respect to materials development, OLSET employed a teacher with applied linguistic training to join the script-writing team. In addition, the script-writers checked their work with outside consultants with primary school training and applied linguistic background. A new approach to writing materials was adopted, and implemented at Level Two of the

programme. This placed greater emphasis on a story to carry a central theme, to which the various supporting materials were related.

The Level Two materials created through this process allowed far greater space for the teacher's individual contribution and involvement. This was reflected in the scripts, as well as in supporting teachers' manual and classroom materials, which contained a far greater emphasis on using media of various types (eg audio-cassettes, comic books, posters, workbooks) in combination.

In terms of the wider processes of planning and curriculum development, the project team employed a primary school consultant, who had wide experience of language teaching and project development, to work with the staff. One of the outcomes of this work was a curriculum document (refer Annexure Three), which has been mentioned earlier in this report, and is included with the other evaluation documents in the accompanying resource file. This document was significant not only with respect to the fact that it outlined a coherent vision for the project's conceptualisation and development, but laid out clear policies with respect to how the project would be implemented. This was linked to an economic analysis of the costs and benefits of the project's work, which was undertaken by James Cobbe of Florida State University, the main points from which are summarised in Annexure Five to this report.

The project also followed up on the recommendation made in our 1993 report that a separate analysis of the materials should be undertaken, and commissioned Letta Mashishi, an applied linguist with wide experience of working with primary school teachers, to undertake an evaluation of the materials. The main points from this materials evaluation are summarised in Annexure Four.

It was thus evident that the project team took action in relation to the criticisms we had raised in the 1993 evaluation, in a number of areas. These included development of a new approach to materials writing at Level Two, as well as the development of a greater coherence in the materials, related to an underlying theory of second language teaching. As at December 1994, revision of Level One materials had not been conducted. This was necessary, as Letta Mashishi's analysis (refer Appendix Four) indicates.

### **6.2.5 Issues relating to Teacher Development**

Our 1993 evaluation had indicated that the project team had established a structure of training workshops, a teacher support group structure, and a focus group structure in all regions in which it was working. The project had not established a policy framework relating to the teacher development side of its work, and in addition had been unable to appoint a teacher development coordinator, with the result that different aspects of INSET in which the project team were involved lacked structure and coherence.

In May 1994, OLSET appointed a teacher development coordinator, to oversee the teacher development side of the programme, and to develop an integrated implementation strategy, working with the regional coordinators in the field. The evidence from our school visits, interviews with the teachers in the schools and with the regional coordinators, and evidence from case studies of the participating schools in 1994 indicated a far greater coherence in the teacher development side of the project's work than had previously been the case. This was evident both at the level of planning and at the level of implementation.

At the level of planning, the project's curriculum development document included a strategy for INSET as an integral part of the implementation of the programme, while at the level of implementation a major shift took place in the teacher support groups. After

the appointment of the teacher development coordinator, these were conceptualised as a vehicle for in-service training, focused on issues relating to classroom management, as well as language teaching activities which could support the programme in the classroom. In this new format, the teachers met together at a central venue, and were involved in workshop-type activities.

The response of the teachers to this new format was generally very favourable, though there was some negative comment on the amount of time the workshops lasted. As a result, suggestions were made in the 1994 evaluation that, in addition to their focus on general language teaching issues and activities, the teacher support groups should focus more on the detail of the radio lessons. In terms of this format, the workshop might involve sharing ideas of how to prepare lessons, sharing experiences of teaching particular lessons and levels in the programme, as well methods of teaching supporting lessons and language development skills. Letta Mashishi makes further reference to this in her evaluation report (refer Annexure Four).

Overall, the evidence from observation of teacher support groups, interviews with teachers, and questionnaires completed by the teachers indicates that, as in 1993, the INSET side of the project's work has been beneficial. Teacher training workshops have been well received. In addition, both focus group and teacher support group structures have considerable potential as regards the development of community credibility, and the support of teachers in their work in the classroom.

The need for these types of activities with respect to teacher development is a central issue in the current implementation of the programme, and to the planning of its implementation at greater scale in the future (refer Annexures Five and Six). Evidence from observation of the programme in the classroom indicates clearly the need for OLSET to link its materials to an ongoing INSET curriculum aimed at changing the classroom practice of teachers. For "English in Action" to be successful, OLSET will need a carefully conceptualised programme of INSET which is sustainable, and an integral part of overall implementation strategy. This point was made in our interim evaluation report of September 1993, and underpins the different scenarios for INSET suggested in Cobbe's (1994) economic analysis of the project (refer Annexure Five).

#### **6.2.6 Community and Parental Issues**

At the community level, the evidence from the 1994 focus groups and case studies indicated continuing support for the project. As in 1993, the evidence suggested overall acceptance of the programme by the teachers, parents and community. Teachers continued to express strong support for "English in Action", as assisting them in their work. Parents also appeared, from the reports of the teachers and principals, to be supportive of the programme.

In our 1993 evaluation, we suggested that the project's work with parents had great potential. We highlighted clear needs for greater parental involvement in the schools, and suggested that OLSET could contribute to the process of increasing parental involvement in education. This could be valuable as regards increasing community advocacy for the programme.

While the evidence from focus groups and case studies in both 1993 and 1994 indicates continuing support for the programme at the level of advocacy, we note that the development of parental programmes (eg reading clubs) has not been a priority for OLSET. We would suggest that parental support (eg the ability to structure and support the homework tasks of children after school) can greatly assist the development of the

language arts curriculum at primary school level, and is one of the hidden sides to successful schooling.

As the teacher development side of OLSET's work becomes more established, it would be logical for the notion of parental development to be explored and developed as part of the teacher development side of the programme's work. We would perceive great value in this for the further development and support of "English in Action" in the schools.

## 7. Product and Process Issues

As with many other curriculum projects, OLSET's materials have been central to the conceptualisation, planning and implementation of "English in Action." The aim has been to develop materials which are effective in improving the language teaching received by pupils in the lower primary school. This has involved OLSET in the development of a curriculum on two levels:

- a. Materials for classroom use; and
- b. Materials for use in the In-Service Training of Teachers.

Evidence from this evaluation would suggest that there have been the normal tensions between materials in concept and materials in use, but that the majority of the teachers are supportive of the programme at both the classroom and the In-Service Training levels. The materials have formed the focal point of the work of the majority of OLSET's staff. They have also formed the point of contact between the realities of the teachers in the schools, and the project team.

Overall, the patterns of usage of the majority of the teachers at present involve switching off the tapes. About half the teachers also repeat lessons. This pattern of usage cannot be described as similar to the conventional usage associated with radio transmission.

In addition, interviews with the project team indicate that there is increasing emphasis in the "English in Action" materials, as well as in the materials being developed on the mathematical side of the project's work, on an approach in which teachers use the audio materials to support their teaching. This approach, which encourages the teacher to use the materials as a guideline and broad framework, is fundamentally different to an approach in which the radio teacher takes control of the classroom for 30 minutes, and the teacher responds within limited parameters set by the radio teacher.

This tension in the programme's methodology needs to be stated at this point. Radio is one of a number of options for "English in Action", which may or may not turn out to be either the most successful option or the preferred choice of teachers. At this point in the programme's development, the effects of radio transmission on the quality of what OLSET is currently providing have yet to be established. The programme in radio format needs to be trialled, and these trials need to be evaluated against forms of materials delivery (eg cassette format), as well as against comparison schools in which other viable options for teaching English are being introduced.

As currently presented, "English in Action" is a comprehensive curriculum of teacher upgrading and support, which delivers audio materials to the schools as one part of the service it provides to teachers, and via teachers to their pupils and their parents.

The point at issue is not only how to deliver a multi-media programme to the schools

cheaply, but also how to deliver and support an INSET programme which develops and enhances the capacity of the classroom teacher to teach.

At time of writing this final report, there is as yet no clarity as to the priorities of the new education authorities, and how these translate into funds available for primary education. In this context, the multi-media, multi-delivery option (as opposed to the radio option) would seem to be the most appropriate to OLSET's current stage of development, and the option that offers the most strategic possibilities at present.

It would thus be logical for OLSET to continue to explore various ways of working rigorously with the programme, to not destroy the INSET programme it has built up with the teachers with whom it has worked to date, and to keep its options open. This would accord with the suggestions made by James Cobbe his report (refer Annexure Five), that a variety of options need to be explored. These do not only relate to radio delivery, but also the degree of INSET and teacher support which accompany delivery, and the relative costs of these options.

## 8. Summary and Evaluation

This evaluation has focused on the development and implementation of "English in Action" from its pre-pilot phase in 1992, and over the first two stages of its pilot development. The evaluation has inevitably focused on the programme's curriculum and materials, as these have been the main focus of the work of the project team over the past three years. However, the evaluation has also focused on organisational aims, process and capacity, as intrinsic to the process of curriculum and project development.

Our evaluation design has had both formative and summative aspects. The central thrust of the evaluation, however, has lain on the developmental side of OLSET's work. During 1993, it was evident that there were major gaps in the way in which the project's curriculum was being conceptualised. While the project team were highly skilled in the technical side of materials writing and production, these activities were taking place in the absence a coherent policy framework as regards language teaching. There were similar gaps with respect to the teacher development side of the project's work. In both areas, there was a need for the development of a guiding programme theory, which would provide the necessary framework within which the work of the staff, and the overall innovation would take place.

At the end of 1993, recommendations were made that the programme should place emphasis on the development of a coherent policy framework which could guide the work of the staff. Our observation was that the project team were hard-working, but that there was a danger of dissipation in the absence of such a central framework. Given the focus of the project's work on developing a language curriculum for the lower primary school, there was a need for the employment of staff with a primary school background, and staff with a background in language teaching. There was also a need for greater focus on teacher development than had been the case.

Over 1994, OLSET has moved to address these issues. One positive result is that staff and consultants with primary school and applied linguistic training now form part of the project team. Another has been the employment of a teacher development coordinator. At the level of management, there have also been changes, to bring in greater educational expertise. As at December 1994, the evidence would suggest that the project team as a whole are more aware of language development and curricular issues, which reflect at both the policy and materials development levels.

Overall, it is clear that the project team are working from the standpoint of a clearer and more coherent theory of development than was the case a year ago. This is exemplified at the policy level in the project's curriculum document, written in the latter half of 1994. More importantly, at the materials development level, there are clear indications that "English in Action" Level Two has been written with language teaching theory in mind. Supporting materials implementation at classroom level, in-school visiting and teacher support groups have been implemented with clearer aims, which in turn relate to the notion of a teacher development curriculum. This is conceptualised as supporting the implementation of the programme at both school and classroom levels.

As at December 1994, the status of the programme is as follows:

- a. Level One materials have been trialled over a two year period and require revision, while Level Two have been implemented at the pilot level for one year only. Gains have been demonstrated in project pupils as compared to pupils in comparison schools, which are greater at Sub A than at Sub Levels. There are, however, still a number of difficulties in the materials which need to be ironed out, as will be apparent from Letta Mashishi's evaluation report (refer Annexure Four).
- b. It is evident that there is a far more coherent project theory with respect to teacher development, which is being translated into an INSET curriculum. This is at its early stages of development, but has considerable potential. As currently conceptualised, the INSET curriculum is being implemented in workshops run within the teacher support group framework established in 1993. This still requires refinement and revision. Suggestions have been made in this report as to ways in which this side of the project's work could be improved.
- c. It is evident that the staff as a whole have a far greater awareness of the issues involved in language teaching and curriculum development than was the case a year ago. As this is a qualitative and ongoing process, it is important that the processes of contact and dialogue between staff which have accompanied the process of curriculum development are continued.

In terms of "English in Action" OLSET has aimed to develop a viable curriculum which can then be implemented widely as a means of teaching English language at the primary level. So far, two levels of materials have been developed.

From the evidence, has OLSET been successful in meeting its aims? On the curriculum development level, our contact with the project team and the schools over 1993 and 1994 would suggest that it has, in developing an increasingly coherent framework for classroom implementation of the "English in Action" materials, supported by INSET, in what in developmental terms has been a very short space of time.

Is the project's curriculum ready for wider implementation? The materials are still at the pilot stage, and require revision. However, the evidence from this evaluation would suggest that OLSET's 1994 materials are far more coherent than those produced the first time around, in 1993. The next stage should involve revision of the materials base, and implementation of the existing materials via various delivery media (eg via radio; via cassettes), and evaluation of the processes necessary to support the implementation of the programme in these different forms. This recommendation implies that ongoing research into implementation would take place simultaneously to revision of the project's existing materials base and ongoing materials evaluation.

Has the project met the needs of teachers and pupils? Even in its current and unrevised

form, there is overwhelming evidence that teachers are supportive of "English in Action", and have used the materials to the benefit of their teaching, and their pupils.

Has the sponsors' money been well spent? The evidence from this evaluation would indicate that it has, in developing an infra-structure which has the potential of improving teaching and learning, in many classrooms.

Charles Potter, Angela Arnott, Ishbel Hingle, John Mansfield, Letta Mashishi, Mandia Mentis and Sbongile Nene

Johannesburg, South Africa  
April 1995

**NOTES:**

1. Stuart Leigh of LearnTech Washington and Real World Productions acted as Technical Adviser to OLSET over the period covered by this evaluation, and played a major role in conceptualising and managing the evaluation process.
2. This part of the evaluation design was developed by Angela Arnott, John Mansfield and Mandia Mentis of Prosearch. It included detailed description of methodology and sampling procedures for pre- and post-testing of pupils in project and comparison schools, and outlined the type of paper and pencil tests which would need to be developed to measure language competence in Sub A classrooms, in a large group comparative design.
3. The meeting included representatives of a number of progressive educational organisations, and included Mary Metcalf, now MEC for Education for the Gauteng region.
4. Refer Potter (1993 (a) and (b)).
5. The theory-driven evaluation approach is based on the work of Chen and Rossi (1980; 1983). Rossi and Freeman (1985), Lipsey et al (1985), Wholey (1987) and Chen (1990), and is based on the premise that evaluations should attempt to identify the descriptive and prescriptive theories underpinning the work of innovative programmes. During 1993, the focus of evaluation lay on descriptive theory, through focus on the Vision, Intention, Policy and Action levels in the programme's conceptualisation and implementation (Potter 1993 (b); 1994).
6. Networking with other educational projects and NGO's/EDA's was particularly important in the period subsequent to Nelson Mandela's release in 1992, and became increasingly so in the months leading up to the election in April 1994.
7. ELMAP was one of the few English language projects which is targeting Sub A, and its materials were developed on different assumptions to OLSET's. Over the period covered by the 1993 evaluation, ELMAP focused mainly on language teaching in the Orange Free State region. Refer James Cobbe's report for a summary of the work and costs of the materials produced by other English language projects.
8. The lack of guidelines and support from the educational authorities of teachers attempting to teach English at Sub A level was evident from our interviews and school visits.
9. The historical policy of DET schools was to introduce mother tongue instruction in Sub A, and then to introduce English as a second language from Sub B. This policy has recently changed. In 1993, it was left to the individual schools as to whether they wished to introduce English at Sub A level, with the result that a number of schools opted to do so.
10. The evaluation design as a whole followed the theory-driven evaluation approach suggested by Chen and his co-workers. This focuses on what Chen terms descriptive and causative theory. The former emphasis lies on the theory underpinning what programmes intend to do, and the latter on what actually emerges, and what can be generalised to other situations.



11. In 1994, an expanded domain of receptive language skills was tapped, pre-reading and reading skills being measured in addition to the listening skills which had formed the basis of the 1993 testing.
12. OLSET worked with a variety of language consultants. Vanessa Francis and Vic Rodseth played a particularly significant role as external curriculum consultants in 1994.
13. Chen (1990) suggests that the descriptive theory of a programme is pertinent to the normative or intentional side of a programme's work, and covers the treatment, implementation environment and outcome domains. The treatment domain covers the intended changes which a programme wishes to bring about, the strategies by which it envisages doing its work, and the development and organisation of these strategies; the implementation environment domain covers how the programme is implemented within its particular environment; while the outcome domain covers the goals or intended outcomes from the programme's work.
14. The case studies were developed in both 1993 and 1994 with the purpose of reflecting perspectives of the project team and the teachers on the implementation of the programme. The regional coordinators played a prominent role in blending the stories of different stakeholders in the programme into documentary form, working under the editorship of Charles Potter.
15. Chen (1990) suggests that the prescriptive side of a programme's work is pertinent to the causative or effective side of a programme's work, and covers the impact, intervening mechanism and generalization domains. The impact domain concerns assessing the impact of the treatment on the outcome, in terms of the direction in which the programme is actually moving; the intervening mechanism domain concerns the causal processes which link the implementation to outcomes, which provides information about whether or not the programme works and why this is so; while the generalization domain focuses on how evaluation results will be used in the future in a particular population, setting or organisation, and other populations, settings or organisations to which the programme might be applicable.
16. Fullan (1982) and Fullan and Stiegelbauer (1991) use the terms "adoption", "implementation" and "continuation" to describe the factors underpinning successful innovation at local, regional and national levels. Myers (1984) refers to the notion of "going to scale", to describe large-scale innovation and change. The 1993 evaluation focused in particular on the vision, intentions, policy and action of those involved in the programme (Potter 1993 (a) and (b)), with the aim of establishing the conception of development espoused by the project team, their perception of the environment in which they were implementing the programme, the nature of the programme they were developing, envisaged outcomes, and how they were implementing the programme in practice. The 1994 evaluation utilised a similar analytical framework, but focused more on summative issues, relative to the readiness of the programme for wider implementation.
17. Potter (1993 (a); 1994 (b)).
18. Campbell and Stanley (1963); Cook and Campbell (1979); Cook and Reichardt (1979); Cook (1985); Cook and Shadish (1986).
19. This was due to a number of drop-outs after the pre-test, and a number of drop-ins after the post-test, in both project and comparison classes.

20. Refer to James Cobbe's report for a description of the other English language programmes currently being implemented in the schools.
21. Hingle and Linington's data indicated that project pupils in rural schools made greater gains than their comparison school counterparts in rural schools. There were similar indications in the Arnott, Mansfield and Mentis data. Together these indications would suggest that "English in Action" may have a particular contribution to make in primary schools in the rural areas.
22. The testing formed one aspect of a multi-trait, multimethod approach which included both quantitative and qualitative data. In terms of this design, indications from pre- and post-testing were combined with indications from focus groups, case studies, interviews, questionnaires and observation, as the basis for evaluating the project's development.
23. An effect size of 2.42 lies beyond the 5% probability level, in terms of a two-tailed z test against a range of similar interventions.
24. An effect size of 0.71 lies within one standard deviation from the mean, which would not be significant in terms of a two-tailed z test against a range of similar interventions.
25. At time of writing this final report, this is the model which is emerging in the 1000 schools project, funded by the IDT.
26. In terms of the 1000 schools project model, schools would contract with NGO's/EDA's to deliver services. These would be made available through a common infra-structure. This would be likely to take different forms, and include different projects regionally. The costs of each project's services would be individually determined, as the basis for the contractual arrangement with the education authorities, and the schools.
27. Cobbe concluded that there was substantial cost advantage in radio delivery as compared to audio cassettes. The reader is referred for details to Cobbe's report in the accompanying file.

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## ANNEXURE ONE

### TEST RESULTS FOR ENGLISH IN ACTION

(based on a summary provided by Stuart Leigh, and discussions with Angela Arnott, John Mansfield and Mandia Mentis)

#### 1. Testing of English in Action Level One

In 1993, as part of the evaluation design (Note 22), Sub A pupils in project and comparison schools were given a listening comprehension test. Results were positive, and indicated in particular that:

- a. Pupils in "English in Action" classes had 20% greater learning gains on the test than pupils in a cross-section of comparison classes in which "English in Action" was not taught.
- b. An increasing amount of improvement in post-test scores took place, depending on the number of lessons of the "English in Action" to which pupils were exposed. Pupils who received less than 33 lessons improved by 6,7%; pupils who received between 34 and 66 lessons improved by 13%; and pupils who received more than 66 lessons improved by 24%, relative to their comparison school counterparts.
- c. In terms of schools, the greatest learning differentials (21%) were shown by pupils in farm schools in rural settings where school resources, support and training have historically been weakest.

Statistically, the effect size for the EIA 1 intervention, as measured by the test, was calculated at 2.42, suggesting that primary goals of the "English in Action" intervention, namely the development of listening skills and receptive language abilities, had been met (Note 23).

#### 2. Testing of English in Action Two

As with the evaluation of EIA 1 in 1993, a multi-trait multi-method approach was used for the evaluation of EIA 2 in 1994. As part of the design, a paper and pencil test tapping a range of receptive language abilities was applied pre and post-instruction, in a sample of project and comparison schools at Sub B level. The test measured listening comprehension, as well as pre-reading and reading skills.

In 1994, the Sub B teachers implementing "English in Action" spent the first part of the year completing those EIA 1 lessons which had not been completed in the previous year (Note 24). The project schools thus began the EIA Level Two lessons in mid-May. By the time of post-testing in October, they had completed on average approximately one-third of the 130 EIA 2 lessons.

Class averages for project and comparison schools pre and post-test were compared, the results indicating that:

- a. The learning gains of EIA 2 pupils were on average 5% greater than pupils in the comparison schools who had experienced English language programmes other than EIA 2.
- b. The learning gains were greatest in rural schools.

It is noteworthy that urban pupils in the project schools began the year with average scores of 75,6% on the pretest, and improved by 6%. Rural pupils in the project schools began the year with average scores of 59,4% and improved by 24,9%, reaching similar performance levels on the post-test.

These results suggest that those pupils beginning with least advantages appeared to derive the greatest benefits from the programme. This finding, in turn, suggests that one of the goals of the project, which was to address issues of equity and access, was met by EIA 2.

Overall, the effect size of the EIA 2 intervention in 1994, as measured by the test, was calculated as ,71 (Note 24). For meta-evaluative purposes, this indicates less effect of the programme at Sub B than at Sub A level. This may have been a factor of the late start of the programme in 1994.

## **ANNEXURE TWO**

A summary of Ishbel Hingle's reports, similar in length and format (perhaps with a central table summarising results?) to the James Cobbe and Letta Mashishi summaries following.

## **ANNEXURE THREE**

Main Points from the Curriculum Development Document, written by the OLSET Team, and summarised by Jenny Kenyon.

A summary of the OLSET team's curriculum development reports, similar in length and format (perhaps with a central table summarising results?) to the James Cobbe and Letta Mashishi summaries.

## **ANNEXURE FOUR**

Main Points from "An Evaluation of the English in Action Programme"

by Letta Mashishi

Angela Arnott, John Mansfield and Mandia Mentis, in their 1993 report, recommended that a evaluation of the "English in Action" Level One and Two curricula was necessary. This would need to examine both objectives and methodologies.

An external evaluation of the programme's materials was undertaken in 1994 by Letta Mashishi, an applied linguist who is coordinator of the Schools English Language Programme attached to the Centre for Continuing Education, University of the Witwatersrand. This was done through two linked analyses of the print and radio materials, supported by observation of the materials in use in the classroom (Mashishi 1994).

In terms of the programme's objectives, Mashishi noted that "English in Action" had three aims:

- a. To promote accelerated student learning in ESL.
- b. To function as an effective in-servicing agent for teachers.
- c. To teach the four primary language skills of listening, speaking, reading and writing, within the context of the pupils' need for communicate in social settings.

In terms of the programme's classroom materials, Mashishi noted that these were based on an eclectic approach, which used (at different times) some form of the Grammar Translation Method, TPR (pupils being asked to follow instructions by the teacher), Suggestopedia (in use of music and chants, as a means to creating a relaxed atmosphere within which language learning could take place) and the Communicative Approach.

With respect to the Level One materials, Mashishi suggested that an eclectic methodology was appropriate, but indicated that the content needed revision. The methodology underpinning the Level One materials also needed to be reconsidered. The role of the teacher as currently conceptualised was too passive. More attention should be given to introducing the rudiments of reading and writing, in addition to the programme's emphasis on listening and speaking. There were a number of areas in which the skill of reading was not handled in a systematic manner, suggesting that a more balanced eclectic view of second language teaching needed to be adopted.

As far as the Teachers Notes were concerned, Mashishi suggested that the materials needed to make the teachers more aware of the different approaches to teaching language which were implicit in the materials. While the communicative approach should be stressed, an attempt should also be made to give teachers an indication of the different techniques and principles involved in language teaching. As the programme's methodology was eclectic, the teachers should be made aware of this.

In addition, Mashishi suggested that the Teachers Notes needed to focus more broadly on providing guidelines for good teaching practice than was currently the case. A currently presented, the Teachers Notes overlooked many elements of effective teaching such as planning, lesson presentation and the ways in which questioning could be used to promote thinking and language development in the classroom. The Teachers Notes also needed to have a clearer focus on encouraging the teacher to critically reflect on her teaching. Not only should the teacher be given a clear indication of the critical elements in the curriculum, but the Teachers Notes should provide an indication of the value of reflection on teaching practices, and an encouragement to reflect on how teaching actually takes place in practice.

Mashishi suggested a number of ways in which this could be achieved. The Teachers' Comments section at the end of the Level Two Notes could be incorporated in the Level One materials, with a comments section after each lesson. This could be integrated with the whole process of INSET in the teacher support groups. Thus teachers could be asked to

comment on which teaching principles or techniques were used in each lesson, what questions the pupils were asked and how pupils were involved in the lesson, and could also be asked to provide specific comments as to assessment of whether the pupils had understood the lessons, as well as areas of the lesson with which the pupils had difficulty. This process could then be extended into the INSET provided in the teacher support groups, by asking the teachers to provide comment on their teaching experience based on their lesson evaluations.

In addition to the focus on teachers' experience in the classroom, Mashishi also suggested that the INSET provided in the teacher support groups should focus on developing the teachers' meta-language (ie developing a common language about and for teaching used by both materials writers and teachers). As conceptualised at present, the materials required the teachers to pass on information about language to the pupils. This knowledge about language and about language teaching could not be assumed in the teachers, nor would it develop automatically. It would need to be developed. Mashishi also indicated the need for a coordinator's training guide which provided guidelines on how to give support to groups of teachers as well as individual teachers.

Mashishi's analysis thus corroborated earlier comments by the evaluators of the programme in 1992 and 1993 concerning the need for revision of the Level One materials. There was a need for a methodology which involved the teacher and which developed the teacher's knowledge of language teaching and her ability to support the programme in the classroom. This, in turn, indicated a need for an integrated programme of INSET and teacher development, focused on ensuring that the classroom materials were well taught, while at the same time developing the skills of the teacher to do so. Mashishi suggested that these aims would most likely be met if the teachers used audio cassettes which they could control.

Mashishi's evaluation would suggest that substantial revision of the "English in Action" materials will be necessary. Annexure Three provides an overview of how the project is currently addressing this need. Mashishi's evaluation also indicates that further development supported by evaluation of the programme will be necessary, focusing on the materials, the role of the teacher and how the programme supports the work of the teacher in the classroom, the role of teacher support and INSET in this process, and how the delivery medium (radio or cassette) affects the implementation of the programme in the schools.

## **ANNEXURE FIVE**

Main Points from James Cobbe's Economic Report on "English in Action"

by Charles Potter

In July 1994, James Cobbe of Florida State University conducted an analysis of OLSET's current costs, and made a series of cost projections based on various scenarios relating to the scope and nature of OLSET's future work with EIA. These were then compared to the costs of alternative candidate systems (materials and textbooks produced by other NGO's/EDA's) currently available in South Africa.

Cobbe presented data which demonstrated that the costs of OLSET materials compared favourably with the other available materials in South Africa. In a scenario in which OLSET provided EIA on cassette to schools, EIA 1 and EIA 2 were slightly more expensive than the alternative materials developed by other NGO's/EDA's. In a scenario in which EIA



1 and EIA 2 were provided through radio broadcasts, the costs were substantially cheaper than the alternative materials available.

Cobbe's analysis was conducted post-election, at a time of rapid change in the South African educational system. Firm information on the context of the future education system, (both on the level of educational policy for primary school education, and for the education system as a whole), was not available. In particular, details as to how much money the government would be likely to have available, and for which areas of the RDP (ie what priority government would place on education as compared to, say, housing or health under the new dispensation) were not available. This lack of clarity related to funds available for teachers' salaries, for new schools and the upgrading of existing schools and classrooms, as well as for materials and textbooks.

In addition, details on the costing of other NGO's/EDA's with respect to their personnel expenses, as well as the models for INSET and teacher support of other NGO's/EDA's (ie the costs relating to the teacher development components of the work of other educational projects working in the area) were not available. Similar lack of clarity existed as to how existing NGO's/EDA's were likely to link with, and be supported by, the new education system were not available.

Cobbe concluded that the state of flux and lack of clarity with respect to the new government's policy and resources was likely to continue for some time. For this reason firm projections and forecasts could not be made. Based on available data, Cobbe thus focused on the costs of developing and implementing the programme with respect to its materials. These costs were compared to the costs of textbooks and other materials produced by other NGO's/EDA's.

On the level of the wider (and larger) developmental costs relating to teacher support and schools-focused development, Cobbe offered indicative figures which were necessarily more tentative. He considered two alternative ways of expanding OLSET's activities, as follows:

The first alternative would be to follow an organic growth model, based on variations of a model for growth developed within the project (Potter 1994 (a)). The various scenarios posed within the organic growth model presupposed schools opting to join the programme voluntarily, OLSET essentially supporting expansion at greater scale in the schools within the regions in which it was already active. As more schools were added, more implementers would also be added, the regional coordinators shifting their functions from direct implementation to becoming supervisors, trainers and supporters of the implementers in the field. Cobbe pointed out a number of potential difficulties with such a model. It was, for example, very hard to see how government would provide finance in a model in which participation was volitional from the side of the schools, and apparently by mutual agreement between schools and an NGO (Note 25). The speed at which the programme would develop was also unclear. However, despite these difficulties, total cost estimates could be constructed for such a developmental scenario (Note 26).

The second alternative would be to consider expansion on a model of blanket provision to all historically disadvantaged schools within a particular magisterial district. Assuming this approach by government, Cobbe posed a number of alternative ways in which the programme could be implemented, which were costed in terms of materials and delivery by radio or cassette, and various scenarios with respect to teacher support and development. The first scenario Cobbe termed the "current model", in which full-time implementing staff would be required wherever the programme was. The second scenario

Cobbe called the "intermediate model", in which full-time staff would also be needed, but each implementer would be responsible for double the number of schools and teachers (the intensity of INSET during the school year being halved). The third scenario Cobbe dubbed the "minimal model", based on an initial workshop, and no face-to-face INSET during the year.

Based on these scenarios, Cobbe projected costs in a number of regions, and derived cost estimates for the programme as a whole. These were then compared to the cost estimates for the materials available from publishers and other NGO's, reaching the conclusion that with radio delivery as opposed to cassette delivery, the OLSET materials were competitive (Note 27), and comparable to the unit costs of textbooks purchased for primary school pupils.

Decisions concerning the intensity of teacher development and support provided would add to these base costs, however. For this reason, though it could be argued that "English in Action" was cost comparable (and in many cases cheaper) than alternative materials available, Cobbe noted that policy decisions by government concerning per capita expenditure in the primary grades, and financial support of teacher development and INSET had not yet been made. Only once government policy in relation to these issues was clear, would it be clear which of the above scenarios would be applicable.

## ANNEXURE SIX

### A Note on Teacher Development and Support

by Charles Potter

From the 1994 evaluation, one central issue emerges clearly. This is the point made by James Cobbe that the future development of "English in Action" depends crucially on policy decisions with respect to expenditure on materials to support teaching in the primary school, and policy decisions with respect to financial support by government of in-service teacher training and school-based development.

Various scenarios have been provided in Cobbe's report and my own earlier contribution, which Cobbe has characterised as an "organic model". A few comments on the assumptions underpinning the organic model are perhaps appropriate in concluding this evaluation report. These stem from my conviction that "English in Action" is not only a vehicle for language teaching, but also for teacher development. It is thus essential that issues relating to teacher development and support be held in mind, in any decisions concerning the development of the programme beyond the pilot phase.

As Hargreaves (1992) has pointed out, teachers do not develop their strategies and styles of teaching alone. Teaching strategies arise not just from the demands and constraints of immediate context, but also from broader cultures of teaching. Following this line of reasoning, Goodson (1992) has suggested that in-service training should promote the development of teachers' voices about their own concerns and issues, while Huberman (1992) has suggested that there is value in linking in-service training with the ways in which teachers spontaneously go about their planning, and tinkering with their classrooms.

Improving language teaching in classrooms is thus not merely a question of provision of materials, no matter how good these may be. Classroom development is essentially an issue of teacher development. My assumptions in this respect are similar to the ideas

proposed by Nick James of the NPI Centre for Productive Education. James suggests (along with Fullan and Stiegelbauer 1991) the value of a "cascade model" of INSET.

My assumptions are also similar to the suggestions made by Myron Atkin of Stanford University on his recent visit to South Africa. Atkin proposed in the report he wrote on his visit that those working in teacher development should aim to achieve a "critical mass" of some 40% of teachers behind a particular form of teaching. Similar observations were made a decade earlier by the late Lawrence Stenhouse of the University of East Anglia. Stenhouse commented in 1981 that, for innovation to succeed, new curriculum practices need to acquire their own traditions (ie become part of the traditional practices of teachers in their classrooms).

These points are made to highlight my conviction that OLSET needs to link its materials to a strategy aimed at changing the classroom practice of teachers. For "English in Action" to be successful, OLSET will need a carefully conceptualised programme of INSET which is sustainable, and an integral part of overall implementation strategy. This point was made in our interim evaluation report of September 1993, and underpins the different scenarios for INSET suggested in my own, and in James Cobbe's (1994) economic analysis of the project.

Charles Potter  
April 1995

## FORMATIVE AND SUMMATIVE EVALUATION DESIGN FOR A RADIO LEARNING PROJECT

by Charles Potter  
University of the Witwatersrand, Johannesburg

### 1. The Project

The Open learning Systems Trust (OLSET) is currently developing a model for teaching English as a second language in South African primary, schools, through the medium of interactive radio. While a number of other projects in South Africa have been working for a number of years to develop procedures for teaching English at the lower primary level (e.g. the Molteno project; MAPEP) and at the upper primary level (e.g. SELP; the Molteno Project; READ), none of these existing projects are using radio as medium.

OLSET's "English in action" programme introduces English from Grade One (Sub A) through the medium of interactive radio. The programme will ultimately consist of a number of levels. The first level (consisting of one hundred and fifty lessons to cover tuition during the first year at school) is currently being developed, and implemented on a pilot level in over a hundred primary schools across South Africa.

### 2. Interactive Radio in Education

The medium of interactive radio has been used successfully in a number of developing countries to introduce basic education of different types (Imhoff and Christensen 1986; Olsson 1989; Zirker 1990). It offers a cost effective technology capable of delivering instruction to schools both in the urban areas, as well as in areas far away from the city.

However, there are limits to what interactive radio by itself can achieve. The problems in South Africa's educational system, and with its curricula, are broad-based, and are unlikely to be solved by instructional technology in itself. However, instructional technology may play a role, and provide a basis for a broader-based intervention on a number of levels, designed to fit the context and its particular needs/

Initially, OLSET's aim was to replicate a model of interactive radio developed and implemented elsewhere. As the project has worked through its pre-pilot and pilot phases, this aim has, however, broadened. There have been a number of influences which have led to this developmental shift. The project's experience of working in the schools, in combination with the process of evaluation described in this article, has been one influence. Another has been evidence which has emerged from other African countries in which interactive radio has been implemented, of problems with the long-term sustainability of the original implementation model.

These various influence in combination have led to awareness of the need to critically examine the value of the imported model, on the one hand, and to develop a short and long-term implantation strategy suited to the nature and needs of the South African context, on the other.

### 3. Focuses of this Article

The purpose of this article is to provide a case study of evaluation design. The design process will be described and its implications discussed, with respect to an evaluation design that has both formative and summative evaluation focuses. Reference will also be made to some of the effects of the process of evaluation on the project's planning and implementation, as the decisions made with respect to evaluation influenced the project team's work.

#### 4. The Need for Formative and Summative Evaluation

Central to the evaluation design described in this article is an assumption that educational evaluation needs to be context-sensitive. The evaluator thus needs to evaluate an educational innovation in terms of its purposes, relative to the context in which it is working.

With respect to the purposes of the innovation, "English in Action" was set up to provide interactive radio learning lessons to children in the lower primary grades in South African primary schools. Financial support for the project was provided by USAID as well as other sponsors, both within and outside South Africa. The project's initial instructional model and implementation strategy were drawn from similar innovations in interactive radio developed elsewhere in the world (Imhoof and Christensen 1986; Zirker 1990). At the planning level, the assumption was that a similarly designed innovation would lead to similar learning gains in the context of South African education.

With respect to the context in which the project was being implemented, however, there were a number of differences, which related to the state of conflict that had characterized South African education over the transition to democracy. The OLSET radio learning project was being implemented in a situation in which both the country and its educational system were in a stage of transition. The project's initial plan was to implement radio lessons developed elsewhere in Africa, with minor modifications and changes. The type of evaluation needed would be measurement-based, and summative in character. As the project's implementation took place in South Africa, there was a shift in assumptions, both concerning the nature of the educational task, as well as concerning the need for formative as well as summative evaluation.

The initial position of the project planners can be characterized as follows:

- The project team originally defined its task as one of adapting what had been tried elsewhere, and implementing this model in South Africa. Included as an integral part of the instructional design was a measurement based model of evaluation, which had been used in other contexts to provide comparative information on learning gains as well as costs relative to benefits.
- The type of evaluation envisaged would be summative in character, quantitative and measurement-based. The project was, however, also sensitive to the need for formative evaluation, which has led to the design of the evaluation described in this paper.

A shift from this position then took place. As development and implementation took place over the project's pre-pilot stage in 1992, the project team broadened the focuses of their work. In the words of one of the project implementers, the focus has shifted from being a project concerned with promoting pupil outcomes, to one promoting both teacher and pupil development. There was also awareness of the need to include parents and the broader community in the process (Note 1), due to the effects of the system of Bantu Education on the relationship between parents, community, teachers, schools and pupils.

The project team's vision thus broadened, reflecting an increasing awareness of the need to promote a process of reintegration within a fragmented system of education, through the work they were doing with teachers, pupils and parents in the primary schools. Changes in intentions, policy and action needed to accompany this vision. In addition, a formative and summative evaluation design was needed which was broad enough to provide information on aspects relating to pupils, schools, teachers, community and parents.

The design of this evaluation process, and its application during 1993, is described in the rest of this article.

## 5. How the Shifts in Conception of the Role of Evaluation in the Project took Place

In January 1993, I was asked to attend a meeting at the project's offices in Braamfontein, Johannesburg. There were a number of others present, and we were asked to comment on the project's evaluation strategy, and in particular, its plans as regards the implementation of a test-teach test design (Note 2).

A variety of comments were made. My own were to state that a test-teach-test design would provide essentially limited information about whether the project's design was working or needed to change, and in particular would provide little information relative to the decisions the project team would be called on to take vis-à-vis the development of materials.

In addition, there were also other limitations in a purely summative and measurement-based evaluation design. An evaluation design based on quantitative information from tests which excluded qualitative and contextual information and indicators, would provide information purely of a technicist nature (Bowers 1979; Buckland 1984), rather than information relevant to interactions and relationships between stakeholders, and whether their educational needs were being addressed in the best possible way. In short, little information would be provided on the level of educational process (Stenhouse 1975; Rudduck and Hopkins 1985).

In essence, a technicist vision of evaluation would essentially focus on product to the exclusion of process, and quantitative issues to the exclusion of the qualitative dimensions of education. It would provide little information on whether the project's implementation strategy was appropriate, or too narrowly focused. There were thus potential dangers in a narrow vision of evaluation, and a narrowly focused evaluation design.

These comments were intended constructively, and were supported by others at the January meeting. The comments of those at the meeting were generally supportive of the project, indicating that there was a need for intervention and innovation on a number of levels. Comments made at the January meeting thus reflected a belief that "English in Action" was a project with considerable potential, particularly in terms of the simple technologies it used, and their wide-spread availability across South Africa. The project was perceived to have particular relevance as regards schools in the rural areas, and in farm schools.

There was concern, however, as to whether the project's evaluation design was broad enough to be provide the type of information the project required on a formative level.

With respect to the summative evaluation design presented at the January 1993 meeting, there was concern that this was too narrowly focused. This carried with it dangers of a limited conception of what the project was attempting to do relative to the context in which it was operating. It was stated that, in terms of these needs, the relevance of the project would be limited if OLSET did not aim to address broader contextual needs, and build the capacities of both teacher and school, as part of its overall implementation strategy. The evaluation design needed to be broad-based enough to address these issues.

## 6. Evaluation Issues, relative to the Project's Implementation Strategy

On the basis of the discussion at the January meeting, I was asked by OLSET to develop a broader-based evaluation design, which would be formative in character. This design would be produced as a document which could be considered by OLSET's management.

A number of issues were raised in the document, and in subsequent discussion with the project team, relative to OLSET's implementation strategy. The following paragraphs encapsulate these issues, and their design implications.

### 6.1 Project Vision

The document stressed the need for evaluation to take place in relation to the project's purposes, as these related to the project's vision. There did not appear to be a vision statement, to which all members of the project team subscribed.

In the absence of a vision statement from the project, I started the evaluation design document with a statement of what I perceived an appropriate developmental vision to be, namely that technology could provide a departure point for educational development, as well as a rallying point for broader community-based development. I made this statement due to my belief that interactive radio as a process had many assets and possibilities.

Among its assets were its high visibility and replicability, as well as its cost-effectiveness. It also provided opportunities for modeling teaching. This could be helpful in a context in which many teachers had been exposed to conflict and strife over apartheid in schools for many years, and also did not feel confident and adequately trained in teaching English as a second language.

A radio-learning project could provide a number of focal points for development. If well-designed radio lessons were provided on a regular basis in schools, more broad-based in-service training as well as community development could take place, on both content and process levels.

On the level of content, opportunities for partnership in teaching between teacher and radio lesson could be provided. Supporting materials could also be provided which could be used by the teacher both for teaching English as well as for other lessons. On the level of process, opportunities could be provided for contact between teachers, enabling teachers to interact consistently with each other. This would involve using the radio learning as a basis for a broader-based processes of in-service teacher training and classroom support.

Given the need for a broader-based conception of development, the project team needed to become involved in discussion of both planning and implementation issues. As this took place, there were likely to be shifts within the project, at the levels of intentions, policy and action. Essential to this vision of project development were that issues of planning and implementation needed to become the focus of critical examination, discussion and clarification. Both stimulation and facilitation of the process of critical examination and clarification of vision, and its influence on planning and action, were also needed.

The central focus of the evaluation would be formative. It would need to be descriptive, while at the same time developing this essentially logical, interactive and reflective process (Ebbutt 1985; Kemmis 1982; Carr and Kemmis 1986; Oja and Smulyan 1989), in respect of the developmental task.

### 6.2 Technology as the basis for Broad-based Intervention

In the evaluation design document, the implementation strategy for OLSET's "English in Action" programme was characterised as follows:

The project would provide a series of radio/audio cassette lessons, which were interactive in nature, and would involve the teachers and pupils in musical activities, games and drills. Through this means, a basic English vocabulary would be introduced, at first through listening and speaking, and then through reading and writing.

The classroom-based lessons would then provide a basis for school-based support. Intrinsic to the evaluation design was the assumption that technology in the classroom had potential, but only as a starting point. Without a broad vision of the potential of technology in relation to teacher and community development, sustainability would not be achieved (Note 3).

To achieve sustainability, the advocacy of various stakeholders would be needed (e.g. Fullan

1982; 1991). Such advocacy would presuppose that the project met deeply felt needs, and built capacity in relation to these needs. To these ends, support should be offered to schools by OLSET, not only in terms of technical assistance in running the programme, but also in terms of School-Focused In-Service Training (INSET).

A fundamental principle to be followed in providing INSET was that school visiting, teacher support groups and workshops for teachers could provide a framework for innovation. In addition, leadership was needed at school level, as well as organization. To enable capacity to emerge in a context in which leadership at school level had been diminished through a decade of conflict and strife in schools, structures were needed at school level which could be organized and run by the teachers, and which could involve the parent body in the education of their children (note 4).

This was the process aspect of the developmental task.

### **6.3 Issues of Adoption, Sustainability and the Curriculum**

Besides the need for school-focused development, there were also aspects of the developmental task concerning the curriculum, and the materials the project was developing. In terms of a context in which there were a number of other NGO's working in educational development in South Africa, a new project such as "English in Action" needed to offer a service based on knowledge of the existing curriculum, and the needs which existed in practice. It also needed to offer a service which took account of the work of other educational development agencies. This was especially important in light of the reality that other projects were already working in many of the schools, and with many of the teachers and pupils with which the project would interact.

This implied a need for the innovation to be carefully planned to fit the context. Attention needed to be directed both to the nature and form of the new curriculum the project was offering, as well as the process of implementation necessary to its adoption and sustainability.

Establishing the nature and form of the new curriculum, as well as the process of implementation necessary to both adoption and sustainability, was the essential developmental task the project should be confronting. The implications of this task needed to be carefully thought through, strategised, implemented and evaluated.

### **6.4 The Type of Evaluation appropriate to the Developmental Task**

The nature of the developmental task as involving both process and product, and the stage the project team were at in terms of the task, implied that an evaluation strategy was needed suited to the work of a project at an early stage in its development, rather than one suited to more developed implementation. An evaluation strategy was thus needed appropriate to a formative stage of development. This would be required in addition to the type of summative evaluation design being conceptualised by the project team.

An issue was not the validity of measurement-based designs, but rather the need for such designs to be supplemented with qualitative data. This type of multimethod evaluation design was necessary due to the variety of planning and implementation decisions which the project team needed to take. An evaluation design was needed which would be context-sensitive and holistic, relative to the need to account for the development of both process and product. Information relevant to both process and product-related decisions was needed, at an early stage of the project's development.

### **6.5 Formative and Summative Purposes of Evaluation**

Provision of information relative to developmental decision-making was one purpose of evaluation. This formative purpose would focus on the nature of developmental decisions, as well as the capacity of the project to provide the necessary information to those who needed it.



This implied a two-way process of establishing the information needs of those involved in different aspects of the project's work, and of developing the procedures necessary to "provide them with the information they needed, on an ongoing basis.

. The second purpose was to monitor the effectiveness of what the project was doing, and progress made in terms of the developmental task. This summative purpose would need to reflect both process and product dimensions. Here measurement-based evaluation would play its role, in terms of establishing learning gains made by pupils.

However, the focus of the project on a process involving various stakeholders would require additional, and more broad-based information. Here case studies of aspects of the project's work might be helpful, as well as evidence based on the accounts and testimony of those involved in the process.

### **6.5 The Need for Context Evaluation**

One area in which information was needed was in the area of needs assessment (or context evaluation). This type of evaluation would focus on providing information concerning the existing situation in the schools"; and the type of curriculum implemented in the schools. At another level, context evaluation would focus on providing information about the type of curricula being developed by other developmental agencies, and why these agencies had taken the decision to focus on particular areas of the education system to the exclusion of others.

Information from context evaluation would be useful both to establishing gaps in existing provision, as well establishing decisions concerning implementation strategies relative to - needs made by other projects. This type of evaluation would highlight not only the workable models developed through their experience over many years of working with teachers and South African primary schools, but also the right and wrong turnings they had taken in their work.

### **6.6 The Need for Process and Product Evaluation**

The evaluation design document, and subsequent discussions with the project staff, stressed the need to conceptualise curriculum development and educational innovation as not only a process directed at establishing those appropriate content features, materials and implementation strategies necessary to change pupil skills, behaviours and measurable outcomes (product features of a curriculum), -but also a process directed at establishing those personal relationships, interactions and social structures appropriate to advocacy and adoption of the innovation, and its long-term sustainability (process features of a curriculum).

As such both product and process evaluation were needed, and should be given equal weight in an evaluation design.

### **6.7 The Need for Evaluation relative to Planning**

A central feature of the project's ability to meet needs, would be its ability to respond to information from its various stakeholders. There would thus need to be structures and capacity in the project which would enable the project team to conceptualise, strategise and plan on an ongoing basis relative to needs.

Evaluation of the project's planning and organisational capacity (what Stufflebeam (1969; 1971; 1983) has termed "input evaluation") was also needed. In essence, the breadth of needs in South African primary schooling indicated that, while technology could provide focus and might offer some technical solutions, the developmental task faced by the project was far broader. Curriculum development was required on both content and process levels. Capacity-building within the project as an organisation, as well as within the schools with which it dealt, was necessary.

The evaluation design document thus reflected a concern 'that OLSET should implement a broad-based evaluation strategy to its developmental task, as well as its implementation strategy. Concrete suggestions were made with respect to formative evaluation, directed both at organisational development and empowerment issues, relative to capacity-building relative to the developmental task.

## 7. OLSET's Response to these Suggestions

Olsen's management considered my evaluation design document, and accepted the recommendation that they broaden their evaluation design. This implied an acceptance not only of the need for formative evaluation, but also an acceptance of a conceptualisation of the developmental task as not only focusing on pupil and teacher outcomes, but also on development at the level of the school, and the parents, and the community.

In discussions between the project's management and the evaluators (Note 5), two structures, with the potential to support development at these levels, were proposed. The first has been alluded to earlier in this article and was termed a "teacher support group". The second was use of focus groups, as a means of community consultation.

### 7.1 Teacher Support Groups

A Teacher Support Group was conceptualised as involving teachers from neighbouring schools in working together. While the focus of the work of Teacher Support Groups would lie on the implementation of the "English in Action" programme, this contact was conceptualised as a starting point for discussion, sharing of ideas, and creation of resources and teaching aids on a broader level.

While focused on the development of the teacher, teacher support groups were also conceptualised as having a role to play in bringing the parents back into education. This would be done, *inter alia*, through the medium of demonstration lessons, which would be organised by participating schools in turn (Note 6).

Ideally, demonstration lessons would take place once per month. These would involve parents from the school, together with teachers from the school, and teachers from neighbouring schools.

### 7.2 Focus Groups

Focus groups were conceptualised (Note 7) as an arena for raising issues concerning the project's development, in which the various stakeholders in the educational process could participate. One function of such a group would be to give information concerning aspects of the project's work. The other would be to hear from those involved in the project regionally their concerns, feelings; and ideas concerning the project's work and its future direction.

Ideally, focus group would be regional structures, which would be held quarterly. The teacher support group, in contrast, would be a local structure. Teacher support group representatives would be encouraged to participate in regional focus groups. Also involved in focus groups, however, would be those representatives of community-based organisations with a direct interest in education, representatives of the educational authorities, and representatives of parents.

### 7.3 The Role of Technology in School-focused INSET

Implicit in the acceptance of these recommendations was the acceptance of technology as a starting point for wider development on both content and process levels.

As regards school-focused INSET, the aim would be that the "English in Action" lesson provide

the focal point for teacher support and development on one level, and for parent involvement and development on the other. Through establishing a process of ongoing contact and mutual support, teachers could become empowered through a process of mutual support and learning from each other, while parents could involve themselves practically in assisting the teachers and the schools to do their work.

#### **7.4 The Need for Context, Input, Product and Process Evaluation**

Also implicit in management's acceptance of the proposals was the recognition that formative evaluation was of value in projects which were newly established. Active engagement with issues related to the need for a broader-based evaluation design was based on recognition of the reality that measurement-based evaluation is capable of providing information of value concerning broad-based trends in a project, but may not be capable of providing information relating to developmental problems or difficulties, nor indications as to where improvement is needed, nor how such improvements might be effected (Cronbach 1963; 1980).

Information was necessary not only concerning what was taking place, but how and why it was taking place. This depth of information could not be provided by data which was abstract, and relatively context-free.

In South Africa, which is essentially a country in transition, in which major changes on a socio-political level have and are continuing to take place, context evaluation would be necessary. Ongoing evaluation would also be necessary on the levels of input (developmental planning relative to perceived needs), process (relational and interactional) and product (outcome-related) levels. As such, the multi-dimensional CIPP evaluation model proposed by Stufflebeam (1968; 1971; 1983), would be appropriate to the evaluation.

#### **7.5 Vision, Intention, Policy and Implementation as Dimensions in Comprehensive Evaluation of a Programme**

Stufflebeam's CIPP model is a comprehensive model of evaluation which provides a framework for conducting evaluations relative to contextual, planning and implementation issues, as well as the outcomes or effects of a project as an innovation. In the OLSET evaluation, there were focuses not only on the project as an organisational entity, but also on the curriculum being developed by the project as the central feature of its innovation.

In project's curriculum, there were clearly a number of levels which were not being addressed. One of the main reasons for this was that the project team had commenced its work with an assumption that the project's developmental task was to make minor modifications to radio lessons developed elsewhere in Africa, rather than to undertake a more comprehensive processes of curriculum development.

In the OLSET evaluation, there thus needed to be specific focus on the curriculum. This implied developing an evaluation strategy which would be sensitive to the different levels of vision, aims, artifacts and negotiations which are intrinsic to the curriculum development processes (Schwab 1962; 1967, 1969, 1971; 1973; Walker 1969; 1971; 1975).

Essentially, curriculum development can be conceptualized as having interlinked levels of intention and action in teaching (Stenhouse 1975; 1980; 1981; 1983; Rudduck and Hopkins 1985). Relative to these levels, there would be value in examining OLSET's curriculum formatively.

The approach chosen to conduct this type of formative curriculum evaluation was the vision, intention, policy, and action evaluation framework utilized by the author in previous evaluations of large-scale innovations in South Africa (e.g. Potter 1991 (a) and (b); Potter and Moodier 1992; Potter, forthcoming)). The type of evaluation envisaged would focus on curriculum as the central feature of the innovation.

The evaluation would focus on providing information relative to curriculum planning and implementation, as well as contextual and process information. It would focus on formative issues relating to teaching in the classroom, as well as issues about schools. It would do so both by observation in schools, as well as by gathering provide in-depth information about certain schools. These types of qualitative data would then be used to interpret summative and measurement-based information relative to learning gains, as well as data from interviews and questionnaires.

The evaluation would thus be issues-based, as well as measurement based. It would be policy-related (Parsons 1981), primarily interpretive (Guba 1978; 1981; Guba and Lincoln 1981; 1983; 1989), and take its departure point from process issues in the schools (Simons 1981). It would focus on the project's vision, aims, policy and implementation strategies in developing and implementing the radio lessons, and on its conceptualization of its curriculum (Potter and Moodie 1992) relative to the context in which it was working, and the needs of the teachers and schools with which it was working.

## 8. Specific Focuses of the Evaluation

### 8.1 Curriculum Development

With respect to its focus on the teaching of English as a second language at the lower primary school level, curriculum evaluation would need to focus on content as well as methodological issues. With respect to content, a new curriculum was necessary, based on the fact that English as a second language had not previously been introduced at Sub A level in those primary schools falling under the aegis of the Department of Education and Training (Note 8).

On a methodological level, in-service training would be necessary, as well as ongoing support of the teacher in the classroom. The nature and process involved in both these aspects would also be the focus of evaluation, as would the issue of continuity and follow-up. This would be necessary in light of the reality that many African primary school teachers, who themselves speak English as their second or third language, are not confident of their own English language ability, nor trained in how to teach English as a second language.

These factors would not only affect the teachers' ability to teach the language in the classrooms targeted by "English in Action", but would also affect the teaching of the language at levels in the curriculum subsequent to those levels at which "English in Action" was introduced.

An evaluation which focused predominantly on short-term learning gains would effectively say little about the long-term growth of the English language ability of the children across the primary school as a whole. It would also say little about the fundamental issue of sustainability, both of the project as an innovation affecting teachers, as well as an innovation affecting pupils.

Information would thus be needed concerning the teachers and the pupils in the context of the school as a whole. This would include measurement of short-term as well as long-term learning gains, of pupils.

### 8.2 The Role of the Teacher

Basic to the evaluation design was the assumption that a tape recorded lesson, or one broadcast over the radio, could offer a basis for introducing English in the classroom. The role of the teacher in this process, and the inclusion of the teacher as an integral part of a broader-based process, were vital (Note 9).

This was important both at school level, as well as in the broader context of the educational system as a whole. Here, the context was one in which there had been a long history of problems in political as well as educational process, manifesting in poor relationships and lack

of trust between the teachers and the educational authorities. A technology of education which excluded the teacher from the process, and which undermined rather than built teaching ability, might produce short-term learning gains, but might at the same time produce little of long-term value in terms of the bigger picture.

In terms of these needs, the evaluation strategy would also be developmental, focusing on the development of innovative strategies to integrate the teachers, the principals and the community (Note 10).

### **8.3 Needs for Support and Development**

There were thus needs for support and development on the level of the teacher, of the school and of the community. This would need to focus on capacity building, both in terms of skills in teaching, as well as in terms of developing the relationships and participation fundamental to successful education.

There were needs on the level of the teacher and the school, but also of the parents. Under the prevailing educational dispensation, parent-teacher associations, and school boards, had a history of being regarded as imposed and illegitimate. There were similar problems as regards relationships with the bureaucracy, and the inspectorate, and problems in the relationship between schools and parents, and parents and the youth.

While it could perhaps be argued that changes on these levels lay beyond the capacity of an interactive radio programme to effect, it could likewise be argued that if these were the contextual factors influencing the quality of education in the context in which the project was working, an interactive radio project could not ignore these problems. The reality was that each of these problems had the potential of rendering the work of the project at worst invalid, or, at best of minor relevance.

### **8.4 The Need for School-focused INSET**

There were also problems stemming from poor quality of teacher training as well as lack of In-Service Training (INSET). In terms of the literature on educational innovation, and in particular innovation in Africa (e.g. Fullan 1982; 1991; Hartshorne 1991; Hawes 1979; Holderness 1989; Holderness and Altman 1992), it was evident that INSET needed to be close to the classroom to be effective.

Whether a radio learning project could provide a basis for school focused development was thus a major issue in the evaluation. This, and the broader issues of teacher and community development discussed above, indicated the need for a broad-based and naturalistic approach to the evaluation of the project, to supplement and contextualise measurement-based evaluation.

## **9. Methodological Issues**

### **9.1 Previous Evaluations of "English in Action"**

The evaluation design document was based on the assumption that a methodology based on use of multiple methods was necessary. This would need to provide information relevant to the development of materials, implementation strategies, support structures, processes and learning outcomes." This implied the value of both quantitative (measurement-based) as well as qualitative information (observational data; data from interviews and self evaluations; information from personal accounts; case studies) in providing a picture both broad and detailed.

As regards quantitative information, there were existing evaluation strategies with respect to "English in Action" which had been tried elsewhere in the world. The teaching of English through the medium of interactive radio had been undertaken in a number of other contexts,

and evaluation procedures developed which enabled learning gains to be quantified and measures (Imhoof and Christensen 1986; Olsson 1989). Within the African context, interactive radio projects for the teaching English as a second language had been implemented in Kenya, Swaziland and Lesotho (Zirker 1990).

The evaluation of the Kenyan version of "English in Action", for example, had been undertaken by the Center for Applied Linguistics in Washington (Imhoof and Christensen 1986). The evaluation design was comparative, based on a test-retest rationale. In terms of this design, children in both radio learning classrooms and control classrooms were tested and retested. The results indicated that children in the radio learning classrooms demonstrated significantly improved achievement in Listening, Speaking, Reading and Writing than their counterparts in the control (conventional) classrooms.

There would thus be both precedent and logic for the evaluation strategy for "English in Action" in the South African context to also be based on a comparative test-retest design. However, it was not just a question of the evaluation model being broad enough to admit qualitative and contextual dimensions. There were also issues of interpretation, and the relationship between evaluator to those involved in the educational process, which were intrinsic to participatory evaluation.

These issues were of importance in a country moving to democracy, and a project working in communities which had historically been disenfranchised.

## 9.2 The Relationship between Evaluator and Evaluated

Underpinning a democratic evaluation ethic are issues relating to the role of the evaluator, and the relationship of the evaluator to those involved in the educational process (e.g. MacDonald 1977 (a) and (b); 1978). Previous evaluations of the "Radio Learning Project" had not apparently explored these paradigmatic issues, the evaluations not apparently explored these paradigmatic issues, the evaluations being conducted by outsiders, and within a traditional paradigm of evaluation (Guba and Lincoln 1981; 1983; 1989; Fetterman 1993 (a) and (b)).

In South Africa, with its history of top-down and -bureaucratic approaches to education, and the effects of these approaches as regards relationships and process, there were sensitivities concerning measurement, as well as evaluations cast within a bureaucratic mode (MacDonald 1975; 1977 (a); McNaught and Raubenheimer 1991; Potter and Moodie 1991; 1992). An approach was needed which would be non-threatening, inclusive, and participatory (e.g. Hall 1975; 1978; Choudhary and Tandon 1988).

The issue was not just one of how data were collected, whether the evaluator made those involved in the evaluation process at ease, whether an evaluator was rigorous, or whether the evaluator was ethical with respect to confidential disclosures. The issue was rather one of the need for a democratic and participatory ethic underpinning the evaluation as a whole.

The traditional role of evaluator as outsider and objective researcher was in question. This was the inherent tension in the call for a participatory, reflexive and empowerment paradigm in conducting the evaluation (Fetterman 1993 (a) and (b)).

An evaluation which was developmental and emancipatory in character, was primarily focused on capacity-building in the sense of the greater insight and empowerment of the insiders involved in the process (Carr and Kemmis 1986; Oja and Smulyan, 1989; Fetterman 1993 (b)). It needed to be conducted with, rather than about teachers and pupils (Stenhouse 1975; 1980; 1981; 1983; Rudduck and Hopkins 1985), as participants in the radio lesson.

Capacity-building and empowerment would thus be central issues in the evaluation, affecting its methodology. This would be especially important, owing to evidence from long-term evaluation of the Kenyan and Lesotho experience (Note 11), that these projects had paid insufficient attention to capacity-building relative to adoption and sustainability.

Those parts of the evaluation which were about schools, classrooms, teachers and pupils should thus be written in terms which teachers would recognise as appropriate and assistive to their development. The challenge was to produce evidence which was valid, and reflected what was taking place within the project. The assumption was that this type of information would be useful both to outsiders and insiders in the evaluation process.

## 10. Implications of a Participatory Evaluation Approach

The decision to conduct formative and summative evaluation in a way which involved the participation of the project's stakeholders had a number of implications. It also implied a shift in assumptions about the role of evaluation in project development.

Prior to the development of the evaluation design document described in this article, it was apparent that OLSET was planning to evaluate "Language in Action" in terms of a measurement-based evaluation paradigm, which was in substantial part measurement-based and conducted by outsiders to the project. There was an implicit assumption that the perspectives of outsiders would be less susceptible to bias, and would therefore be more valid, than the perspectives of insiders (i.e. those who worked within the project).

The shift to a participatory evaluation design implied a shift in basic assumptions, and the adoption of an alternative paradigm. This was based on the assumption that different people attach different meanings to the same event, and that meaning has to be negotiated. The process by which evaluation would be conducted was thus important, space and time being required to establish shared meanings concerning the work being conducted by those involved in the project, as well those affected by the work.

Ongoing contact between the different stakeholders involved in the educational process was thus necessary. This would need to be built into the design of the evaluation. If this process were adequately established, the evaluation's findings would have maximum likelihood of being useful, and utilised.

For reasons relating to the legacies of apartheid in South Africa, the alternative paradigm (associated with terms like "responsive", "participatory", "utilisation-focused" and "democratic" (MacDonald 1975; 1977(a); Stake 1973; 1980; Hall 1975; 1978; Patton 1980; Guba 1978; 1981; Guba and Lincoln 1981; 1983; 1989), was assumed to be preferable. In terms of this paradigm, the aims of the evaluation design phase would be two-fold.

The first aim would be to negotiate a framework for the evaluation which would be likely to be useful to the project and its stakeholders. The second would be to establish a process of involvement and participation in the evaluation, involving project staff and the project's stakeholders. This implied gaining the acceptance, involvement and participation of those working in the project, and of its stakeholders, in the evaluation design. This could then be continued and built on during the evaluation itself.

The assumption was that time spent in gaining acceptance of the aims, focuses and methodology of the evaluation would have direct benefit not only to the course of the evaluation, but also to the programme being evaluated. Once the design phase was completed, the participatory process would continue, data being gathered by a combination of insiders and outsiders working together, and interpreted jointly, with the aim of negotiating meaning and appropriate judgements.

## 11. A Final Comment on Evaluation Paradigms

Stress has been placed in this article on the issue of evaluation paradigms, due to the author's firm conviction that it is important that a paradigm of evaluation is appropriate to the aims and values of the particular programme being evaluated. In OLSET's case, the acceptance by the



project that the paradigm of formative evaluation should be essentially participatory and democratic in character was an important step.

The step implied a shift in assumptions. This shift had implications both for the evaluation as well as for the ethos of the project, its vision and its development aims. While the shift in assumptions had primary implications in suggesting the value of formative evaluation in the context in which the project was working, there were also implications as regards summative evaluation. A central issue in the negotiations surrounding evaluation was whether summative evaluation should be also based in the alternative (participatory/democratic) paradigm, or whether it should be based in the traditional paradigm, which was essentially autocratic and bureaucratic in character.

In the final analysis, the evaluation design had implications for both formative and summative evaluation, the decision being taken to base both forms of evaluation within a participatory/democratic paradigm. One of the reasons behind this decision was awareness of the sensitivity surrounding education at this stage of South Africa's history, and the particular concern that a summative evaluation design grounded in the traditional paradigm could negatively affect the project's image vis-à-vis the communities in which it was working.

The shift from a traditional measurement-based summative evaluation design to a broader-based and participatory/democratic evaluation design was thus symptomatic of broader shifts in the vision of the project. These related to both the role and possibilities of interactive radio in distance education.

Previous interactive radio projects had not placed major emphasis on negotiations concerning evaluation, negotiations concerning curriculum, nor on a process of teacher support and development as intrinsically linked to the interactive radio curriculum. These new directions implied an emphasis on open learning in an interactive radio learning project.

In terms of this conception, interactive radio would form a departure point for a broader process of school-focused development and support. It would thus form a distance education medium around which open learning could take place.

## NOTES

1. Interviews conducted with project implementers, August 1993. These points were also strongly stressed by Ms Sbongile Nene, throughout the evaluation.
2. The gist of the comments made was captured in a very comprehensive set of minutes on the meeting produced by Mr Stuart Leigh.
3. My discussions with Dr Ken Hartshorne during my earlier evaluation of the IBM "Writing to Read Project", were basic to this belief.
4. The goal of increased parental involvement was stressed particularly by Ms Sbongile Nene.
5. Ms Sbongile Nene made the suggestion of a focus group structure, based on research she had conducted with the Urban Foundation. The suggestion of teacher support groups was made by myself, based on the experience of evaluating the Urban Foundation's Primary Science Programme with Mr Peter Moodie, and my contact with Mr Brian Gray of the University of the Western Cape.
6. The idea of demonstration lessons was proposed by myself, based on the model adopted by the Primary Education Upgrading Programme in Bophutswana, and my contact with Professor Bill Holderness of the Institute of Education at UNIBO.
7. A focus group project was established as part of the evaluation, under the leadership of Ms



Sbongile Nene.

8. Refer Zirker (1990).
9. The ideas of Dr Ken Hartshorne, based on various discussions during the period we worked together in the Centre for Continuing Education, were central to this assumption.
10. My experience in working with Di Raubenheimer, Rob O'Donoghue and Jim Taylor in the Primary Science evaluation was influential here, as were the ideas of Carmel McNaught of the University of Natal (Pietermaritzburg).
11. Refer Zirker (1990).

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## USING QUESTIONNAIRES AND FOCUS GROUP INTERVIEWS IN AN EVALUATIVE STUDY

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### 1. Introduction

A Focus Group is defined by Millward (1995, p. 215) as a discussion-based interview involving the simultaneous use of multiple respondents to generate qualitative data, which is focused on an external stimulus and staged by a “moderator”. It has its origins in sociology (Merton & Kendall, 1946), and has traditionally been used in the marketing arena and in research on the social effects of mass communication, as well as more recently in research in the social sciences, particularly within sociology, applied psychology and health psychology.

In the case study described in this paper, a process of action research was undertaken on an ongoing basis over a period of five and a half years in a South African university, by a project team of which the author was a part. In the fourth year of the project’s operation, a problem was encountered which required an evaluation. Questionnaires and focus groups were used as ways of gathering information concerning course requirements and study demands made on engineering students, as well as their ways of coping with their studies. This information was then analysed and fed back to the project team, to assist in the processes of evaluative review and planning involved in the action research cycle.

The purpose of this paper is to focus on the methodology used in the evaluation. The aim is that the reader gains an idea of

- how questionnaires and focus group interviews were combined in conducting the evaluation
- the procedures for triangulation used in integrating the data yielded by use of multiple methods in data collection and analysis.

Reference will also be made to additional readings on focus group methodology, to which the reader may wish to refer.

### 2. The Context of the Evaluation

Action Research is defined by Cohen and Manion (1989, p. 217) as “small-scale intervention in the functioning of the real world and a close examination of the effects of such intervention.” It focuses on a specific problem in a specific setting. It is collaborative and participatory in nature, involving the researcher in working with others concerned with the problem as part of a project, with all team members taking part directly or indirectly in action, with the aim of diagnosing the problem, and developing ways of solving the problem in the context in which it manifests. This usually a process which is cyclical in nature, involving team members in planning, implementation, observation and reflection/evaluation.

In the early 1980's, a large industrial corporation in Johannesburg sponsored a project which would select a number of African matriculants to study engineering at university (Note 1). A condition of the appointment was that the project students would enter a pre-university year, during which they would take a number of courses to upgrade their academic skills, and would at the same time be exposed to engineering as an applied field

in the various divisions of the corporation and its associated companies. After their pre-university year, the project students would then enter university, and proceed with their academic studies.

When they enrolled for their engineering degrees after their pre-university year, the academic results of the first cohort of project students were promising at first year university level, with a 90% pass rate as compared to a 66% pass rate for the first year student body as a whole. In the following year, when the remaining project students in the first cohort proceeded to second year level, their pass rate was 60%, which was equivalent to the pass rate for the second year student body as a whole. However, in the next year when the first cohort proceeded to third year level, all of the project students failed. This compared negatively with the 75% pass rate of the third year engineering student body as a whole.

Though the number of project students in the first cohort was small, the results of the second and third cohorts of project students were similar. The indications were that project students were adequately prepared for the demands of the first year engineering curriculum, but experienced difficulties at levels beyond first year.

The poor results at third year level provided the motivation for the evaluation described in this paper, which can be characterised as a contextual evaluation (Stufflebeam, 1968; 1972) focused on obtaining specific information concerning the Engineering Faculty context. The evaluation was commissioned in order to establish factors in the university environment which could be contributing to the situation of high failure rates, as well as to establish forms of instruction and academic support which could assist the project students in making the grade at university. It was undertaken by Potter, Meyer, Scott and da Silva (1984), and formed part of the wider process of evaluation which is intrinsic to action research. It thus linked with the evaluative process followed in developing the programme, and other evaluative studies undertaken by other members of the project team (Meyer 1985; Pinto 1985; Potter, 1991; Scott, 1990).

### 3. Methodology

#### 3.1 Sampling

One hundred and sixty engineering students in five disciplines (electrical, chemical, metallurgical, mechanical and civil engineering) and in four years of study participated in the study. The sample was randomly drawn from alphabetical student lists for each year of study in each discipline, using a table of random numbers to determine starting position in the list. Thereafter every tenth student was highlighted in the list until a quota of forty students for each of the four undergraduate years relating to the engineering degree had been selected.

The sample thus comprised 20 groups of students representing four different levels and five disciplines of study within the engineering degree. In addition, each of the 20 groups was stratified to represent students who had performed at different levels in their previous year's examinations, or who had failed the previous year of study. The aim was to gauge the study habits and attitudes of students coping well, adequately and repeating their courses.

Once selected for the sample, the students were informed of the purposes of the research and asked if they would participate by their class representatives. They were also informed that they would be paid for the three hours they would spend participating in the study. This contributed to a very high turnout, with 158 of the 160 selected students completing the pre-interview questionnaire, and taking part in the focus group for which they had been selected (refer Tables in Annexure One).

### 3.2 Data Sources and Instruments

Data were gathered by questionnaire and focus group interviews, based on a rationale suggested by Kerlinger (1973, p. 487-488), in which an interview schedule would be constructed to probe issues initially brought into a respondent's consciousness by questionnaire. Data from the interview would then be integrated with data yielded by questionnaire as two sources of content which could be analysed for recurring themes.

The questionnaire categories were developed through consultation with the sponsors of the evaluation as well as members of the project team. This was done by a process of interview, in which those consulted were asked to specify their informational needs, issues and questions, following the rationale suggested by Stake (1983). The themes raised were then clustered into six areas, as follows:

- a) Expectations of students concerning the Engineering Course
- b) Skills and abilities required by Engineering Students
- c) Attitudes towards the Engineering Curriculum, based on the experience of students at the university
- d) Problems encountered by Engineering Students at the university
- e) Support systems used by Engineering Students in their studies
- f) The position of black Engineering Students at the university.

The statements of informational needs, issues and questions relating to these categories were then used as the basis for developing a series of open-ended questions, which were then ranked in order of importance by members of the project team. These were then placed in a logical order to form a questionnaire. The questions which had been most highly ranked were then used as the basis for developing a focus group interview schedule, which consisted of two questions relating to each of the six informational categories.

The questionnaire was then distributed to each of the students who had been selected as respondents in the study. At this stage each student was informed that they would be paid for their completed questionnaire, which would need to be completed prior to the date of the focus group interview. The interview data were then gathered in focus groups of between 7 and 10 students, which were based on the rationale of using the interview schedule as well as the questionnaire items to initiate a flow of discussion.

Specific probing questions were also asked by the interviewers relating to the purposes of the study. The focus group interviews took place in a round table situation, over a series of successive lunch-times, with each student being interviewed with other students in the same year or study and in the same engineering discipline. In order to encourage students to speak freely, they were informed that the data would be analysed and reported in such a way as to ensure their anonymity.

### 3.3 Ensuring Anonymity of Respondents

In order to ensure anonymity in the interview, students' names and their previous year's academic performance were recorded on a floor plan. A chair number was assigned to each student according to where he or she sat around the table in relation to the interviewer, who was accompanied by a research assistant. The interviewer guided and moderated group process, while the research assistant observed and tape recorded the interview, taking field notes in which the verbal and non-verbal responses of the students

were noted and tagged by chair number.

These field notes were then tied back to the interview transcript at the analysis stage, chair numbers as opposed to names of students being incorporated in the transcript to establish who had spoken and the responses of others to what was spoken. At the coding stage, each student's level of academic performance (eg student with aggregate greater than 75%) was then substituted for the chair numbers in the transcript, and the students' names eradicated from the record.

### 3.4 Model of Triangulation

Four interviewers conducted the various interviews with the 20 groups in the sample. The interviewers worked in teams of two, acting as joint moderators of the focus group process. Each interviewer thus conducted ten focus group interviews. The interviewing teams were assisted by two research assistants, each assistant acting as recorder and transcriber of ten interviews. There were thus possibilities for investigator triangulation (Denzin 1970; 1978), which was conducted as follows:

After the transcripts had been typed, the team of interviewers and research assistants met as a panel to integrate the data, and pool perceptions of what had taken place in each interview. The transcript was first read aloud by the research assistant. The interviewers then outlined their impression of the interview process highlighting features of the data that (s)he felt were significant. Other members of the group then asked questions and commented on aspects of the data, adding their own impressions. These transactions were recorded, and these tapes in turn abstracted by the research assistants.

Three sources of data were thus available for triangulation:

- a) The questionnaire data.
- b) Transcripts of the focus group interviews.
- c) Transcripts of the integration sessions, involving comment and interpretation of the process of the interviews by the interviewers and research assistants..

Each of these data sources was structured into four strata corresponding to the four years of study in the engineering curriculum, and each of these strata into five cells corresponding to the five engineering disciplines in which the students were studying. This accorded possibilities for further triangulation within strata and across cells in the data. In addition, the tagging of the interview data according to level of examination results of the respondents enabled recurrence of themes to be established across strata, cells and levels of previous academic performance of the respondents.

### 3.5 Data Analysis

The data were submitted to assertions analysis (Janis 1965, 55-82) on the following rationale:

- a. Assertions made by students in the questionnaire and interview were coded into propositional form (Osgood et al, 1956; 1957) and grouped into categories. This involved a procedure in which each focus group interview was treated as a separate cell for purposes of analysis. Lists of assertions made in the interviews and questionnaires were first compiled. These were cross-referenced to the original transcripts and questionnaire forms, photo-copied and cut up. They were then grouped into categories relating to the purposes of the investigation, as follows:



- i. Expectations concerning university study in engineering.
  - ii. Skills and abilities required by an engineering student.
  - iii. Study problems encountered at university.
  - iv. How the university had helped with these problems.
  - v. Support systems used by engineering students.
  - vi. Support systems recommended by engineering students.
  - vii. People consulted by engineering students concerning their study problems.
  - viii. Aspects which diminished the success of engineering students at university.
  - ix. Study problems of African engineering students at university.
- b. Recurring assertions in each category and in each data cell (from students in the same year of study and in the same engineering discipline) were clustered.
  - c. Recurring assertions in each category across different data cells (from students in the same year of study and in different engineering disciplines) were clustered.
  - d. Recurring assertions in different categories within each stratum of the data set (from students in the same year of study) were clustered.
  - e. Recurring assertions in different categories within the data set as a whole (from students in different years of study) were clustered.

A colour coding system involving different colours and symbols was used to distinguish the above groupings of assertions visually. By this means of data set of +/- 400 pages of typed questionnaire data, +/- 100 pages of interview transcripts and +/- 160 pages of coded assertions from the data was reduced to a series of propositions organised under themes. On this system separate colour codes and tallies were established for common assertions occurring:

- a. Within single data cells.
- b. Across data cells.
- c. Within the data set as a whole.

The above process of analysis involved repeated scrutinising of the data, with the aim of establishing themes relating to the purposes of the study, which in turn related to specific comments made by students in the questionnaire data and in the focus group interviews. Once the process of classification and cross-referencing was complete, it was possible to take a particular theme, relate it to supporting assertions, and go back to the comments made by particular students in the transcripts. These could be verified against the questionnaires and the tapes of the interviews.

In reporting the results of the analysis, common assertions occurring both within and across data cells were accorded greater weight than common assertions occurring within a single data cell. Common assertions within a single data cell were, in turn, accorded greater weight than assertions made only once, by a particular student.

### 3.6 Reporting Results

Despite the weighting of frequencies in the analysis, tables of frequency were not used in reporting the results of the analysis. Due to the open-ended nature of the questionnaire and the interviews, and the large number of data cells, the technique of highlighting commonly occurring assertions across and within data cells, supported by quotes reflecting specific comments made by students, was felt by the authors to be more applicable to illuminating trends in the data, than frequency analysis, based on more numerical assumptions.

Results were reported by year of study, under seven headings relating to the themes which formed the guiding framework of the evaluation, namely:

- a. Expectations concerning the Engineering course.
- b. Skills and abilities required by Engineering students.
- c. Attitudes to the curriculum.
- d. Problems encountered at university.
- e. Support systems.
- f. African engineering students.
- g. Summary.

The decision to report the data in this way was taken for journalistic reasons, relating both to the purposes for which the investigation had been commissioned, as well as the nature of the audience (Note 2). In addition, there was the issue of the impact of the report (Note 3). The research of Miller and his colleagues (Miller, 1956) on memory indicated that data organised under seven categories was most likely to be attended to by the average person, and this principle was thus adopted in organising and ordering a report on a huge and thematically rich data set.

Summaries of the data for the first, second, third and fourth years of study can be found in the original report, to which the interested reader is referred for detail. The full reference for this is provided at the end of this chapter. Copies of this are available in bound form either from the Centre for Continuing Education, which published the original report, or from the Psychology Department at the University of the Witwatersrand, Johannesburg, which has copies of the report in its resource room.

### 3.7 Limitations

As with many exploratory evaluative studies, the comments of the students provided a number of indications concerning possible directions for future action, as well as issues and questions requiring more in-depth investigation. For this reason, a summary of trends was reported for the data obtained from the first year students. A similar style was followed in reporting the results of the second, third and fourth year data, which for reasons of space are not included in this chapter. Both trends as well as counter-trends and negative instances from the assertions analysis were summarised in the report. In addition, verbal exchanges from the tape recordings of the focus group interviews were used as a journalistic device to substantiate trends reported, as well as highlight possible solutions to problems raised by the engineering students interviewed. In the abstract at the front of the report, these indications were presented in summary form.

The outcomes of the evaluation were thus in line with its purposes. It should be noted,

however, that this was both a strength and limitation. On the positive side, the use of a guiding framework of pre-ordinate questions ensured that evaluation purposes were met. The questions also provided a logical framework for the evaluation, as well as a structure for the evaluation report.

However, the setting of pre-ordinate questions may have limited the responses of students, as well as the responses of the facilitators guiding the focus group process. The issue of payment of students, while ensuring that 158 out of a possible 160 respondents returned their questionnaires and participated in the focus group interviews, may have also introduced bias into what was essentially an exploratory contextual evaluation.

Nevertheless, despite these limitations, a number of trends from the data emerged which indicated possible courses of action for the future. The fact that these themes were identified based on such a high return rate from a highly stratified sample, added to the credibility of the evaluation findings.

In line with the process of action research, these indications were fed into the decision-making process and the further cycle of action involving planning, implementation, observation and evaluation. The decisions made included a recommendation to initiate a concurrent academic counselling and tutorial scheme to assist engineering students requiring academic support while at university. The indications from the evaluation report also influenced the decision by the university to defy government legislation and integrate its residences, which had up to this point been segregated.

What follows in the final section of this paper is a summary of trends from the first year data. This has been provided to enable the reader to gauge the style of reporting, as well as how trends as well as counter-trends and negative instances from the assertions analysis were related to the purposes of the evaluation in the report. The reader will also be able to identify the way in which verbal exchanges from the tape recordings of the focus group interviews have been used as a journalistic device to verify and substantiate trends reported, as well as highlight possible solutions to problems raised by the engineering students interviewed.

A similar style was followed in reporting the results of the second, third and fourth year data, which for reasons of space are not included in this paper. The reader is encouraged to refer to the original report, to gauge the impact of the journalistic style used in reporting the results of the evaluation on the utilisation of its findings.

#### **4. Study Habits and Attitudes of First Year Engineering Students**

The first year engineering students in the sample formed part of a highly articulate and cohesive group, identifying strongly with their chosen field of study and with each other as engineering students. This group cohesion, and the ease and fluency with which they spoke and wrote about their university experiences and problems, were features of the data from the sample as a whole.

Adapting to the experience of university life and lectures was reported as a problem by the majority of the first year engineering students interviewed. Few students expressed confidence in their ability to handle either the level of the amount of work with which they had to contend. The majority found the pace of work and the delivery in lectures problematic. The biggest problem appeared to be how to adapt to these new demands, and adjusting available resources (home, family, friends and above all time) to cope with the pressure of the course.

In the face of adversity, the response of the majority of students was to become highly task orientated, and to adopt survival strategies. Peer support was considered as essential to passing at university. Study problems occurred frequently and were a matter of concern to

all students. The fellow engineering student was regarded as a potential “buddy” to whom the student in trouble could turn for advice. He or she could understand the student’s problem best, being subject to the same study pressures.

Social distance between lecturers and students, and students and their home departments, appeared to be a feature of first year engineering study in most disciplines. Only if a student could not sort out a problem using the student network, would a lecturer be consulted.

In the case of the Metallurgical students, however, the link between the first year students and their home department appeared to be a closer one. This feature appeared to be linked to the department’s organisation of its engineering tutorship scheme, and was evidenced in written comments by the Metallurgical group as follows:

**Question:**

In what ways has the university helped you with your problems?

Answers:

- a.) Metallurgical engineering tutorship. Plato computers. Possible use WATFIV compilers in the engineering department. Helpful lecturers in some subjects. Past exam questions are readily available.
- b.) Tutorship (Metallurgical Department).
- c.) The Metallurgical Department has been very helpful in providing tutors which would help us with our problems. They are trying to make things a little easier for us.
- d.) Nil.
- e.) The Metallurgy Department is most helpful in that you can go to them with any problem. They have also organised an extra tutorial scheme for all subjects.”

In first year, black and particularly African students appeared to be placed at a position of social distance from their white engineering counterparts, their lecturers and their home departments. The problems of black students were particularly acute due to poor schooling and language problems. While white students appeared to have developed a closely-knit and highly effective social infra-structure directed at overcoming adversity (in the form of a continuous stream of academic pressures and study problems), there was no evidence that the separate structures developed by black students were as effective.

Disparities in the education system, particularly in the previous teaching of mathematics, appeared to affect all students, but black students in particular. Ability to bridge the gap between school and university, and good teaching in all first year level in all subjects, appeared to be crucial to first year engineering students’ success.

## 5. Utilisation of Evaluation Findings

Utilisation of evaluation findings is normally related both to the credibility of an evaluation’s findings, as well as their relationship to decision-makers’ frames of reference (Patton, 1978; 1980; 1987; Weiss, 1973; 1977; 1979; 1980; 1982; 1983a; 1983b). The evaluation design was a simple one, based on the use of questionnaires and focus group interviews in combination. It involved the development of two instruments, and the use of these with a highly stratified sample of engineering students.

In terms of this design, the greatest source of credibility lay in the high response rate of the

students in the sample, which enabled a variety of forms of triangulation to be implemented. Had the return rates not been as high, the potential for utilisation of findings would have been lowered. Utilisation was also ensured through the relationship between the evaluation process and the ongoing process of action research conducted within the programme. The evaluation findings could thus be fed into an already existing decision-making structure directed at facilitating the entry and integration of black students selected for a pre-university year into their engineering studies and subsequently into the world of work.

In terms of long-term utilisation of findings, a major outcome from the evaluation process was a decision to initiate a concurrent academic counselling and tutorial scheme (CACTUS) which targeted the needs of these students, in which tutorials and academic support by provided by graduate engineering students. This tutorial programme ran for eight years, and was instrumental in changing a situation in which many of the project students were failing at higher levels in the engineering curriculum to a situation in which the majority passed their courses.

The evaluation report was also widely referred to in the years subsequent to its completion. It was quoted in particular by those involved in research on the academic performance of engineering students, as well as by those persons advocating the integration of campus residences in South Africa.

## 6. Summary

Particular attention has been directed in compiling this paper on the methodologies for data collection and analysis used in the evaluation. An attempt has also been made to give the reader a flavour of the way in which results were reported, and how quotes from the questionnaire and interview data were used to substantiate trends as well as counter-trends summarised in the evaluation report.

The evaluation was one of a series of evaluative studies commissioned by the corporation sponsoring the project students. These studies were conducted simultaneously over a three month period from conception to reporting. Further information about the role of the evaluation process in the development of the project, the different types of curriculum developed by the project team and the relationship between type of instruction and support provided the project students and their university retention and pass rates is provided in Potter (1991a; 1991b).

I conclude this paper by focusing on the strengths and weaknesses of the methodology used in the evaluation. The interested reader is also provided with a number of references, which provide more detail on the research methodologies employed in the evaluation, as well as detail on different facets of the evaluation.

## 7. Strengths and Weaknesses of the Evaluation Methodology

Rosenthal and Rosnow (1991) suggest that, in spite of the fact that most scientists seek for universal truths, there are limits or boundaries of scientific truths, as much as there are limits and boundaries of the scientific enterprise itself. For this reason, it is important to recognise the limitations of scientific method, the limitations implicit in different types of research designs and methodologies, as well as the boundaries of particular designs and empirical methods.

With respect to utilisation, the greatest strength in the current evaluation lay in the way in which a set of evaluation concerns, issues and questions were elicited from the primary stakeholders involved in the evaluation, and in the way in which the sample was stratified and selected. Another strength lay in the simple design, and the uncluttered and direct

style used in the evaluation report.

A weakness lay in the lack of exploration of the methodological aspects of the evaluation, with respect to both the evaluation design and its practical implementation. Particular attention has thus been paid in this paper to the strengths and weaknesses of the design and the methodology used in analysing the data and reporting the results, as these aspects were not fully discussed in the original evaluation report.

The strengths and weaknesses discussed in this section highlight the tensions involved in writing evaluation reports for an audience of corporate decision-makers. The assumptions made in writing the original evaluation report were that this readership would be interested more in the results of the evaluation, than in the ways in which the analysis was conducted, and its strengths and limitations. This paper has thus attempted to address this gap, given the continuing interest in the original evaluation report.

Charles Potter

May 1999

### Extension Activity

The questions which follow focus on different aspects of the case study presented in this paper, and form a framework for identifying the focuses, design, theoretical framework, strengths and weaknesses of the design and methodology used in conducting the evaluation. A commentary is provided for you in Annexure Two at the end of the paper, to enable you to compare your analysis of the evaluation's design and methodology with the logic followed by the author.

1. What are the questions which guided this evaluation?
2. Draw a flow diagram illustrating the programme theory underpinning the evaluation.
3. What type of evaluation was this? What are the reasons you have classified the evaluation in the way you have?
4. Represent the evaluation design in design notation.
5. What were the conclusions at the end of the evaluation? Were the conclusions based on a methodology based on description of trends in the data, or an attempt to state a cause and effect relationship between variables, or both? Were the conclusions justified?
6. What were the strengths of the evaluation?
7. What were the weaknesses of the evaluation?
8. In what ways could the evaluation design have been improved?
9. What is the contribution of the evaluation to knowledge?
10. What are the practical implications of the evaluation?

### Further Reading

COHEN, L. and MANION, L. (1989). *Research Methods in Education* 3rd Ed. London: Routledge.

Good introductory chapters on action research, case study research and use of triangulation as a research technique.

MILLWARD, L. (1995). Focus Groups. In BREAKWELL, G.M., HAMMIOND, S. & FIFE-SHAW, C. (Eds.), *Research Methods in Psychology*. London: Sage.

An introductory chapter, in which the basic principles of focus group methodology and content analysis of focus group data are described.

MORGAN, D.L. (Ed.) (1993). *Successful Focus Groups: Advancing the State of the Art*. London: Sage.

A clear explanation of focus group methodology, and the issues involved in quality control of focus groups.

POTTER, C.S. (1991) (a). *An Analytical Case Study of a Pre-University Project*. University of the Witwatersrand, Johannesburg: Unpublished PhD thesis.

A description of the action research process and the utilisation of the focus group research described in this chapter. A summary of the research design and findings is presented in Potter (1991b).

POTTER, C.S., MEYER, M.I., SCOTT, A. & DA SILVA, M. (1984). *Study Habits and Attitudes of Students in Five Engineering Disciplines*. Johannesburg: University of the Witwatersrand, Centre for Continuing Education, Cadet Scheme Working Paper 18.33 (iv).

The original report on the evaluation described in this paper, showing how data were analysed and reported, and the journalistic style involved in making focus group research firm, vivid and readable.

UZZELL, D. (1995). *Ethnographic and Action Research*. In BREAKWELL, G.M., HAMMIOND, S. & FIFE-SHAW, C. (Eds.), *Research Methods in Psychology*. London: Sage.

An introductory chapter, in which the origins of action research are described as well as its use as an agent of social change.

## Notes

1. Anglo-American Corporation of SA Ltd was the major sponsor of the project. Five other companies also became involved in the project in the early 1980's, sharing the costs of the development.
2. As the project was developed jointly between the university and industry, the audience included managers of the sponsoring companies as well as academics. The report thus needed to be drafted in such a way as to meet the needs of these different interest groups.
3. For maximum impact, the style used in the report was vivid, and focussed on the results of the analysis. It thus included less on methodology than would have been the case had the audience been primarily an academic one.

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WEISS, CH (1983) (b). The Stakeholder Approach to Evaluation: Origins and Promise. *New Directions for Program Evaluation*, 17, 3-14.

## ANNEXURE ONE: COMPOSITION OF SAMPLE OF INTERVIEWEES BY YEAR, DISCIPLINE AND EXAMINATION PERFORMANCE

TABLE I

COMPOSITION OF SAMPLE OF INTERVIEWEES BY YEAR AND BY DISCIPLINE

	Chemical	Civil	Electrical	Mechanical	Metallurgical	N Rows
1st Year	10	9	8	8	5	40
2nd Year	9	8	9	8	6	40
3rd Year	8	10	8	10	6	42
4th Year	7	10	7	7	7	38
N columns	34	35	32	33	24	
						Total: N =160

The sample was stratified to represent students who had performed at different levels in their previous years examinations. In this way it was hoped to gauge the attitudes of those coping well, adequately, and repeating the course.

The detailed breakdown of the examination performance of those interviewed is reflected in Table II below.

TABLE II

COMPOSITION OF SAMPLE OF INTERVIEWEES BY YEAR, DISCIPLINE AND EXAMINATION PERFORMANCE

### First year engineering students

Matric Aggregate	A	B	C	D	Repeat	Total
Chemical	1	2	3	2	2	10
Civil	2	2	2	1	2	9
Electrical	2	1	2	2	1	8
Mechanical	1	2	2	1	2	8
Metallurgical	-	1	2	2	-	5
Total	6	8	11	8	7	40

### Second year engineering students

Aggregate first year university examination	1	U2	2	3	Repeat	Total
Chemical	2	2	2	1	2	9
Civil	1	2	2	1	2	8
Electrical	2	1	2	2	2	9
Mechanical	2	2	1	1	2	8
Metallurgical	-	1	3	2	-	6
Total	7	8	10	7	8	40

**Third year engineering students**

Aggregate second year university examination	1	U2	2	3	Repeat	Total
Chemical	1	2	2	1	2	8
Civil	2	2	2	2	2	10
Electrical	1	1	2	2	2	8
Mechanical	2	2	2	2	2	10
Metallurgical	-	1	2	1	2	6
Total	6	8	10	8	10	42

**Fourth year engineering students**

Aggregate third year university examination	1	U2	2	3	Repeat	Total
Chemical	1	1	2	2	1	7
Civil	2	2	3	3	-	10
Electrical	2	1	2	2	-	7
Mechanical	2	1	2	2	7	7
Metallurgical	2	2	1	2	-	7
Total	7	8	9	11	3	38

Total N students = 16  
Total N groups = 20

**Keys:**

1. Matric Aggregate = aggregate performance in matriculation examination prior to university entrance, as follows:

A = 80% or above

B = 70 - 79%

C = 60 - 69%

D = 50 - 59%

Repeat = student repeating year of engineering previously failed.

2. Aggregate University Examination = aggregate performance in matriculation examination prior to university entrance, as follows:

1 = 75% or above

U2 = 70 - 74%

2 = 60 - 69%

3 = 50 - 59%

Repeat = student repeating year of engineering previously failed.

Note: 158 out of 160 students originally selected participated in the study. 2 additional students participated by replacement.

## ANNEXURE TWO: SUGGESTIONS ON HOW TO COMPLETE THE EXTENSION ACTIVITY

### 1. What are the questions which guided this evaluation?

The evaluation questions are not stated explicitly, but are implicit in the different sections of the questionnaire and interview schedule. They can also be deduced from the different sections of the evaluation report.

You will recall from Section 3.2 that the different categories of questions included in the questionnaire were as follows:

- (a) Expectations of students concerning the Engineering Course
- (b) Skills and abilities required by Engineering Students
- (c) Attitudes towards the Engineering Curriculum, based on the experience of students at the university
- (d) Problems encountered by Engineering Students at the university
- (e) Support systems used by Engineering Students in their studies
- (f) The position of black Engineering Students at the university.

Based on these categories, a set of guiding evaluation questions could be written as follows:

- (a) What are the expectations of students concerning the Engineering Course?
- (b) What are the skills and abilities required by Engineering Students?
- (c) What are the students' attitudes towards the Engineering Curriculum, based on their experience at the university
- (d) What problems are encountered by Engineering Students at the university
- (e) What support systems are used by Engineering Students in their studies
- (f) What is the position of black Engineering Students at the university?

Of these questions, all are clear and answerable with the exception of question f, which could have been better phrased. Perhaps a better guiding question might have been "How do black Engineering students fare in their university studies?" The exact phrasing used in the question is important. An evaluation question needs to be a question, which can be answered through the data sources used in conducting the evaluation.

### 2. Draw a flow diagram illustrating the programme theory underpinning the evaluation.

Evaluating a programme in terms of its theory implies analysing the logic underpinning what the programme aims to do, and then establishing what it actually does and the results it is actually achieving in practice. A flow diagram of the logic of the programme can be constructed by first trying to write a sentence, which summarises what the programme does and its intended outcomes. This provides an idea of the cause and effect logic on which the programme's work is based.

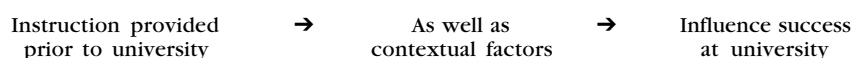
In the case of this evaluation, the programme's theory could be written as follows:

Instruction provided in a pre-university year will influence subsequent success in university studies.

This logic can then be represented in a flow diagram as follows:



The current evaluation is focusing on contextual factors at university, which are also influencing university success. A flow diagram reflecting this theory could look as follows:



The current evaluation would involve an examination of the middle box in the flow diagram. The emphasis in the evaluation would lie on examining the contextual factors positively or negatively influencing success at university.

### **3. What type of evaluation was this? What are the reasons you have classified the evaluation in the way you have?**

As the current evaluation would involve an examination of the middle box in the flow diagram, and as the emphasis in the evaluation would lie on examining the contextual factors positively or negatively influencing success at university, the evaluation could be classified as a contextual evaluation. As its aim is to describe contextual factors influencing university success, it could also be called a descriptive evaluation.

### **4. Represent the evaluation design in design notation.**

Design notation is a system of shorthand which is used to summarise the main features of a research or evaluation design (Singleton, Straits and Straits, 1987). This enables the researcher to see at a glance how complex a design is, and what type of evaluation model is being used.

In design notation, independent or manipulated variables are normally designated by use of the letter X. Observations are designated by the letter O.

Thought the programme was based on a cause and effect model, the evaluation was not. It was based on a simple descriptive design. It involved descriptive data (i.e. observations) gathered through use of two data sources (questionnaires and focus group interviews) at one point in time. It did not involve a manipulation of an independent variable.

As there was no manipulation of an independent variable, the letter X would not be used in representing this evaluation design in design notation. The evaluation design would be summarised by use of a single letter O (standing for observation). This would be written as follows:

O

This (i.e. a single letter O standing by itself) would imply that a very simple design was used. This was based on one set of observations was gathered at one point in time with one group (i.e. engineering students). There was no manipulation of an independent variable and no comparison with other groups (e.g. similar observations made with science students). There was also no attempt to relate the measurement of an independent variable to a dependent variable.

**5. What were the conclusions at the end of the evaluation? Were the conclusions based on a methodology based on description of trends in the data, or an attempt to state a cause and effect relationship between variables, or both? Were the conclusions justified?**

It is important in any evaluation not to draw unjustified conclusions. In a complex evaluation design (e.g. a design in which a comparison is made between different programmes or between different groups receiving or not receiving the programme), it may be possible to draw inferences about the efficacy or effect of a particular programme.

In this programme, no inferences were possible, as there was no manipulation of an independent variable and no comparison with other groups (e.g. similar observations made with science students). There was also no attempt to relate the measurement of an independent variable to a dependent variable.

Instead the conclusions were merely descriptive, describing the responses made by engineering students to different questions in a questionnaire, and in a focus group interview. It was possible to identify trends in the data by linking similar trends across the different engineering disciplines as well as years in which the students were studying. However, it was not possible to compare engineering students with other students not studying engineering.

The evaluation was thus based on a strategy which was descriptive, using a very simple design. Nevertheless, the conclusions were of interest and relevance to others.

**6. What were the strengths of the evaluation?**

The strengths of the evaluation lay in the simple design used, in the sampling (in which the different disciplines and years of study could be used as the basis for linking trends in data through triangulation), and in the vivid style used in reporting the evaluation. The results were also reported in a way that linked directly with the concerns of the stakeholders involved in the programme, and those of the sponsors of the programme and of the evaluation.

**7. What were the weaknesses of the evaluation?**

Insufficient description of the methodology was available to readers in the main report. The style of reporting was likely to be suitable for an audience of corporate decision-makers, who were likely to be interested in findings and results rather than the process involved in linking trends in data. A more academic audience needed more detail on methodology, how results were obtained, as well as the processes of substantiation and verification involved in establishing valid conclusions, and establishing reliability and validity through cross-checking of different levels in the analysis.

**8. In what ways could the evaluation design have been improved?**

This paper was written for the purposes of addressing the above weakness.

**9. What is the contribution of the evaluation to knowledge?**

The evaluation highlighted the existence of a “buddy” system among engineering students, and also indicated that the project students were left out of the buddy system for two main reasons. The first was that they had been so well prepared prior to university that they did not need to participate in the “buddy” groups in first year, when these student networks were formed. The second reason was a logistical one, relating to the fact that the campus residences were segregated under existing apartheid legislation. Those project students who were resident on campus were incorporated into the “buddy” network,

while those who lived at some distance from the university campus were not.

Both these features of the ways in which engineering students coped with their large workload and assignment deadlines had not been highlighted in previous studies. This thus represented new insights, and a contribution to knowledge.

#### **10. What are the practical implications of the evaluation?**

Once the issue of student networking was addressed through the introduction of a concurrent additional counselling and tutorial scheme (CACTUS), the pass rates of project students increased from a 0% pass rate to an 87% pass rate at third year level (Potter 1991a; 1991b).

This contributed directly to both increased retention and pass rates of the project students as well as other cohorts of African engineering students entering the university. This effectively opened the doors to successful study, and to engineering as a career, for large numbers of engineering students whose previous education had been of poor quality.

University of the Witwatersrand, Johannesburg

CENTRE FOR CONTINUING EDUCATION

## **Study Habits and Attitudes of Students in Five Engineering Disciplines**

C.S. POTTER

M.I. MEYER, A.S. SCOTT and M. DA SILVA

REPORT AND REPRINT SERIES NO.7

University of the Witwatersrand, Johannesburg

Centre for Continuing Education University of the Witwatersrand

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## PREFACE

The research reported in this document was conducted in 1984, as an evaluative study conducted as an integral part of an evaluation of a bridging programme for engineering students. The report was produced as a working paper, for a meeting of the internal and external evaluators of the programme. Forty copies were printed. Subsequent to the meeting, given the perceived relevance of the study, two hundred copies of the document were printed.

It has subsequently been referred to by a number of researchers, and has also been used as the model for a number of other pieces of focus group research. By 1990, the original report had been reprinted several times, with a total print run of some 2000 copies. It is still being requested from the Centre, and has been referred to and cited both in theses as well as in journal articles in higher education.

The decision has thus been taken to include the document in the Centre for Continuing Education's Report and Reprint Series. Our hope is that others will continue to find the contents of the report relevant to their work, both in terms of the design and methodology used in the study as well as the data and findings.

When reading any evaluation report, there is a likelihood that the contents will date, as the context and purposes for which the evaluation was conducted change, or are no longer relevant. It is thus important for the reader to bear in mind the context of apartheid which prevailed in South Africa over much of the second half of the twentieth century. At the time the data for this evaluation were collected and analyzed, universities were segregated. Legislation prevented white and black people from living in the same areas, in the same university residences, from studying together, from riding on the same busses, from using the same bathroom facilities and from sitting on the same park benches. These prohibitions were rigidly enforced by the State.

It is apparent in 1991 that conditions in South Africa are changing and it is increasingly likely that apartheid legislation and other apartheid prohibitions will disappear from the statute books. As South Africa as a country develops away from segregation and racial conflict towards integration and democracy, it is also likely that the terminology and language used in this report will seem increasingly strange to readers.

It is our hope that this is indeed the case in the future. We have tried for this reason to report wherever possible what students actually said about each other, and to report their comments and the ideas they expressed in their own words. It is our intention that this report be read as an evaluative case study, from which an idea of the study habits of engineering students and their attitudes to their lecturers and fellow students can be gained.

It is also our hope that the reader will in the future find that many of the ideas expressed in this report become outmoded. The more this turns out to be the case, the further away South Africa is likely to have moved from the apartheid legislation and social prohibitions prevailing at the time the evaluation was conducted.

Charles Potter

Deputy Director: Centre for Continuing Education University of the Witwatersrand,  
Johannesburg

November 1991

## STUDY HABITS AND ATTITUDES OF SAMPLES OF STUDENTS IN FIVE ENGINEERING DISCIPLINES

### ABSTRACT

One hundred and sixty engineering students in five disciplines and in four years of study were interviewed by the authors of this paper. The sample was stratified to represent students performing at different levels academically in their degree, and as far as was possible, randomly drawn.

A questionnaire and interview with accompanying interview schedule were used as instruments to elicit the data, which were of a verbal type yielded in response to open-ended questions. The data were first coded into propositional form and then analysed using assertions analysis technique to yield indications concerning the study habits and attitudes of students in their First, Second, Third and Final years of study.

A number of indications emerged from the analysis:

- a) It was apparent that a highly developed informal student network was used by the majority of engineering students at all levels of study in overcoming their study problems. This network included a "buddy" system operating among students in the same year of study, as well as students in higher years of study at university.
- b) Study problems appeared to be frequent for the majority of students in the sample, and to be related to high level of workload and rapid pace of instruction. This was the case for students in their First, Second and Third years of study. In Fourth year, work load did not appear to be the same problem.
- c) The gap between school and university appeared to be a particular problem for first year engineering students.

A lack of career counselling was evident at this level and a lack of orientation to engineering as a career at all levels of study.

- d) The development of adequate foundations in mathematics appeared to be critical and a problem for many engineering students which was particularly apparent at First year level. The development of logical and problem-solving abilities were crucial to success in the higher years of study. These seemed to be adequately developed by the theoretical courses and projects to which the students were exposed but limited by lack of exposure to the applied side of engineering.
- e) Motivational and non-cognitive attributes (such as perseverance and self discipline) appeared to be fundamental to success at all levels of study. Coping with an enormous workload, and organising time and resources to meet a stream of impinging deadlines, appeared to be the most frequent student problems.
- f) The ability to interact and communicate with others appeared to be important, not only for adequate development of problem-solving abilities, but also for the obtaining of help with study problems in the courses taken by a student.
- g) Tutorials were rated as the most effective support system offered by the Faculty. Student peers were the most common and effective support system operating. Lecturers were consulted infrequently, and attitudes to lecturers appeared ambivalent. Poor standard of lecturing appeared to be contributory to this attitude.

The position of black students in the Faculty appeared to be problematic on a number of dimensions crucial to engineering success. Poor preparation at school, language problems, and conceptual difficulties with the work were mentioned as particular problems of black students

studying engineering.

Black students in the Faculty of Engineering appeared to operate from a position of isolation to the informal student network operating among their white counterparts. As such they were not party to the hints and suggestions that circulated among the rest of the student body, nor did they have recourse to the other affective support systems (eg consultation with peers, family, students in higher years of study, graduate students) which the majority of white engineering students utilised.

Residence, transport and financial factors appeared to operate to the detriment of black students' success at university. Of these the residence factor appeared to be most crucial. Suggestions were made in several groups in the sample that these problems could only be overcome if black engineering students were resident on campus, so as to be more central to the mainstream of the student life on the one hand, and party to the engineering student network (which is particularly active in the white residences) on the other.

The evaluation report which follows is detailed and the reader may wish to skim or skip or sample within the various sections. The authors have attempted to give a picture, of how the study was conducted, as well as a view into the assertions and groupings of assertions in the data which led them to the above conclusions.

Five separate sections are contained in this report.

The first is a section outlining, the research methods used in gathering and analysing the data.

The following four are concerned with the study habits and attitudes of students in the First, Second, Third and Fourth year groups in the sample. A summary of each indications for each year of study is made at the end of each section.

This will be apparent from the Table of Contents overleaf.

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TABLE II COMPOSITION OF SAMPLE OF INTERVIEWEES BY YEAR, DISCIPLINE AND EXAMINATION PERFORMANCE

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Over the end of April and during early May 1984, 160 engineering students at the University of the Witwatersrand completed questionnaires and were subsequently interviewed by the authors of this paper.

The purpose of the research was to gain insight concerning the study habits and attitudes of engineering students at University. This information could in turn throw light on:

- a) What constitutes a successful engineering student at university
- b) Reasons behind student success and failure in engineering.

This study was prompted by concern over high failure rates of black engineering students at university and financed by Messrs Anglo American Corporation of South Africa who were conducting an investigation into high failure rates in Second and Third year Engineering among black university students sponsored by Industry on the Undergraduate Cadet Scheme.

**2. THE SAMPLES**

The samples for the study were drawn as follows:

**TABLE I****COMPOSITION OF SAMPLE OF INTERVIEWEES BY YEAR AND BY DISCIPLINE**

	Chemical	Civil	Electrical	Mechanical	Metallurgical	N Rows
1st Year	10	9	8	8	5	40
2nd Year	9	8	9	8	6	40
3rd Year	8	10	8	10	6	42
4th Year	7	10	7	7	7	38
N columns	34	35	32	33	24	
						Total: N =160

The sample was stratified to represent students who had performed at different levels in their previous years examinations. In this way it was hoped to gauge the attitudes of those coping well, adequately, and repeating the course.

The detailed breakdown of the examination performance of those interviewed is reflected in Table II below.

TABLE II

## COMPOSITION OF SAMPLE OF INTERVIEWEES BY YEAR, DISCIPLINE AND EXAMINATION PERFORMANCE

## First year engineering students

Matric Aggregate	A	B	C	D	Repeat	Total
Chemical	1	2	3	2	2	10
Civil	2	2	2	1	2	9
Electrical	2	1	2	2	1	8
Mechanical	1	2	2	1	2	8
Metallurgical	-	1	2	2	-	5
Total	6	8	11	8	7	40

## Second year engineering students

Aggregate first year university examination	1	U2	2	3	Repeat	Total
Chemical	2	2	2	1	2	9
Civil	1	2	2	1	2	8
Electrical	2	1	2	2	2	9
Mechanical	2	2	1	1	2	8
Metallurgical	-	1	3	2	-	6
Total	7	8	10	7	8	40

## Third year engineering students

Aggregate second year university examination	1	U2	2	3	Repeat	Total
Chemical	1	2	2	1	2	8
Civil	2	2	2	2	2	10
Electrical	1	1	2	2	2	8
Mechanical	2	2	2	2	2	10
Metallurgical	-	1	2	1	2	6
Total	6	8	10	8	10	42

## Fourth year engineering students

Aggregate third year university examination	1	U2	2	3	Repeat	Total
Chemical	1	1	2	2	1	7
Civil	2	2	3	3	-	10
Electrical	2	1	2	2	-	7
Mechanical	2	1	2	2	7	
Metallurgical	2	2	1	2	-	7
Total	7	8	9	11	3	38

Total N students = 16  
Total N groups = 20

**Keys:**

1. Matric Aggregate = aggregate performance in matriculation examination prior to university entrance, as follows:

A = 80% or above

B = 70 - 79%

C = 60 - 69%

D = 50 - 59%

Repeat = student repeating year of engineering previously failed.

2. Aggregate University Examination = aggregate performance in matriculation examination prior to university entrance, as follows:

1 = 75% or above

U2 = 70 - 74%

2 = 60 - 69%

3 = 50 - 59%

Repeat = student repeating year of engineering previously failed.

Note: 158 out of 160 students originally selected participated in the study. 2 additional students participated by replacement.

It will be noted from Table II that composition of the samples drawn in Metallurgical Engineering differed slightly from those of the other Engineering disciplines. This difference was caused by the relatively small numbers of Engineering students registering for Metallurgy as compared to the other disciplines represented in the sample.

It will also be noted that few repeats were interviewed at Fourth year level. This was a function of the small number of Fourth year Engineering students repeating their final year of study in the Faculty as a whole.

### **3. THE DATA**

#### **3.1. Method of Gathering Data**

Data were gathered by questionnaire and group interviews, based on a rationale suggested by Kerlinger (1973, 487-488) in which an interview schedule is constructed to probe issues initially brought into a respondent's consciousness by questionnaire. Data from the interviews is then integrated with that yielded by questionnaire as two sources of content which can be analysed for recurring themes.

Interviews were based on the rationale of using the questionnaire items to initiate a flow of discussion. Specific probing questions were then asked by the interviewers relating to the purposes of the study.

Interviews took place by year and by discipline, in a round table situation, over a series of successive lunch-times. In order to ensure anonymity of the respondents in the interview, students names were recorded on a floor plan. A number was assigned to each student





### 3.2. Method of Recording Data

Four interviewers conducted the various interviews with the groups in the sample. A research assistant acted as transcriber in each interview.

The interviewers were staff of the Undergraduate Cadet Scheme. All had several years of experience in the programme, and previous experience in using interviews and questionnaires in social science research.

The two research assistants employed in this study varied in background. The first had previous experience in coding data of different types for a number of studies and had, in addition, received previous training in coding documents for the purposes of content analysis. The second was new to the job, and was trained as she went along.

Data were recorded by the research assistants in propositional form, using the rationale suggested by Osgood and co-workers (1956, 47 - 102), in which it is assumed that complex sentences can be kernelised into propositional units, phrased as either:

Attitude Object/Verbal Connector/Common Meaning Term

or

Attitude Object 1/Verbal Connector/Attitude Object 2.

The propositions formed the units in the data set upon which analysis could be performed (Krippendorff 1980, 62).

### 3.3 Method of Integrating Data

After the transcripts had been typed, interviewers and assistants met as a panel to integrate the data, and pool perceptions of what had taken place in each interview.

The following method was used:

The transcript was read aloud by the research assistant. The interviewer then outlined his interview process of the impression highlighting features of the data that he felt were significant. Other members of the group asked questions and commented on aspects of the data, and added their own interpretations.

These transactions were recorded, and the tapes were in turn abstracted by the research assistants.

Three written sources of data were thus available for analysis

- a) The Questionnaire Data
- b) Data from the Group Interview
- c) Interpretation of the Process of the Interview by the Interviewers in the Data Integration Session.

## 4. DATA ANALYSIS

The data were submitted to assertions analysis (Janis 1965, 55-82) on the following rationale:

**4.1. Assertions made by students in the questionnaire and interview were coded and grouped in the following categories:**

- a) Expectations concerning university study in engineering.
- b) Skills and abilities required by an engineering student.
- c) Study problems encountered at university.
- d) How the university has helped with these problems.
- e) Support systems used by engineering students.
- f) Support systems recommended by engineering students.
- g) People consulted by engineering students re their study problems.
- h) Aspects which diminish the success of engineering students at university.

Study problems of black engineering students at university.

**4.2. Recurring assertions in each category within each data cell (from different students in the same year in the same discipline) were clustered.**

**4.3. Recurring assertions in each category across different data cells (ie from different students in the same year in different disciplines) were clustered.**

**4.4. Recurring assertions in different categories within each stratum of the data set (ie from different students in different years in the same discipline) were clustered.**

**4.5 Recurring assertions in different categories within the data set as a whole (from different students in different years of study) were clustered.**

At this stage in the analysis, a colour coding system was used to distinguish the groupings of the various assertions visually. By this means a data set of +/- 400 pages of typed questionnaire data, +/- 100 pages of interview transcripts, and +/- 160 pages of coded assertions from the data was reduced to manageable proportions.

On this system separate colour codes and tallies were established for assertions occurring:

- a) Within single data cells
- b) Across data cells
- c) Within the data set as a whole.

In terms of the assumptions relating to triangulation (refer note below), common assertions occurring both within and across data cells were weighted more heavily than common assertions occurring within a single data cell. Common assertions within a single data cell were in turn weighted more heavily than assertions made only once, or repeated assertions made by a particular student.

The sections that follow are based on the assertions made by the 160 white engineering students in first, second, third and fourth year interviewed in this study. While the sample was stratified to represent academic performance in different years of study and different engineering disciplines, the views expressed may not be representative of the engineering student body as a whole. The interpretations, though based on the data, are those of the authors of this study.

It should be noted that there has been pressure on the authors to produce this report rapidly. Had this not been the case, different analyses by different investigators would have been conducted for reliability purposes. This was not possible, owing to the need to produce this report in a very short period of time.

Clear trends emerged from the form of analysis used, based on common trends in the different data cells. In the sections that follow, the study habits and attitudes of the First, Second, Third and Fourth year students in the sample are dealt with separately. The different themes and headings in this report are based on clusters of common opinions expressed by different students in the different samples interviewed, and the questionnaires returned by these students prior to the focus group interviews. An abstract has also been prepared, based on central indications and conclusions from this study.

*Author's Note:*

*It will be noted that tables of frequency have not been used in representing the data. Due to the open-ended nature of the questionnaire and interviews, and the large number of data cells, the technique of triangulation (Denzin 1970) highlighting commonly occurring assertions across and within data cells, was felt by the authors to be more applicable to illuminating trends in the data. This is based on identification of common themes in the data as opposed to frequency analysis, which is based on more numerical assumptions.*

## STUDY HABITS AND ATTITUDES OF FIRST YEAR ENGINEERING STUDENTS

The major themes emerging in the Questionnaires completed by, and the inter-views conducted with the first year engineering students were as follows:

### 5.1. Expectations concerning the Engineering course

The majority of students interviewed expected a hard course, with a large workload taught at a rapid pace. Many expected, however, more of an introduction to engineering than actually occurred in first year. There was, however, a common perception of lack of relevance of many of the subjects they were taking to the engineering discipline they had chosen. This theme was evident in the comments made by several students.

The pace and workload of the course were greater problems for students in all disciplines. The amount of work, the long hours they had to concentrate and study, and the consequent erosion of free time, came as a shock.

A recurrent theme was that the majority of work had to be attempted in a student's spare time. As one first year Metallurgist put it:

"Hard work, little free time. Long exhausting days. Easy to fail examinations. High standard of self-discipline. Much work to be attempted in own time."

The lack of free time to work during the week resulted in students working late at night on most days of the week and during weekends. The lack of free time also affected the way in which engineering students used the support systems (eg the first year tutor system) available to them. A commonly occurring theme was that students rarely had a chance to socialize or play sport. As a first year Mechanical engineer put it:

The work is hard and the hours long. Weekends do not exist.

### 5.2. Skills and abilities required by Engineering students

Ability in Maths and good grounding in Science were the most frequently cited abilities that students felt were necessary to success in first year engineering. Mathematics was perceived as

particularly focal, and the teaching of mathematics at university particularly critical to the first year engineering students' studies.

The mathematics course was rated, however, as the most difficult particularly in terms of lack of adequate preparation received by students in their previous schooling, as well as in terms of standard of lecturing and tutorials at first year level.

Anomalies in the sequencing of instruction in mathematics at a first year level were commented on negatively by many students, who mentioned in particular the need for more structured approach to the introduction of concepts in the subject. As one Electrical engineering student, with a C aggregate in matric, stated:

"The work is not difficult, but we are not given time to understand it properly - ie the work is taught at a tremendous pace. It is not taught in sequence. Students are taught integration before calculus. This means that they don't understand integration when it is taught."

A recurring theme was how ill-equipped many students found themselves to cope with the gap between school and university, particularly in mathematics.

A Mechanical engineering student, for example, with an A aggregate in matric, commented:

"I do not feel there is enough time at 'varsity to go through matric work or work that should have been done in matric. eg Additional Maths - those who did it in matric have no problem with university maths.

The Civil engineering students interviewed indicated that for the first two months they were totally unable to understand the Maths lectures. The Metallurgical engineering students indicated that the standard of lecturing in the subject was very poor, and suggested that the lecturer did not prepare his work adequately. The first year Electrical group indicated that work was not taught in sequence (the example of integration being taught before calculus has been referred to earlier.)

Suggestions were made in two of the groups in the sample that the first year university term should start earlier (eg in January) to assist in bridging the gap between school and university. There was consensus in the Electrical engineering group, for example, that a pre-university year was necessary to upgrade the standard of work the students had done at school, to avoid conceptual problems.

A first year Mechanical engineering student with an A aggregate in matric put it as follows:

"There is a feeling of panic at 'varsity. Panic because you do not understand the work".

Skills and abilities required by Engineering students were perceived by the students in the First year sample as follows:

- a) A Mathematical and Scientific orientation, and ability to use mathematics particularly in solving problems.
- b) High motivation to study engineering.
- c) High ability to concentrate for long periods of time in lectures.
- d) Self-discipline, particularly as regards studying late at night, and in spare time.
- e) The ability to grasp concepts quickly.

Questions of interest and motivation, and the choice that an engineering student has to make

between his commitment to his studies and his social and personal life came through as predominant issues to be resolved by a potentially successful as opposed to an unsuccessful First year engineering student.

Development of problem-solving ability in mathematics and thorough, grounding in mathematical concepts at a First year level, appeared to the interviewers to be the most important conceptual task faced by the engineering student entering university.

### 5.3. Attitudes to the First year Curriculum

Many aspects relating to first year were viewed positively.

Applied Mathematics was perceived by the majority of students interviewed as particularly relevant. Attitudes to EAD were mixed, but mainly positive.

Many students felt the need for more work relating to their disciplines in EAD at a first year level, and felt that the subject reflected too great an emphasis on Mechanical engineering.

Attitudes to Physics and Chemistry varied. The first year Metallurgical engineering group indicated that their Physics lecturer signposted his course well, and that solutions were provided to tutorials. This group perceived their Chemistry course as difficult but relevant.

The Electrical engineering group, however, indicated that Chemistry labs taught them nothing and that the Chemistry course was not relevant to their discipline. The lab courses were perceived as badly designed. As one student commented in the interview:

"You spend hours in labs doing repetitive work not related to work done in class".

The Chemical engineering group expressed mixed views. They felt that Chemistry was largely a repeat of school work. The biggest problem they saw was with Maths and the lack of contact between lecturers and demonstrators.

The following interchange typified what took place during the interview.

Question:

"What is good about your first year at university?"

SILENCE

Student with B aggregate in matric:

"It is very general to get a background. First year is a bit disappointing."

Student with C aggregate in matric:

"One must be motivated to pass"

While comments made by the students varied, the interviewers' impression was of a highly cohesive group of students who had established a firmly knit social structure within a few months of being at university. As one interviewer commented concerning the First year Electrical engineering group:

"I was amazed by the class identity and cohesion in the group considering that they'd only been together in class for a few months and considering the class is so big.

"I was surprised that they found the work so difficult. I was also very surprised that they said they'd like to have a pre-university year or a post-matric year. I found the whole question of

sequencing very interesting. It seemed to worry them a great deal. This question of having integration before calculus. I think they found it very demotivating and that it prevented them from understanding the course. They also mentioned that other engineering groups had it better. That the course was better sequenced for them.

"The question of notes came up again. That they could have notes so that things could be explained in class. The poorness of the lecturers also came through. The total unawareness of lecturers to their problems."

Another commented:

"Lecturers assume that students know certain principles, based on assumptions about their schooling. They appear to be unaware of actual student needs."

#### 5.4. Problems Encountered at University

Frequently encountered problems were as follows:

- a) The volume of work
- b) Keeping up to date
- c) Understanding work in lectures
- d) Frustration and demotivation when the work proved too difficult
- e) The pace and sequencing of instruction.

A common theme (as cited in the previous subsection) was the unawareness of lecturers to student problems.

The main problem perceived by all students was, however, lack of time. As a first year Civil engineering student put it:

"The only problem is time and adapting to the number of hours that have to be put in."

Another First year Civil engineering student stated:

"The workload is very heavy and there is not enough free time, there is a very large gap from matric work and you have to be very forward to get sufficient help."

A first year Electrical engineering student commented:

"I have never worked so hard, and never done so badly."

As one interviewer commented (relating to the first year Mechanical engineering group):

"The overall impression was: a group of guys coming from widely varying backgrounds, but all faced with a common problem. There seemed to be a group cohesion, which was quite surprising. Everyone seemed to have the same type of problem. The problem was coping and adjusting, coping with different lectures and lecturing styles.

"They were unable to find sequence. One of the questions each student had to face was 'How do I structure and revise my approaches to study which I developed during school?'

"It also seemed that the problem-solving type of approach where you are not given all the information, but have to go off and find it, was the essence of the study approach required.

"Each study problem seemed an individual type. You either solved the problem by preparing well beforehand, or you worked hard at your tuts.

"But you had to make a decision as to how to regulate your resources to the demands of a new problem. That seemed a common task for everyone. "

The problems of adapting to increased workload, increased pace of lecturing, and higher levels of concepts than encountered at school, appeared to the interviewers to be the major study problems encountered by first year engineering students.

### 5.5. Support Systems

Tutorials were rated by all students as the most effective support system available in the university. The student counselling service was also perceived as useful.

The Faculty's personal tutor service was regarded as potentially valuable, but many students felt that they did not have time to use it properly.

By far the most commonly used support system was the student's own circle of friends. Engineering students in higher years of study, family, and graduate engineers were also frequently consulted.

As mentioned in previous subsections the interviewers were struck by the highly developed student network which existed among the first year students even four months into the First year programme.

In the First year Mechanical engineering group the attitude of students of all levels of ability was that it is impossible to understand everything covered in lectures. To cope with study problems the following strategies are effective:

- a) Work with a friend
- b) Keep up to date
- c) Go through your work beforehand
- d) Do your tuts (tutorial assignments)
- e) Ask your lecturers only as a last resort.

The consensus in this group was that lecturers assume that students understand. Fellow students are thus better able to identify a student's problem than are their lecturers. A "buddy" is essential to sort out the continuous stream of conceptual difficulties and study problems.

As a first year Mechanical engineering student put it:

"It is necessary to have a friend to work with - ie you should have a regular co-worker."

The following interchange indicates the attitudes of this group to fellow students and lecturers:

Repeat student: "It is best to ask someone at your level!"

B aggregate student: "A person with first class passes will probably not understand why someone else is having problems"

D aggregate student: "I feel that lecturers laugh at students who ask questions".

The status of the repeat student was thus particularly high, already knew the system and its pitfalls.

The attitudes of the repeat students can be inferred from this comment by a first year Civil engineering student repeating his first year of study:

"You should realise that Wits is a self-help organisation. You shouldn't rely on the lecturers."

They were, however, many exceptions to this pessimistic feeling. The first year Metallurgical students rated their Department's initiatives in laying on additional tutorials very highly. The July vacation course in EAD was also positively viewed, together with the tutorial system, and the Chemistry Department's resource room directed at helping students in difficulty.

One First year Mechanical engineering student commented:

"I don't think that I can blame my failure on support systems at university. The only thing that could have helped me to pass was motivation and that is something that each person must find for himself."

### 5.6 Black Engineering Students

A number of themes concerning black students studying First year engineering recurred throughout the questionnaire and interview data:

- a) Black students were rated by the other students as very hard working due to the poorness of their previous schooling in the black education system.
- b) They tended to work by themselves, and as such were not aware of many of the solutions to problems discussed by their white counterparts.

*Authors' comment: It was a noticeable feature of all Metallurgical groups interviewed that they were relatively content and identified strongly with their Department. In the*

*majority of other disciplines, this feeling only emerged around the Third year level.*

A First year Electrical student wrote as follows:

"(Black students) have no one to refer to or ask about their problems."

A First year Civil engineering student commented:

"I think they are excluded from the group of students that form the main body of the class and perhaps they have a large gap to make up from school and just are unable to make up the gap."

- c) Language was rated by the white students as the black students' biggest problem (especially difficulty with technical terms). This manifested in difficulty in understanding the context of lectures, difficulty in getting down appropriate notes (particularly when these were dictated) and reticence in asking questions even when it was clear to the student that he did not understand. The difficulty of overseas lecturers in understanding questions asked by black students contributed further to the reticence ascribed to black students by their white counterparts.
- d) Difficulties in visualising in 3-D in the EAD course were also perceived as problematic for black students in first year.
- e) Many white students indicated that their black counterparts took a long time to grasp concepts. working with abstract ideas. This was ascribed to difficulties in working with



abstract ideas.

- f) Rate of work and rote-learning were also mentioned as problems.
- g) In the Civil engineering group transport and financial factors were mentioned as particular problems for black students. Difficulty with computer programming was also mentioned. A Civil engineering student (repeating first year) commented as follows:

"They must feel outnumbered, especially in Engineering. Judging from their marks last year they appear to have other problems apart from work. They can speak to you quite well, they could ask a problem and you could explain and they seem to accept it.

"They would never argue back and don't seem to ask questions even though they don't understand."

and later in the same interview:

"They struggle a lot. You can explain even something very specific, and they don't seem to see the reason behind it".

The interviewers concluded that First year students were accepting of the black students, at a superficial level, but were more concerned with their own problems (adjusting to the workload and getting through the course).

A first year Metallurgical student commented:

"I sometimes feel that the black students may be at a disadvantage because they do not seem to be able to grasp the work. On the other hand, that also tends to be a problem which everyone has at some stage or another."

Language and culture were perceived as a major barrier between white and black students.

As a First year Civil Engineering student wrote:

"They are not at ease socially among white students. White students find it difficult to communicate with them because of cultural and language barriers."

In one of the few direct comments about the Cadet Scheme, Chemical engineering student stated:

"The greatest problem facing the black student is the problem of the enormous gap between their schooling and what they learn at university. The students who are part of the Cadet Scheme have the problem that they have been taught some of the First year work and so move along well for a while but then they fall behind when the work is new because they have not been taught to work properly for the type of work which engineering involves."

### 5.7. Summary

The First year engineering students in the sample appeared to form part of a highly articulate and cohesive group. The students identified strongly with each other as engineering students.

This cohesion, the ease and with and fluency with which they discussed and wrote about their problems came as a surprise to the interviewers. Any conception of the engineering student as a person lacking in communicative ability is, on the basis of the data from this sample, totally unfounded.

Adapting to the experience of university life and lectures appeared to be a problem-solving exercise for every first year engineering student. Few students expressed confidence

concerning their ability to handle the level and amount of work with which they had to contend.

The majority found the pace of work and the delivery in lectures problematic. The biggest problem appeared to be adapting to these new demands, and adjusting available resources (home, family, friends and above all time) to cope with the pressure of the course.

In the face of adversity, it appeared that most students became highly task orientated, and adopted survival strategies. Peer support was regarded as essential to passing at university. Study problems occurred frequently and were a matter of concern to all students. The fellow engineering student was regarded as a potential "buddy" to whom the student in trouble could turn for advice. He could understand the student's problem best, being subject to the same pressures himself.

Social distance between lecturers and students, and students and their home departments, appeared to be a feature of First year engineering study in most disciplines. Only if a student could not sort out a problem himself, using the student network, would a lecturer be consulted.

In the case of Metallurgical students, however, the link between student and his home department appeared to be a close one. This feature appeared to be a direct response to the department's organisation of its engineering tutorship scheme, and evidenced in written comments by the Metallurgical group as follows:

"Question: In what ways has the university helped you with your problems?

Answers:

- a) Metallurgical engineering tutorship. Plato computers. Possible use WATFIV compilers in the engineering department. Helpful lecturers in some subjects. Past exam questions are readily available.
- b) Tutorship (Metallurgical Department).
- c) The Metallurgical Department has been very helpful in providing tutors which would help us with our problems. They are trying to make things a little easier for us.
- d) Nil.
- e) The Metallurgy Department is most helpful in that you can go to them with any problem. They have also organised an extra tutorial scheme for all subjects."

In First year, black students appeared to be placed at a position of social distance their white engineering counterparts, lecturers and their home departments. The problems of black students were particularly acute due to poor schooling and language problems.

While white students appeared to have developed a closely-knit and highly effective social infrastructure directed at overcoming adversity (in the form of a continuous stream of academic pressures and study problems), there was no evidence that the separate structures developed by black students were as effective.

Disparities in the education system, particularly in the previous teaching of mathematics, appeared to affect all students, but black students in particular. Ability to bridge the bridge between school and university, and good teaching at a first year level in all subjects, appeared to the interviewers to be particularly crucial to first year engineering students' success.

## 6. STUDY HABITS AND ATTITUDES OF SECOND YEAR ENGINEERING STUDENTS

### 6.1 Expectations concerning University

A demanding and challenging course with a high workload was anticipated by the majority of the sample of second year engineering students. Many students also expected that problem-solving ability would be required in their courses, as well as the ability to think logically.

The majority of students found the workload greater than expected, and commented that as a result their free time was eroded. Many students also mentioned their expectation of a more practical orientated course. A recurrent theme was that the work in their courses was largely theoretical, and that the standard of practical work done (eg vacation work) was not of a high standard.

Comments were, however, frequently made that the course was stimulating, and that the theoretical knowledge was appreciated particularly due to the development in logical thinking that occurred as a result of the type of theoretical courses taught at university.

### 6.2 Skills and Abilities required by Second year Engineering Students

Intense motivation and self-discipline were mentioned by many second year engineering students as an aspect crucial to succeeding at Wits. The ability to work for long hours, and to concentrate for long periods of time were also stressed as important non-cognitive attributes of the successful engineering student.

Recurring themes in the questionnaire and interview data relating to coping with the curriculum were as follows:

- a) Ability to work under pressure.
- b) Strong will power and determination.
- c) Stamina and perseverance.
- d) Ability to teach oneself and work on one's own.
- e) Self-discipline.
- f) Ability to work continuously over long periods of time.
- g) Ability to motivate oneself even when the position seems hopeless.

The students stressed the following cognitive aspects in relation to engineering study:

- a) Mathematical aptitude was repeatedly mentioned as the most important ability required by the student at university in all engineering disciplines.
- b) Logical ability was also viewed as important, particularly as regards the ability to understand and to solve problems.
- c) Scientific reasoning ability was required, coupled with a desire to apply mathematical and scientific principles practically.
- d) The ability to sort out what is relevant from what is irrelevant was important, particularly in prioritising an enormous workload.
- e) The ability to picture drawings as 3-D objects was essential in EAD.

- f) The ability to extract principles from an example of its application, and the ability to apply this principle to a new set of conditions effectively, were important to solving engineering problems.

Of the comments made by students, the non-cognitive aspects (such as motivation, self-discipline, and perseverance) outnumbered the cognitive by a wide margin. From analysis of the data, it was apparent to the authors that willpower to work long hours, and concentrate for long periods in coping with the enormous workload were the two most important non-cognitive attributes a Second-year engineering student should possess.

Mathematical ability was the most important cognitive attribute. Staying up-to-date with work was the most important single task of a Second-year student.

### 6.3 Problems encountered by Second year Engineering Students

Problems relating to self-discipline in studying, adjustment to long periods of study (particularly at night), and lack of motivation, were recurrent themes in the data. The biggest single problem of the Second year engineering student was time, both for coping with the workload within the curricular structure, as well as for pursuing interests outside of those relating to university work.

Poorly presented lectures and poor lecturers, inefficiently run and inadequately staffed tutorials, and the poor standard of notes were also frequently mentioned as problems. Poor quality of lecturing and tutorials appeared to be consistent problems across all groups interviewed.

In the Metallurgical engineering group, for example, three out of six students responding to the questionnaire rated poor lecturing as a problem.

In the Chemical engineering group the comments listed below represent the views of three out of nine students responding to the questionnaire (in this group two out of nine students rated themselves as having no problems).

Student A:

"Insufficient time to do all subjects as well as one would like to. Course is very rushed and tutorial groups too large. It is thus difficult to get a tutor/lecturer to explain something you don't understand in tutorial periods. Many lecturers also have no consulting hours."

Student B:

"There has been some bad lecturing. I find that very few lecturers actually know what they are talking about, or if they do they certainly don't know how to teach, ie they do not have an explaining ability - also tutorials have far too few demonstrations."

Student C:

"I have had many conceptual problems in the course that have not been well explained in lectures. Theories are presented but not explained at all and the student is expected to branch out in the theory without a working knowledge of how it was obtained... "

### 6.4 Support Systems

Tutorials were rated by all groups interviewed as the most effective support system provided by the university. In subjects where tutorials were not available (eg in Chemistry) the students experienced particular difficulties.

There was consensus concerning the need to staff tutorials adequately. The input given by certain tutors was rated very highly.

Student tutors in many cases fulfilled a valuable role in explaining concepts misunderstood by students in lectures. This was particularly crucial if the student was unable to understand the lecture content. This happened frequently for the majority of students interviewed (eg in the Mechanical engineering group all students in the sample indicated that they felt out of their depth for most of the time).

From the data it appeared to be important for tutor and lecturer to have adequate contact. It was, however, necessary for tutor and lecturer to be different people. In one case (Metallurgical Engineering) where lecturer and tutor were the same person, the students taking the course had major problems. In this case it appeared that the normal process of clearing up conceptual problems the students encountered in lectures could not operate effectively in the tutorials; had another person acted as tutor it was likely that the students would have been able to get around their problems.

Opinions on the value of laboratories were divided. While some students rated laboratories as helpful, there were particular problems (eg in Physics) when the content covered in laboratories was introduced before the necessary theory had been introduced in lectures.

The Mechanical and Electrical engineering groups rated their chemistry lectures at a First year level as a waste of time, due to the irrelevance of the content covered (eg working with aspirin) to the needs of these disciplines. In Chemical and Metallurgical disciplines a similar problem was perceived with Physics laboratories as irrelevant to the needs of the Chemical and Metallurgical engineers.

The standard of physics lectures was, however, rated highly by the groups interviewed, indicating that the theory in the subject was appreciated, while the practical application was not. This appeared to be a function of the way in which laboratory experience was organised, rather than an objection to practical work per se.

Many students mentioned in this connection that results in laboratories were copied and "cooked". The attitude towards laboratories appeared to be poor due to the amount of time they took up in relation to the principles they demonstrated, and the low weight they held in terms of potential marks for a student.

The following comments by the 2nd year Civil engineering group are indicative of their expressed opinions to support systems:

Student A: "The tutorials have been the more useful but the labs one can do without knowing what is going on."

Student B: "Definitely tutorials are the most useful. Workshops are also useful but they are mainly for practical purposes."

Student C: "The tutorial periods have been most useful and almost vital because that is where all my learning takes place."

Student D: "Tutorial classes help, labs and workshops have so far been a waste of time."

Student E: "Tutorials are by far the most helpful learning aid (give a methodical way to learning). Lecturers are obliging and helpful. Labs are somewhat useful but are not worth the time unless they carry some weighting factor."

Student F: "Labs and workshops - often they have brought the principles into clearer light or shown a different view of the same idea thus giving better understanding and grasp of a concept."

Recommendations made by the second year students included:

- a) Improving the existing tutorial system (eg by making available. tutorial solutions; by providing additional tutorials in subjects in which tutorials were not offered; by increasing the number of tutors in certain overloaded tutorial classes).
- b) Introducing a series of tests throughout the year, enabling the student to stay up-to-date and not only to as great an extent on the final exam to pass or fail him.
- c) Changing the subminimum % for each exam to a lower percentage.
- d) Improving the quality of lecturing and if possible issuing notes.

The possibility of a five year degree in Engineering was also raised by two of the five groups interviewed. The students in one group indicated that Engineering would become a more attractive Faculty if this were the case.

It appeared, in summary, that Second year students relied heavily on their own resources and those of their friends in Second year as their major support systems. People commonly consulted by Second year engineering students in sorting out their study problems were:

- a) Friends
- b) Family
- c) Students in higher years of engineering study
- d) Engineering graduates, particularly those taking higher degrees at university.

This was a common trend across all groups interviewed.

Of the support systems offered by the university, tutorials were the most effective. The attitudes towards tutorials, however, varied. The second year Chemical engineering group, for example, commented on the tutorial system as follows:

Repeat student: "The bad thing about tutorials is that there is no silence - it should be enforced so as to work better."

Student with 1st class aggregate: "In the majority of tutorials we have to wait in a queue to get an explanation which is an enormous waste of time."

Repeat student: "Everyone talks in queues. I don't go to Maths tutorials because it is a waste of time as we always have to queue up."

Student with Upper 2nd class aggregate: "I don't go to Maths tutorials either, as it is a waste of time."

Student with 2nd class aggregate: "It's easier to consult friends and quicker."

Student with Upper 2nd class aggregate: "They should give tutorial solutions. It would help."

ALL STUDENTS IN THIS SAMPLE CONFIRMED THAT THEY HELP EACH OTHER A LOT AND RELY TO A GREAT EXTENT ON THIS KIND OF HELP.

### 6.5. Black Engineering Students

Black students were perceived by their white counterparts as follows:

- a) They tended to stick together. They were characterised as shy and reluctant to discuss their work with whites.

- b) Language and communication were rated as their biggest problems.
- c) Many black students did not understand lecture content fully (especially terminology and examples used by lecturers in explaining principles).
- d) Being a minority in second year was a problem. The black students hardly ever asked questions, and tended to avoid contact with the white students.
- e) Three-dimensional concepts in EAD were a problem for many black students.

A Second year Civil engineering student put his views as follows:

"(There is a) language barrier. Lecturers often use examples based on colloquial/cultural ideas to explain principles, which the blacks of different cultural backgrounds do not understand or even become confused. They are often in a minority and do not participate in a class, which would be to their advantage (a result of the racism present in the society)."

On the positive side the Second year Electrical and Mechanical groups both indicated that lecturers in these disciplines tended to be more sympathetic to black students than their white counterparts. The Second year Mechanical group further indicated that black students take the initiative and go and speak to their lecturers.

The Second year Electrical group, however, felt that the degree of interaction between black students was not as high as with white students helping each other, and suggested that were black engineering students resident in a white residence the situation might get sorted out.

The following interchange took place in the Second year Chemical engineering interview:

Student with 1st class aggregate: "They don't mix with whites, even if you make an attempt."

Repeat student: "The basic problem is that blacks stay on their own; they overwork themselves because they don't mix and get the hints and suggestions which are passed around all the other students."

Student with 1st class aggregate: "These hints don't get to them."

Repeat student: "It's a pity, some do communicate but they aren't. I can't see a solution. They work harder than the whites but their marks don't show."

Student with Upper 2nd class aggregate: "They also have a language problem."

Student with 1st class aggregate: "Especially with some tutors who have a very difficult vocabulary."

## 6.6 Summary

The majority of Second year engineering students interviewed were experiencing difficulty with the workload. The average student in Second year appeared (on the basis of evidence from the interviews) to be working +/- 30. hours a week outside of lectures.

Many students expressed difficulty in motivating themselves to work consistently in coping with this workload. In the Second year Mechanical engineering group their dilemma was apparent in this interchange:

ALL AGREED THAT MOST OF THE TIME THEY FEEL OUT OF THEIR DEPTH.

Repeat student: "Often I'm not motivated."

Student with 3rd class aggregate: "Some weeks I can work better than others."

Question: "Social life?"

ALL AGREED THIS IS VIRTUALLY NON-EXISTENT.

Student with 1st class aggregate: "My weekends are taken up with work. I find it difficult because most of my friends are doing other degrees. They can't understand why I have no time."

Student with 3rd class aggregate: "We can only do Thermo and Applied Maths tuts over weekends. We could perhaps have those tuts during the week."

Student with Upper 2nd class aggregate: "But there is no time to do it during the week."

Time was perceived by the second year engineering student as his most precious commodity. Irritation was common among students concerning those aspects of the course they felt were unrelated to their disciplines, or aspects (eg laboratories and tuts) which they felt wasted their time.

The majority of Second year engineering students battled with concepts presented in lectures. Tutorials were used as one means to sorting out these recurrent conceptual problems. When the quality of the tutorial was not high or the student could not get help of the type he needed the "buddy" system was used to gain the needed clarity.

One surprising feature for the interviewers was the lack of awareness many engineering students at this level had concerning engineering as a career. A disturbing (but current) theme was that of the student who had joined up with the engineering group during orientation week. Needs for career guidance, for adequate orientation into engineering study, and for engineering-related courses from early in the first year of study were recurrent themes in the data.

The negativity felt by many of the students towards their lecturers was also a disturbing feature (perhaps related to the overload which the majority of Second-year engineering students experienced).

The need for lengthening the curriculum over a five year, as opposed to a four year, period was suggested in two of the Second year groups interviewed (the Electrical and Mechanical groups). The former group indicated that only by doing so would the Engineering Faculty become a more attractive one to students applying to the University.

The importance of mathematical aptitude for engineering, and the need for good teaching in the subject, were stressed by all groups.

The importance of adequate motivation, and the influence of failure on demotivating students, was also a dominant theme.

Many students expressed the need for more orientation in their

disciplines by their home departments from early on in their First year of engineering study. Conversely, students felt a demotivation through not coming more to grips with their engineering discipline during their initial year of study at university. A Second year Chemical engineering student wrote as follows:

The very poor standard of lecturing in some of the ancillary departments (eg Chemistry, Physics, Maths) in First Year squashed a considerable amount of interest in the course."

The relevance of the First year engineering curriculum was queried in all groups interviewed. As a Second year Chemical engineering student put it:



"First year had very little engineering as such, only EAD with an engineering project in final quarter. In Second year I still only have two Chemical engineering lectures per week."

Another student in the same group made the following comment:

"Many sections were irrelevant to me. EAD proved useless and was just excessively time consuming. I expected work to be judged by the correctness of answers, but in many cases presentation, introductions and 'waffle' seemed to count. This disappointed me."

A Second year Electrical engineering student, in contrast, viewed the First year background courses as providing him with background for his subsequent studies:

"During the First year I expected to do more courses orientated towards electrical engineering, but I now realise that it is important to know the basics before branching into a particular engineering course."

Conflict between methods of teaching science and methods of teaching engineering was evident in many places in the data. The following comment (from a Second year Chemical engineering student) was representative of these differences in emphasis:

"There is no correlation between Chemistry and Chemical Engineering. We often find that a definition given in Chemistry is totally different to that given in the Chemical Engineering course."

The various attitudes of the Mechanical engineering group will be apparent from the following extract from their interview:

Repeat student: Chemistry in first year is a total waste."

Student with 1st class aggregate: "We did a lot of irrelevant work in first year. First year is virtually the same for all branches of engineering. It makes students a 'jack of all trades'. Students should be able to start on their chosen field straight away."

Repeat student: "in later years students branch out into more courses."

Student with 3<sup>rd</sup> class aggregate: "There should be more of an option in First year."

Student with 1st class aggregate: "It would be better to have an engineering course spread over five years."

Student with Upper 2<sup>nd</sup> aggregate: "There are too many concepts to grasp. We need more time."

## 7. STUDY HABITS AND ATTITUDES OF THIRD YEAR ENGINEERING STUDENTS

### 7.1 Expectations Concerning the Engineering Course

The majority of Third year students responding to the questionnaire anticipated a difficult and demanding course, which would be hard work. Many students also expected a practically orientated course, in which the practical training given would vary according to the engineering discipline in which the student specialised.

Only in one group (the Third year Mechanical engineering students) was there an expectation that the course would be orientated towards engineering problem-solving. In the other four groups this aspect was not mentioned, indicating that the students had not chosen engineering on the basis of any real information concerning the type of training they would receive at university, or the type of work they would ultimately perform, as engineers in the field.

Lack of awareness of the nature of the engineering courses taken was a recurrent theme in the questionnaire data and came through strongly in response to a probe question in one of the interviews.

In this interview (the Third year Metallurgy group), all students indicated that they had no idea of the major options open within the discipline (Mining and Metals/Physical Metallurgy) when applying to the university. In one case it appeared that the student's scholarship with a mining house effectively precluded him from studying the branch of Metallurgy in which he was really interested.

The lack of awareness of many of the students up to Third year level in the curriculum appeared to indicate a lack of relevant career counselling" and orientation to the engineering curriculum at school level, at entry point to the university, and, surprisingly to the interviewers, to an extent in the higher years of engineering study.

The following comment made by a student in the Third year Mechanical engineering group was indicative of the feelings of his fellow students:

"Lecturers fail to explain why students are doing the work that they are doing in their course."

A Third year Metallurgy student echoed the same feeling when he wrote:

"(It would have helped) being shown the relevance of what you are studying and the purpose for this."

One of the interviewers commented on the Metallurgy interview as follows:

"They struck me as a well-balanced class, finally beginning to see the light of what was going on in the course. They were, however, really angry that it had taken them so long to find out what metallurgy was all about."

Other similar themes in the data revealed a disturbing picture of lack of awareness in engineering students entering the university as to what their degree was likely to entail.

It appeared from comments made (eg in the Third year Civil engineering group) that the 'theoretical' nature of the course came as a surprise.

While the majority of the students appeared to appreciate the theory, which they felt taught them to think and problem-solve, the lack of exposure to real-life and practical engineering situations (eg plant visits, case studies, videos of and talks concerning engineering as applied in industry) was, however, commented on negatively by several groups.

The difficulty of the course and high workload were much as expected. However, many students stated that there was too little emphasis on design, both in the structure of the courses presented as well as in the way in which the courses were assessed.

The high loading of the final examinations in passing or failing the year appeared to be a particular problem for many students. The Third year Electrical engineering students wrote in their questionnaires as follows:

Student B: "The test and exam system is a problem."

Student C: "I feel we might be being pushed too deeply into theory and not having enough practical experience."

Student D: "Even though I cannot suggest an alternative, at university the system is not to apply knowledge... the system is to pass exams. This is a pity (as the university aims to give) an education."

Student B: "The weighting of finals are much too high and this could be reduced by increasing designs which are related to subjects and make them count more."

A probe question in the subsequent interview with the Third year Electrical engineering students included the following exchange:

Student with 3rd class aggregate: "Final exams are too heavily weighted. One can fail a year simply because the exam does not go well. Final exams count 80% of your marks."

Student with 3rd class aggregate: "One learns more from design projects. This involves understanding which would test students better. These design projects do not count enough."

Student with Upper 2nd class aggregate: "The amount of work involved in design is much more than that involved in a test."

Student with 3rd class aggregate: "Design - tests one's performance."

Student with Upper 2nd class aggregate: "It is not as easy to make mistakes, careless mistakes which lose marks, in a design."

ALL AGREED THAT THERE IS TOO MUCH EMPHASIS ON FINAL EXAMINATIONS - THERE SHOULD BE MORE EMPHASIS ON DESIGN.

THE GROUP AGREED THAT EXAM PAPERS ARE GENERALLY FAIR. THEY ALSO GENERALLY AGREED THAT, BECAUSE THE COURSE IS PRESET, IT IS DIFFICULT TO CHANGE THE PROPORTION OF MARKS IN THE COURSE.

### **7.2 Skills and Abilities required by Engineering Students**

Interest and motivational aspects were rated consistently by the Third year Engineering students in all groups as fundamental to success in their studies.

Self-discipline, motivation, perseverance, hard and consistent work, the ability to continue working even when experiencing setbacks, the ability to concentrate for long hours and devotion to becoming an engineer were recurring themes in the data.

A picture emerged of students entering their most difficult year of study, from the aspect of coping with sheer workload. The ability to persist in working consistently despite enormous pressure, rapidly impinging deadlines and demotivation due to setbacks and failure appeared to the interviewers to be an important non-cognitive attribute of the successful engineering student at Third year level.

On the cognitive side, Mathematical and Logical abilities were the two attributes mentioned most frequently by the students as fundamental to success in their degree. Aptitude for science, and a feel for solving problems were also rated as important, together with time management, initiative, and intelligence.

Many students felt that the ability to solve engineering problems was the most important skill they learned at university. As a Third year Mechanical engineering student put it:

"The course has taught me to tackle problems in a way that I might not have done had I not attended Wits."

An interchange in the Third year Metallurgical interview further illustrates this point.

Question:

"Problem Solving?"

Repeat Student: "It is more a call for logic rather than being creative."

Student with Upper 2nd class aggregate: "It is not relevant to be creative."

Repeat Student: "One needs something additional to be a good engineer. It is not sufficient to know only theory and practice, there is an extra ability which is indefinable."

EVERYBODY AGREED WITH THIS LAST STATEMENT.

Student with 2nd class aggregate: "One needs a kind of feel to solve problems"

Student with 2nd class aggregate: "One must develop a feel for certain problems and know what will work and what won't - this comes through experience."

Repeat Student: "Background at school is also important."

Student with 2<sup>nd</sup> class aggregate: "One must be capable of looking at a problem and knowing how to think of a solution."

Repeat Student "It is important to learn how to think, it's a technique one must acquire."

The Third year Mechanical engineering students were more explicit as to how they felt this was achieved:

Student with 3rd class aggregate: "Theory develops problem-solving abilities but does not train one for engineering."

Repeat Student: "Problem-solving is the most important aspect of Engineering. The practical side of the work can be easily picked up afterwards."

ALL AGED THAT PRACTICE OF PROBLEM-SOLVING IS WHAT TRAINS ONE TO SOLVE PROBLEMS.

Student with 1st class aggregate: "All subjects are interrelated. To solve a problem one needs to bring in other subjects as well."

ALL AGREED ON THIS - IN THIRD YEAR ALL SUBJECTS CONVERGE.

Student with 3rd class aggregate: Working back in problem-solving helps. There is a kind of a critical thinking in engineering. One has to distance oneself from the problem and organise it. One must have set goals in mind."

Student with 3rd class aggregate: "It is also important to interact with fellow engineers. "

Repeat Student: "Being able to work with another person is important.

Student with Upper 2nd class aggregate: "It's difficult to work with someone else."

ALL AGREED ON THIS - IT IS VERY IMPORTANT TO WORK TOGETHER.

Directly after this interchange, the students commented on the problems of black students in integrating with their white engineering peers.

### 7.3 Problems encountered at University

Student with 3rd class aggregate: "Many of them feel out of it. They simply attend lectures and tutorials but do not participate very much."

Repeat Student: "They are very reserved, they do not have enough self-confidence."

ALL AGREED - BLACK STUDENTS RELY VERY MUCH ON EACH OTHER BUT DO NOT MIX WITH WHITES.

ALL AGREED - RELYING ON EACH OTHER IS THE MOST IMPORTANT SUPPORT SYSTEM FOR STUDENTS. BLACK STUDENTS LOSE OUT AS THEY DO NOT MIX.

*Authors' Note: While this aspect will be dealt with more fully in Section 7.5 below, it appeared to the interviewees that awareness of the insights and study hints circulating among the white student body was essential to a black engineering student's success as an engineering student at a predominantly white university.*

Inadequate lecturing and unbalanced distribution of work and exams over the academic year were the problems most frequently mentioned by the students in Third year engineering.

Communication between lecturers and students and liaison between different teaching departments were also rated as problematic. This lack of communication resulted in overload as well as uneven distribution of the work over the academic year.

There was, however, a strong feeling in many of the groups interviewed that once one got to Third year lecturers were much more approachable.

A Third year Metallurgy student commented as follows:

"Lecturers who really tried to help you in class and especially in tuts always gave me more motivation to try harder. Lecturers who give you the impression that you are stupid are really demoralising."

Another student in the same group wrote:

"In later years lecturers are a good deal more accessible and accommodating with flexible test dates, tutorials and projects. As a repeat student with much free time, the arrangement of work within the department not only stimulates interest but generates good practical experience as well as assisting financially."

A number of students mentioned that they felt it was up to themselves to sort out their own study difficulties. Demotivation was, however, mentioned as a major problem. This appeared to be linked to the workload, as well as the mainly theoretical approach adopted in teaching many engineering courses.

As a student in Third year Civil engineering wrote:

"My only major problem has been an ongoing motivational problem which is too often perpetuated by lecture content and the attitudes of certain lecturers."

A Third year Mechanical engineering student commented:

"I tend to lose interest because of the lack of practical applications and examples ie too theoretical."

Another student in the same group saw his problems as follows:

"Lack of practical experience, lack of communication between departments, resulting in extreme theory workload."

The views of another student in Third year Civil engineering were far stronger, but reflected the same consensus:

"Incompetent lecturers - this is the biggest problem. The whole approach to engineering education - no inclusion or study of important national engineering projects, etc. Totally unstimulating, frightening (because of the work intensity) environment."

Initial difficulty with computer work was found to be a problem by many students in the sample. Learning to use computers, and learning the convention of engineering drawing in EAD were seen by the majority of students as necessary, but very time-consuming. Needs for better foundation courses in computer programming, as well as assistance with debugging programmes were highlighted in the questionnaire as well as in the interview data.

Problems with computers and engineering drawing did not appear to relate to the difficulty of the work so much as the demands on the student's time, which was at a premium due to high workload in other areas. Problems relating to time management, and the rate with which course material was presented, thus appeared to be major issues in the Third year student body as a whole.

The feeling among many students was that they learned few things really well as a result of these pressures. The question of a five year curriculum was raised as a solution to these problems, in several groups interviewed. Needs for more practical orientation and experience, tours to industry and case studies were also mentioned by a number of students as solutions to the problems raised.

#### 7.4. Support Systems at University

Tutorials were seen by the majority of students in the Third year engineering sample as the most effective support system at university. A Third year Chemical engineering student stated:

"For any engineering student tutorials are a must. I am sure that if any problem arises in the work, tutorials are sufficient to sort them out."

Laboratories were seen as useful by some students but of limited value by others.

The views of the following two Mechanical engineering Third year students were representative of the mixed attitudes of the Third year sample as a whole:

Student A:

"The laboratories run by the department of mechanical engineering I found to be helpful. For the rest I thought that they were a waste of time, since the labs were complex, and guidance poor. This resulted in many of the students not understanding the labs. The tutorial system in general is good."

Student B

"Tuts are useful sometimes and labs help to understand theory but some labs are done before the theory which confuses and therefore teaches nothing."

Student C:

"Tutorials are absolutely essential. Laboratories are interesting but would be more useful if the student could participate more actively instead of just taking a few readings. "

Student D:

"Tutorials are useful if used properly by the student. Labs and workshops I feel don't help much because the student usually doesn't know exactly what is happening and therefore doesn't get much use from them."

Attitudes to workshops were also mixed. As a Third year Chemical engineering student put it:

"Tutorials make it easier to keep up-to-date with one's work while laboratories and workshops help make the course more interesting even though some of these are a waste of time."

Fellow students were the people most frequently consulted by Third year engineering students in sorting out their study problems. While lecturers were seen as willing to help by the majority of students in the Third year sample, students appeared to be more likely to consult their peers in the same year of study, than their lecturers.

Graduate students or students and family members were also seen as sources of academic support. The student counselling service, however, was used by very few students. The "mentor" system of personal tutors introduced by the engineering department was also mentioned seldom. It appeared in some cases and in some departments (eg Metallurgy, Chemical engineering) that the contact and relationship with the personal tutor had been a good one, but that students were more willing to ask a fellow student than a member of staff should a problem present itself.

As a Third year Electrical engineering student put it:

"A fellow student can better identify with other students' problems than a lecturer."

In three out of the five groups interviewed, suggestions were made for ways of formalising this "buddy" system. In the Chemical engineering group suggestions were made for assigning graduate students and final year students to junior students. In the Mechanical engineering group the students suggested a system whereby within the first week of first year, a Third year student met with first year students to discuss the ways in which university work should be tackled. In the Metallurgical engineering group, the students suggested tutorial sessions conducted by students who had already completed a year of study.

*Authors' Note: It appeared to the interviewers that the suggestions might assist with some of the concerns raised by students, particularly at the first and second year level, relating to:*

*a) Lack of contact with their home departments*

*b) Lack of adequate orientation of students to the structure of the engineering curriculum, its options, and its specialisations,*

*and*

*c) Lack of study skills orientation relevant to engineering study.*

### **7.5 Black Engineering Students**

The inhibition of black students in relation to asking questions in lectures was mentioned by a number of the white students interviewed.

A Third year Electrical engineering student commented:

"(They have) an inhibition to ask questions during lectures as well as to seek aid from fellow white students if they need it."

A Third year Mechanical engineering student put his views more strongly:

"I have never seen a black student question a lecturer."

Reasons for this inhibition were ascribed to black students being shy, and being scared to appear foolish in a predominantly white environment. Black students were also characterised as

not getting involved in class discussion, in lectures and in tutorials.

A Third year Mechanical engineering student stated:

"They simply attend lectures and tutorials but do not participate very much."

The result of this state of affairs was that black students fell behind in spite of working hard. As a Third year Metallurgical engineering student put it:

"They work hard but they do not always understand the work"

A Third year Civil engineering student wrote:

"They have initial difficulties with adjusting to the gap between school and university. After the second year of study they are the most diligent and hardworking."

These observations were echoed in the comments of a Third year Electrical engineering student who said:

"(They) do not use the help of their fellow students. They work hard but do not always understand the work."

In the interview with the Third year Electrical engineering students the following interchange took place:

Student with 1st class aggregate:

"Black students have a communication problem. This prevents them from asking questions."

Student with Upper 2nd class aggregate:

"They often ask questions after lectures. They may be afraid of being embarrassed in class."

Student with 3rd class aggregate:

"They keep to themselves - form their own groups. They do not tend to approach white students for help."

Student with 1st class aggregate:

"Whites can approach each other for help. Blacks do not always have this opportunity."

*Authors' Note: From comments made by their white peers a profile of the average black engineering student on campus emerged as follows:*

*a) He would have had inferior schooling, and would have inadequate background to engineering study as a result.*

*b) He would have language and communication problems, and would in addition fear exposing himself to ridicule in a predominantly white environment, He would thus be reserved, and not talk a lot about his problems.*

*c) He would be diligent and work hard, but would operate from a position of isolation from the majority of his white peers.*

*d) He would thus direct his studies from an isolated position while his average white counterpart would in contrast be operating from a position of continuous contact and "trouble-shooting" with his fellow students, and with students in higher years of study who had in-depth*



*knowledge of the system.*

*e) In addition, transport, residential, social and financial factors relative to both socio-economic factors and apartheid legislation would tend to operate, increasing the isolation of the black student from the mainstream of university life.*

A comment from a Third year Civil engineering student summarised the influence of prevailing apartheid legislation succinctly:

"All problems (of black students) must be mainly caused by apartheid eg accommodation, inability to mix freely socially with classmates, long and inefficient transport to and from Wits, etc, bad matric grounding."

Incorporating black engineering students into white residences was suggested by a number of the Third year students as one way to get around these problems effectively. As a Third year Chemical engineering student commented:

"If black students stayed at residences, their environment would be more conducive to their understanding the work."

#### **7.6 Summary**

The overall picture which emerged from the Third year data was of a group of students in their most pressurised year of study. Despite this pressure on the student, a positive attitude towards their degrees and their specialisations was, in the main, evident.

In most groups, a strong sense of identity with their home departments and their disciplines was apparent. In Civil engineering, however, the students in the Third year sample appeared to lack the same cohesion. This may have been a direct reaction to the workload the students mentioned they had to cope with. It seemed more likely to the authors, however, that other factors were operating, either from the side of the students, or from the side of the department.

*Authors note:*

*An assertion made in this group was that students took 10 subjects at Third year level, and worked between 40-50 hours outside lectures per week.*

In the sample as a whole, students' most common problems appeared to be those associated with coping with a mainly theoretical degree and with heavy workloads. Many students commented on the need for more practical experience, and felt that their education could be enhanced by more exposure to engineering theory applied in practice. The value of case studies, tours to industry, and guest speakers in their discipline were suggested by a number of students in the sample.

The theoretical knowledge provided by their courses was, however, appreciated in its own right as providing a basis for problem-solving. Developing competence in engineering problem-solving was viewed, in the majority of groups, as the central focus of their university degree.

Many students indicated that they had taken a long time to get to grips with Engineering. A need for orientation of engineering students at all levels in the engineering curriculum was apparent.

The lack of orientation was particularly acute at entry point to the university. Various means by which contact with their home departments could be strengthened were suggested by the students. These included formalising contact between students in higher years of study and students in their junior years of study, as well as critical examination of the content taught at a first year level and in ancillary courses.

Much of the ancillary course content was perceived as irrelevant by students in particular disciplines, since its use in their specialisation was not apparent. Review of the ancillary courses was thus suggested, with a view to excluding content irrelevant to engineering.

Many students, however, suspended judgement on their course - as a Third year Chemical engineering student put it:

"My own feelings are that the course is well balanced as I am not yet able to take a retrospective look at the course in its entirety. "

Overall, the authors gained the impression that the white students appeared to a great extent to be coping with their studies, and to have established adequate informal support systems which could be rapidly directed to getting over a study problem as it occurred. The position of black students at Third year level, in contrast, was not positive.

The white students interviewed perceived their black student counter parts as withdrawn and reserved, and operating in the main without access to the "underground" of which each white student was a member. To gain membership of this, or to effectively put an ear to the pulse of the study habits of the rest of the class, were problems black students in the main had not come to terms with.

Suggestions were made that this was unlikely to happen until black engineering students were in mixed residences, where sorting out of problems was more likely to happen than in a racially segregated residential and study environment.

## 8. Expectations concerning the Engineering Course

A recurring theme in the data from all the samples interviewed was an expectation of being introduced to the practical side of engineering, with particular reference to an introduction to engineering as applied in industry. Many students commented, however, that this expectation was not fulfilled, in that their curriculum placed too little an emphasis on practical engineering.

A comment by a Fourth year Electrical engineering student illustrates this concern:

"The course has far too little emphasis on practical engineering, present day technology, management, finance, etc. Some work is far too theoretical. (There is) too large a gap between a university graduate and a working engineer."

A comment made by a Fourth year Chemical engineering student echoed this concern:

"I feel that the course content does not have much bearing on the work I will be doing when I am in industry."

The majority of students, however, appreciated the theoretical work they had been taught, and felt that their ability to solve problems had been developed by their studies at university. As Fourth year students in the Mechanical engineering sample put it:

Student A: "I have been taught problem-solving and the approach to problem-solving. I have been introduced to design work and I have been helped along the way by some professional lecturers."

Student B: "I have learned a wide spectrum of basic tools to solve many Mechanical engineering problems."

Student C: "From what I have seen of industry and research work, the training I have received has been good."

Student D: "My course has provided me with valuable tools and techniques which will give me the confidence and ability to tackle problems in the future."

Student D, however, also commented:

"I have not had as much exposure to engineering industry as I would have liked. I would have liked to have had more practical training."

This concern was echoed by a Fourth year Metallurgical engineering student, who stated:

"I feel that the broad theoretical base has been over emphasised with a number of service courses being offered to fill "in the gaps in our knowledge, which are not closely related enough to Metallurgy. The practical aspects, such as course work which technikon students cover in Second and Third years, are left to be crammed in Fourth year."

A Fourth year Civil engineering student took a more long-term view of his training:

"I expected the civil-related subjects to be more practical. They all have a largely theoretical bias, and I now expect that the majority of any education as an engineer will occur once I have graduated."

*Authors' comment: These themes recurred frequently in data across all samples interviewed.*

*With regard to the theoretical courses taken at university, there was a distinct split between the views of those who felt that more general courses should be taught (eg finance, law, psychology), and the views of those who were primarily concerned with engineering ability in their discipline. This difference appeared to be related to the aims of the student, and the purposes for which he or she had opted to study engineering at university.*

The majority of students in the Metallurgy group, for example, saw themselves as working in a management capacity within five years of graduation, and were concerned that they would not have the people and financial management background to achieve their aims. The majority of students in the Electrical group, in contrast, appeared to be interested in increasing and honing their knowledge in relation to aspects of their specialised electrical engineering courses.

In Civil engineering, however, many of the Fourth year students appeared to be still unsure as to whether they really wanted to take engineering or not. This conflict was also apparent in the data from other samples. A fourth year Chemical engineering student, for example, stated:

"Since matriculation I have changed greatly as a person. I now feel that I am unsuited to an engineering career and as a result, have great difficulty in motivating myself in respect of my course work."

A Fourth year Electrical engineering student indicated that he had experienced a similar problem, brought about through loss of interest in his course work:

"(I have experienced) a lack of encouragement from industry and the faculty itself. The staff don't take a great interest in the delivery of the material and as a result I seem to have lost interest in some of the courses over the years."

The importance of practical work for motivational purposes was stressed by another Fourth year Electrical engineering student as follows:

"(I have experienced) a lack of encouragement from industry and the faculty itself. The staff don't take a great interest in the delivery of the material and as a result I seem to have lost interest in some of the courses over the years."

The importance of practical work was also stressed by another Fourth year Electrical

engineering student as follows:

"A very little stimulation in the field could make a difference to your attitude towards the subject."

*Authors' note: We gained the distinct impression from the above comments that perseverance was a factor crucial to success as an engineering student, to which attitudes and factors relating to motivation were clearly linked.*

### 8.2 Skills and Abilities required by Engineering Students at University

Mathematical ability was rated by all groups interviewed as an essential attribute of the successful engineering student. The ability to relate theory to practice was also perceived as of prime importance.

Two Fourth year Electrical students put this in the following way:

Student A: "A mathematical ability is a prime condition, as is the ability to persevere with a task. It is important to be able to relate theory on paper to real-life situations."

Student B: "(A successful engineering student should have) ambition, and the ability to relate the theory to the practical field, ie he must be able to analyse and say what the numbers mean physically."

Self-discipline, motivation, and perseverance were also rated as essential to the success of the engineering student at university. The abilities to think logically, and work quickly, were perceived as important, together with the abilities to place appropriate weight on and prioritise in terms of the relevant as opposed to the irrelevant aspects of the curriculum.

### 8.3 Problems encountered in University Study

The Fourth year students rated the workload as their biggest problem at university. The standard of lecturing received was also frequently mentioned as a problem which affected their studies. Looking retrospectively over a number of years the engineering curriculum, the transition between school and university was also mentioned by students in several samples as a particular problem they had had to contend with.

On the question of support systems it was evident from the data emerging from all groups that the majority of students did not view the university as providing any real support systems. They felt in contrast that they had sorted out most of their study problems without help.

The personalised tutor system provided by the Metallurgical Department was, however, recommended by the Fourth year Metallurgical sample as being potentially valuable. The following comments were made by students in this group:

Student A: "(I would recommend) a more personalised tutoring (ie assigning a tutor to each student at an early level - 1st year if possible - who stays with the student his varsity career)."

Student B: "(I would recommend) a private tutor arrangement, initiated in 1st year with departmental lecturers, weekly or monthly group meetings could be arranged, whereby problems could be discussed, on a regular basis. Depending on the tutor/student relationship the same tutor should be retained for the whole of student's university career."

The views of the Chemical engineering sample, however, contrasted strongly with this idea. Two students commented:

Student A: "I do not believe that there are any services of an academic nature that would have helped me pass. A service to relieve the monotony of constant contact with technical work and

technical people might have made the course more enjoyable."

Student B: "I've never felt the need for any other (support) systems."

Despite a lack of formal academic support, it appeared that there were powerful informal academic support systems operating. Engineering students in residence, for example, had organised a system of additional tutorials directed at overcoming their first year study problems. In addition, the vast majority of students in the Fourth year engineering student samples consulted their friends and graduate students as a matter of course to sort out their study problems as they arose.

A Fourth year Civil engineering student commented:

"Students tend to count more on each other for help than on the tutors. "

In addition, the majority of lecturers were seen as approachable if one had a problem. As a Fourth year Mechanical engineering student put it:

"Workloads have been spread out where possible. Some lecturers have bent over backwards to help us, others have hardly bothered. They have done what they had to. Communication between students and staff has improved over the last year."

Comments made by students in the focus group interviews, in addition, indicated that it was important to be pragmatic, and focus on the task of passing the course. It was thus important to understand one's lecturer's conceptual framework in order to link one's way of answering questions in exams with the lecturer's style of thinking and presentation.

The following interchange in the interview with the Fourth year Civil engineering group illustrates this point:

Student with U2 class aggregate: "One should gear oneself towards answering what the lecturer wants from the student - eg structuring of answers should fit in with the lecturer's framework."

Student with 1<sup>st</sup> class aggregate and Student with 2<sup>nd</sup> class aggregate (in unison): "One can pick up the lecturer's style from tutorials and lectures."

**NODS OF AGREEMENT.**

Student with 2nd class aggregate: "An important aspect of exams is to realise that everything is related to the course, even if it doesn't seem so at first glance."

Student with U2 aggregate: "Some questions are similar to those in class tutorials, others are more obscure. This is a problem with foreign lecturers, for instance, it's difficult to know what they are asking."

Student with 2nd class aggregate "Where there is a change of tutors one can often notice a drop in marks due to this business of having to adapt to the different lecturers' requirements."

A Fourth year Chemical engineering student reiterated this in stating:

"If a student has enough drive and determination to succeed he will do so. A student needs to be able to adjust quickly to new situations. Unfortunately a student has to be able to conform to the lecturer's requirements. The next lecturer may have a different set of requirements."

#### **8.4 Support Systems at University**

It will be evident from the discussion in the previous subsection that Fourth year engineering students regarded their greatest support system as being themselves. Friends were, however,

frequently consulted if problems arose. Post-graduate students were also referred to, both when solving problems as well as a source for notes if the student fell behind.

Of the support systems provided by the University, tutorials were rated as the most effective by the majority of students interviewed. Often however, the students indicated that having the tutorial solution was more important to them than actually doing the tutorial and having it marked; the Chemical engineering students, for example, all supported their department's policy of not marking tutorials.

A Fourth year Civil engineering student stated:

"It's better to have a solution and then go through the question yourself. You need to find a pattern."

Laboratories were viewed as useful by the majority of students particularly where organised by their home department. Workshops training were also rated as valuable.

Recommendations made by students for improving the quality of their degree included:

- a) A system of structured tutorials, in which students worked through problems with their tutor using group problem-solving techniques.
- b) A higher proportion of marks allocated to work done during the year, in order to decrease the final exam weighting.
- c) Making the degree longer so that they could have a better understanding of its contents.
- d) Less emphasis on non-engineering subjects.
- e) The inclusion of more practical aspects in their courses.

*Authors' note: Improvement of the quality of lecturing in courses was a frequently recurring need expressed by all samples.*

### 8.5. Black Engineering Students

Black students were perceived by the Fourth year engineering students as coming to university without adequate grounding at school level. Language (especially familiarity with technical terms) was rated as a particular problem resulting in diffidence, reticence, and lack of participation in class work.

As a Fourth year Mechanical engineering student put it:

"They don't make their presence felt."

It was apparent from comments made by the students that black and white students do not mix, either during university hours or socially outside them.

A Fourth year Metallurgical engineering student stated this as follows:

"(They are unable) to meet on a social level with other students. Black students go to their "own" canteen, do not attend functions and they lose out on a lot of informal (and very valuable) discussion of the work, and the friendship that makes the availability of help with work so much easier."

The attitude of the majority of students appeared to be that they were not prepared to initiate contact to bridge the racial gap.

The following interchange in the Fourth year Electrical engineering group illustrates this clearly:

Student with a 2nd class aggregate: "If a black asks something, if he is polite, I'd go into quite a bit of detail."

Student with 3rd class aggregate: "It depends on themselves."

Student with Upper 2nd class aggregate: "If they have been educated in South Africa they are hesitant to approach whites. If they have been educated in South West or Swaziland they feel freer to relate to whites. Black students tend to keep separate."

Student with 2nd class aggregate "They are reluctant to stand up in lectures. They are scared of what others will say."

Student with 3rd class aggregate: "Generally we are quite happy to help them, but the approach must come from them."

A contrasting viewpoint was that of a Fourth year Mechanical engineering student (who had been brought up in Mozambique):

"Their background contributes to their being inhibited. They are not often in contact with whites. I once started a conversation with a black because we both spoke the same language (when I went to England). He found it difficult to integrate himself with others - we had to invite him. What I mean is, the majority should take the first step to include the minority group (in this case, the blacks)."

The dilemma of this particular student, and the influence of social pressures on attitudes and behaviour, is evident from a further comment later in the same interview:

"In Mozambique, I had many black friends. I have found that in South Africa, environment plays an important role. I met a previous black friend from Mozambique in South Africa and to maintain the friendship in South Africa would mean attracting adverse attention from the rest of society. Blacks and whites keep separate."

Suggestions to incorporate black engineering students into white residences on campus were made by two Fourth year engineering groups.

*Authors' note: Our overall impression from the interview and questionnaire data is that integration of campus residences would appear to have merit as a practical solution, and would provide a way to working positively with the problems highlighted above.*

## 8.6 Summary

The picture that emerged from the fourth year data was of a group of students who had reached a point where it was highly probable that they would qualify as engineers. The students realized this and exuded greater confidence and serenity than other groups interviewed.

To reach this point in their studies, they had undergone an extremely rigorous and extended (in terms of workload) university training. This had caused them at various times and for extended periods to face pressure, long hours of work at night and at weekends, frequently occurring deadlines, demotivation, and, in a great number of cases, failure.

One of the interviewers commented:

"I was struck by the intelligence of the group as a whole. They seemed to have a perspective on the courses they'd been doing, eg Aeronautical Engineers who said that although they hadn't had any real experience with designing aircraft, they felt that they had got a really good basis in problem-solving, and seemed quite content with the fact that their course wasn't directly

related to what they might be doing in the future. They felt that they'd be able to cope later on."

At Fourth year level the profile of the successful engineering student that emerged was a person who was task orientated, who was capable of dealing with a large and difficult workload, and who was capable of taking any problem, establishing a model of the situation in his mind, and working through a problem-solving sequence logically and iteratively, relating at each stage the theoretical outcomes to the practical.

The Fourth year engineering student was perseverant, and had at various points through his university career placed his degree above personal and social commitments. He was thus more task than people orientated.

In light of the need to continually relate their problem solving strategies to applied situations, many of the Fourth year engineering students in the sample were concerned about the lack of practical experience their degree offered them. While several students were capable of taking a more long-term view, with the practical side of engineering. From comments made, it was apparent that they saw little relevance in a certain proportion of the theory to which they had been exposed.

Assuming that all theory in the curriculum was relevant, it appeared to the interviewers that courses within the engineering degree as a whole needed to be more adequately signposted than was currently the case. While it was apparent that the theoretical input was appreciated by the majority of the students in the samples (who felt in the main that they had developed the necessary conceptual equipment and knowledge to deal with the majority of problem situations they were likely to encounter after university), many students had difficulties in seeing where the parts fitted in to the whole. A common theme was the need to see what they were learning could be applied in practice.

The position of black students in the Faculty was not a positive one. There was little evidence, from data gathered from the fourth year engineering samples, that Black engineering students were coping with the demands of their university curriculum, or developing the necessary social and communicative skills necessary to become competent engineers in practice. The profile of the average black student in the Faculty of Engineering was a hard-working, serious student who was attempting to cope with his study problems from a position outside rather than from a position within the student network, which his white counterparts found essential to coping with the demands of their degree.

It would appear from the data that a number of factors were contributory to this position of isolation. Poor schooling, response to embedded societal attitudes and legislated segregation, difficulties with using English for the special purposes of advanced engineering study, transport, financial, residence, and motivational factors appeared to be operating. Black students, on the one hand, appeared to be reticent to ask questions and exhibited strong avoidance and withdrawal behaviour. White students, on the other, appeared largely content with the situation, since it did not affect their own progress and success in their studies.

On the evidence, suggestions made for integrating student residences on campus would appear to have strong merit. The indications are that, until black engineering students are resident on campus, in residences where they become more part of the mainstream of student life, little success will be achieved in working with the problem of the high failure rate among black engineering students which is currently the case.

In addition to taking this step, additional efforts may be necessary on the academic support level to ensure that the black students are exposed to the hints and insights that circulate in the informal engineering student network. Access to this "buddy" network appears to be essential to coping with an engineering degree at Wits.



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