THE USE OF MICROCOMPUTERS IN COMMONWEALTH AFRICA

Paul M. Nyambala
CAPA Secretariat
Nairobi, Kenya

1. Introduction

1.1 Preamble

A preliminary survey revealed that there is not much yet worth reporting about the use of microcomputers in the Commonwealth Africa, especially in the context of the improvement of statistics teaching. The teaching of statistics as such has yet to receive the deserved attention, especially in the open colleges, and most of the government statistics officers are trained on the job or in special institutes elsewhere. Of course, there are universities offering statistics, mainly with Mathematics, Business, Engineering and Economics. In the polytechnics, some basic topics in statistics are offered with the mathematics courses for engineering or accounting. However, since the key goals of this conference include exchange of ideas on teaching materials this presentation will focus on the preliminary issue of what computing materials have been identified in the region.

1.2 The Problem, Scope and Method

1.2.1 A survey instrument was hastily designed by way of a questionnaire. Several questions were raised but it was intended that the instrument would answer four focal questions:

a) The type and model of microcomputers that have been installed.

b) Who initiated and funded the installation of the computing facilities.

c) What type of manpower are available to use the facilities.

d) To what basic uses the facilities are put.

1.2.2 The scope of this presentation is confined to these four basic questions. Other matters touched on are mere clarifications or background perspectives.

1.2.3 It was found feasible to circulate the questionnaire to all the sixty-seven member institutions of CAPA. The primary source of data was therefore the questionnaire.

Two secondary sources of information were also used: direct telephone or personal communication and institutional documents held at the CAPA Secretariat.

The data and information received was organised manually. The first task was to divide the institutions into two: those that have computing facilities

and those that do not. These were typified Y (Yes) and N (No) groups. For the N group only two further questions arose:

a) Do they use other computing facilities at all?

b) Do they have plans for installing computing facilities in the future?

For the Y group, which comprised fifteen out of forty-three responses it was found feasible to analyse responses for each individual institution and present specific findings as well as some generalisation.

Before presenting the findings some background perspectives are presented to facilitate an appreciation of the research environment.

1.3 The Diversities in the Commonwealth Africa

1.3.1 The Commonwealth Africa comprises fifteen countries, namely: The Gambia, Ghana, Nigeria, Sierra Leone, Kenya, Uganda, Tanzania, Zambia, Zimbabwe, Malawi, Botswana, Swaziland, Lesotho, Seychelles and Mauritius. The socio-economic indicators as summarised in table below gives the basic features of these countries.

Basic Socio-Economic Indicators: Commonwealth Africa

State	Population Millions	Area Sq.Kms. (1,000)	Per Capita GNP US $	Life Expectancy Years
1. Botswana	1.00	575.0	920	61
2. The Gambia	0.70	11.0	290	36
3. Ghana	13.00	239.0	420	59
4. Kenya	19.00	583.0	435	57
5. Lesotho	1.50	30.0	460	53
6. Malawi	6.60	118.0	230	44
7. Mauritius	1.00	2.0	1,160	67
8. Nigeria	94.00	924.0	1,000	49
9. Seychelles	0.07	0.4	2,400	66
10. Sierra Leone	3.60	72.0	330	38
11. Swaziland	0.71	17.0	870	55
12. Tanzania	21.00	945.0	275	45
13. Uganda	14.00	236.0	290	49
14. Zambia	6.30	753.0	580	51
15. Zimbabwe	7.90	391.0	755	56

Source: CAPA Secretariat: Technical and Vocational Education in Developing Countries, Kambalametore and Nyambala. Quoted from World Development Report 1985.

1.3.2 The relevance of the socio-economic factors in this context concerns the ability and willingness of the various Commonwealth countries to acquire computing facilities. While some countries have acquired computing capabilities in the teaching institutions, others are still preoccupied with the more fundamental problems of acquiring the basic tools like the bench vices for training rudimentary craftsmen.

With these introductory and background remarks the main results of the survey may now be presented.

2. The Results of the Survey

2.1 Analysis of Responses

2.1.1 Thirty-three out of sixty-seven institutions responded by returning completed questionnaires. Another ten responded verbally through personal contact. Thus the situation in twenty-four institutions remained unknown. The profile in each of the fifteen Commonwealth countries is as below:

Country	Mailed	Mode of Responses			Type of Response		
		Posted	Verbal	Total	Yes	No	Total
The Gambia	2	-	2	2	0	2	2
Ghana	3	1	2	3	0	3	3
Nigeria	24	10	-	10	6	4	10
Sierra Leone	1	-	-	0	-	-	-
Kenya	9	6	3	9	4	5	9
Uganda	2	-	-	0	-	-	-
Tanzania	10	6	1	7	0	7	7
Seychelles	1	1	-	1	1	0	1
Mauritius	1	-	-	0	-	-	-
Zambia	7	5	1	6	2	4	6
Zimbabwe	3	1	-	1	0	1	1
Botswana	1	1	-	1	1	0	1
Malawi	1	1	-	1	1	0	1
Lesotho	1	-	-	1	0	1	1
Swaziland	1	1	-	1	0	1	1
Total	67	33	10	43	15	28	43

2.1.2 The table is self-explanatory, except to add that under the Type of Response, Yes means that the institution indicated the availability of some sort of computing facilities, while No means the opposite. Thus only fifteen institutions indicated the presence of microcomputers. It is estimated that another five or so institutions, mainly in Nigeria, have computing facilities. Hence it is concluded that : About one-third of the Polytechnics in Commonwealth Africa had acquired some sort of computing facilities by early 1986.

2.1.3 A further analysis to ascertain whether or not the twenty-eight institutions giving No responses do use computing facilities owned by other organisations showed that only three do. The remaining twenty-five institutions indicated that they had made no contact with computers. In another direction eight out of the twenty-eight indicated plans for acquiring computing facilities in the near future.

2.2 The Distribution of Computing Facilities

2.2.1 The type of microcomputers available in each college as enlisted in the questionnaire were extracted and are given below. Only fifteen colleges are involved so that the full list is presented. Year of acquisition is entered alongside.

Benue State Polytechnic, Nigeria	2 Apple IIe, 64K, 1985; 1 ZX81, 32 K
Sokoto State Polytechnic, Nigeria	20 Commodore VIC 8K, 1982
Kwara State Polytechnic, Nigeria	2 Apple II 64K, 1983; 6 Commodore 32K, 64K, 1984; 1 Word Processor 96K, 1981
Kano State Polytechnic, Nigeria	1 IBM PC 256K, 1985
Federal Polytechnic, Yola, Nigeria	2 Commodore 64K; 1 Apple III 128K
Kaduna Polytechnic, Nigeria	1 TRS 80 MIII 64K, 1982; 5 TRS 80 MII 64K, 1982; 1 TRS 80 M16B 256K, 1984; 1 TRS 80 M16 128K, 1984; 1 Commart Communicator 256K 1985
Kenya Technical Teachers College, Kenya	KayPro 4 64K, 1985; KayPro 10 64 K, 1985
Mombasa Polytechnic, Kenya	28 RML 480Z 64K 1985; RM Nimbus PC 276K, 1985
Kenya Polytechnic, Kenya	12 Commodore 32K, 1980; 4 Rair 64K, 1980

Seychelles Polytechnic, Seychelles	1 TRS 80 MII, 1983; 2 IBM PC 256K, 1985
Evelyn Hone College, Zambia	6 IBM PC XT 512K
Zambia Institute of Technology, Zambia	1 ICL 64K, 1984; 2 IBM PC 512K, 1985; 8 IBM PC 128K, 1985; 3 Epson QX 16 256K, 1985
The Polytechnic Malawi, Malawi	4 TRS 80 MII 48K, 1982 to 84; 2 Digital Rainbow 64K, 1983; 4 TRS M4 64K, 1984; 28 IBM PC 256K, 1986
Botswana Polytechnic, Botswana	16 RM 480Z 64K, 1985

2.3 Installation Policies

2.3.1 Critical issues in acquisition of imported technology in developing countries include the question of initiative for acquiring and selecting the technology and technological models. In most African countries computers are considered an exotic technology whose acquisition is not a primary concern of governments. It was interesting to ascertain how a polytechnic made a breakthrough to secure approval and funding for installing computing facilities.

2.3.2 In Nigeria, there was indigeneous initiative in deciding to acquire computing facilities. The initiative came invariably from the staff of mathematics and computer science or technology. The result was that most microcomputers in Nigeria were acquired using college or government funds. Other colleges in the region outside Nigeria had not facilities.

2.3.3 In the eastern, central and southern African Countries, the initiative for acquiring facilities came mainly form foreign donors. Consequently, the same donors funded the machines. The donors included: The British Government, CIDA/Canadian Government, The World Bank, and the U.S.A. Government.

2.3.4 Apart from Nigeria, the initiative to acquiring computing facilities has been foreign donors and funded as part of aid packages.

2.4 Manpower Aspects

2.4.1 The manpower available to use the facilities was investigated. It was enquired as to whether indigenous or expatriate and formally trained (F.T.) in computing or not (N.F.T.). the following picture emerged for lecturing staff.

Country	Indigenous		Expatriate		Total	
	F.T.	N.F.T	F.T.	N.F.T.	F.T.	N.F.T.
Nigeria	12	9	3	8	15	17
Kenya	7	3	1	6	8	9
Seychelles	1	2	3	6	4	8
Zambia	2	4	2	2	4	6
Malawi	-	2	-	3	-	5
Botswana	-	-	-	2	-	2
Total	22	20	9	27	31	47

2.5 The Use of Microcomputers

2.5.1 The institutions responded that the use the microcomputer mainly as a teaching apparatus or to back up the teaching of a number of subjects or skill areas. The instrument presented seven specified areas and provided an open space for unspecified uses. The responses were as in Table A.

Table A: Teaching Use

Use	Yes
Programming	12
Mathematics	9
Statistics/Data Processing	9
Engineering/Technology	7
Graphics/Design	4
Business Accounting	9
Other	1

Table B: Administration Use

Use	Yes
Standardisation of marks	6
Student records	9
Personnel records	3
Store/supply	4
Accounting	5
Payroll	3

2.5.2 Some institutions indicated that they use the microcomputer for administrative functions, and the responses are given in Table B above.

3. Final Remarks

3.1 The above is but a very brief outline of some selected aspects of the use of microcomputers in Commonwealth Africa. The region is still preoccupied with the acquisition of basic technological tools for training the traditional craftman. The computer is finding ready market more and more in the industry and commerce, but less rapidly in the government training

institutions. It would be interesting to conduct an evaluation of the rate of acquisition and diffusion of computer technology in the various sectors of the national economies vis-a-vis training institutions.

3.2 On the other hand, there is genuine need for some concerted effort to stimulate greater concern for the development and improvement of the quality of statistics education in the region. Perhaps a series of regional workshops and seminars on matters of teaching statistics materials, content and method, could be conceived. Our collaboration in this regard could be readily available. Such efforts could lead to changed circumstances by the time ICOTS III is convened.

References

Milton, R.G., & Nelder, J.A. (Eds.). (1969). Statistical Computing. Academic Press.

Rodin, E.Y. (Ed.). (1976). Computers & Mathematics (with applications). Pergamon Press.

Knuth, Donald E. (1981). The Art of Computer Programming; Vol. 2: Semi-numerical Algorithms. Addision-Wesley.

Box, G.E.P., Hunter, W.G., & Hunter, J.S. (1978). Statistics for experimenters. John Wiley & Sons.

McClynn, D.P. (1979). Personal Computing. John Wiley & Sons.

Sagasti, Francis. (1978). Science and Technology for Development, STP12 - IDRC, 209e.

IDRC 171e. (1981). Absorption and diffusion of imported Technology. Workshop Proceedings in Singapore.

Lee, J.D., & Lee, T.D. (1982). Statistics and Computer Methods in Basic. Van Norstrand Reinhold, U.K.

Kambalametore, A.V., & Nyambala, P.M. (1985). Technical and Vocational Education in Developing Countries. CAPA Secretariat (unpublished). Regional Paper for Vancouver Conference in October 1985.

Nyambala, Paul M. (1984). New Information Technologies and Education; Developing Indigenous capacity. CAPA Secretariat (unpublished). Paper for IDRC Conference in Harare, Zimbabwe in July 1984.

Miscellaneous Curriculum Papers, Syllabuses of various examining boards held at CAPA Secretariat as well as files on CAPA institutions.