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Computers in Third-World Schools

Examples, Experience and Issues

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Preface

This book analyses uses of microcomputers in secondary schools in developing countries. It is based on an international cooperative study which we carried out in 1988–89. We were fortunate to have the help of colleagues in seven countries whose work with us was financed by the Harold Macmillan Trust, which supports educationalists in developing countries who are seeking to improve the quality and availability of education.

RATIONALE

During the early 1980s, many Western governments introduced large numbers of microcomputers into their schools. There is already an extensive literature analysing the process of adoption of this technology, describing learners' experience and evaluating its effectiveness.

Governments of developing countries have in general hesitated, for good reasons, before following the Western lead. As a consequence little has yet been written about the adoption process in developing countries where microcomputers have often been quietly introduced into classrooms. Descriptions of classroom experience (as for Kenya), and papers reviewing the likely issues, have appeared, but only a few analytical reports are available. The Commonwealth Secretariat in London took a lead in promoting discussions between industrial and developing countries within the Commonwealth (Commonwealth Secretariat, 1986, 1987), and UNESCO organised a series of meetings leading up to the Congress on Informatics and Education in Paris in April, 1989 (Anderson and others, 1986; Carnoy and Loop, 1986; Carnoy, Daley and Loop, 1987; UNESCO, 1984a, 1984b, 1984c, 1985, 1989a and 1989b). The South-East Asian Ministries of Education Organisation has coordinated a survey of computers in schools in the six member countries (Pak and Punyapinyophol, 1987, 1988).

The reasons why governments of developing countries should or should not adopt this technology in schools are highly controversial and decisions are being taken in the context of wider debates about computer applications in general, educational and economic

development. We felt that a study of the kind in this book would be valuable at a time when many such governments are considering, against a background of immense economic difficulties, whether policy is required and what it should be in this field. In our opinion, policy-makers, educational administrators, academic leaders and advisors, teacher trainers, teachers and students of education need an analysis which identifies and discusses the issues. We also think it is important that such an analysis should be well-grounded in the experience of teachers using microcomputers in developing countries. By 1988–89 these teachers were thinking hard about the educational implications. We very much wanted their views as well as those of Ministry officials.

Because microcomputers are reaching classrooms in significant numbers there is much to be gained from drawing together and analysing the experience of developing countries. The authorities in China, Jordan, Mauritius and Sri Lanka agreed that co-workers could be contracted by the Open University for this study, and we were able to enlist volunteers in Kenya, Tunisia and Zimbabwe. Where Ministries could not agree to the Open University contracting co-workers, as in India, senior officials spoke openly to us. Recent studies in Brunei, Indonesia, Malaysia, the Philippines, Singapore and Thailand were made available to us, and we also draw on reports of work in Barbados, Botswana, Egypt, Fiji, Jamaica, Lesotho, Nigeria, Pakistan, and Trinidad and Tobago. In general, we deal with Eastern Hemisphere countries, and do not cover any developments in Latin America (see Otieza, 1987, for a summary).

METHODS

The study on which much of this book is based is modelled on three earlier research projects (Hawkridge, 1983; Hawkridge, Vincent and Hales, 1985; Hawkridge, Newton and Hall, 1988). We identified co-workers and volunteers who collected qualitative data in two ways. We asked the teachers to visit five to ten teachers at nearby schools who are using microcomputers, to discuss with them their experiences to date. For this purpose we provided an agenda of questions. We also asked them to organise at least one meeting, normally of not more than 20 people, at which the issues were discussed on the basis of a few short talks prepared by the

teachers and/or advisors. The co-workers and volunteers wrote up for the book what they learned by these means. For each country, where possible one of us visited the Ministry of Education at the start of the study and again at the end, particularly to discuss policy issues, and, at the same time, to meet our co-workers or volunteers. In some countries we were able to find co-workers or volunteers at national level, as well as the teachers, and we provided them with a similar agenda of questions. Our drafts for each country went back to them for checking, but we must take full responsibility for any errors or misinterpretations.

OUTCOMES

We hope this book will add to knowledge and stimulate discussion in many countries. Even a small-scale qualitative study of this type is likely to have a catalytic effect. Our co-workers and volunteers generally experienced enhanced contact with others, within their own countries and internationally, and increased their awareness of problems and opportunities. They, their schools and their Ministries of Education seem likely to benefit, as we have ourselves through carrying out this study.

The book starts from economic problems faced by developing countries. Part I deals with perceived economic and educational needs in these countries and addresses the general question: Why have computers in the schools? Part II explains the nature and capabilities of hardware and software in use, and discusses the training necessary for teachers and others.

In Part III, we draw on the reports of our co-workers and volunteers, with full acknowledgements, and on other published and unpublished sources, to describe and comment upon the experience of teachers and students with computers in schools in 22 developing countries. In Part IV, we discuss policy and practice, from the perspectives of the Ministry, principals, teachers and students (and their parents), again drawing on the reports wherever appropriate. Finally, in Part V we assess opportunities and problems in this field for developing countries over the next 10 years.

This is not strictly a research report. It provides what we hope is a readable and richly descriptive account of experience, coupled with careful and critical analysis of the context against which

decisions must be taken regarding adoption of computers in schools in developing countries. We are not interested in 'selling' computers. We do want to inform those who may have to decide to spend very scarce resources on this technology and those who will need to use it. Indeed, we were delighted when Sri Lankan policy-makers informed us, as this book went to press, that our study had provided the impetus for a wider-ranging and more comprehensive national survey of their own.

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In Hangzhou, our co-workers were Mr Han Liang and Mr Zhang Xu-guang of No. 1 Middle School, Mr Sun Yong from Xue Jun Middle School and Mr Yan Zheng-wen of No. 4 Middle School. In Zhejiang Province, Mr Ma Shou-gen, Deputy Secretary-General, and Professor Chen Wenxiang, Vice-Chairman and Professor Tan Zugen, Executive Vice-Chairman of the Education Commission, smoothed our way, as well as Mr Xia En Gong, Deputy Director of the Commission and Mr Ji Tong, Principal, and Mr Gu Wei, Head of Computer Studies, both at No. 1 Middle School. Mr Zheng Zuhuang, Vice-Chairman (Planning and Finance) of the Education Commission, provided a full account of Commission policy.

Ms Liu Dailin, Lecturer in the English Department of the Chinese Radio and Television University in Beijing, and Mr Ye Zundao, Deputy Director, Foreign Affairs, Zhejiang Provincial Education Commission, very kindly translated our co-workers' reports and other documents.

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India. Dr Ashok Chandra, Ministry of Human Resource Development and members of his staff spoke freely about early stages of the CLASS project; the present director of CLASS, Dr A. K. Jalaluddin, and members of the team at NCERT were most helpful in showing us the project in action and in discussing issues it raised. We also wish to thank Mr Y. N. Chaturvedi, Joint-Secretary, Department of Education, Ministry of Human Resource Development, and Mr David Theobald of the British Council, New Delhi.

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Kenya. The Hon. Mr Peter Oloo-Aringo, Minister for Education, was informed of our study. Miss Jane Ayoo, Ofafa Jericho High School, Nairobi, and Mr Soman Mathew, Coast Girls' High School, Mombasa, volunteered to assist us. We also wish to thank Mr Jeremy Greenland, Programme Officer for Education in the Aga Khan Foundation, Geneva; Mr Brian Wray, Director, and Mr Ben Makau, Research Director, both of the Computers in Education Project, Aga Khan Education Service, Kenya, and Mr Ted Edmundson, British Council representative in Nairobi. Mr Salim Versi, Programme Officer in the Aga Khan Education Service, kindly gave us permission to quote his article 'A Day in the Life of the Aga Khan Academy Resource Centre'.

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Mauritius. Our co-workers were Mr Sivananden Sungeelee, of Dr Maurice Cure Government Secondary School, Mr Khodabaccus, of Professor Hassan Ruffa State Secondary School, Terre Rouge,

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Singapore. Mr Loh Kong, Assistant Director, Computer Education Section, Department of Educational Technology, Curriculum Development Institute of Singapore, and his staff provided much useful information, as did Dr Wong Khoon Yoong, Acting Head, Department of Mathematics Education in the Institute. Ms Jee Ho permitted us to refer to her Bath University MEd thesis.

Sri Lanka. We were fortunate to have Professor V. K. Samaranayake, Chairman of the Computer and Information Technology Council of Sri Lanka, to coordinate the work in his country and to write an account for us of policy and practice at national level. Our co-workers were Mr D. Anura Jayalal, of Viraketiya Central College, Ms K. P. Manel C. Manage, of the Anula Vidyalaya Computer Centre, Nugegoda, and Ms A. G. N. Dias, Assistant Principal of the Girls' High School, Kandy.

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Zimbabwe. We could not have written up developments in Zimbabwe without the help of Mr Chris Blake, formerly of the Curriculum Development Unit in the Ministry of Education, and latterly in charge of computer education at Peterhouse School. He volunteered to provide us with published documents from several sources. Emeritus Professor Cyril A. Rogers, sometime Dean of Faculty of Education at the University of Zimbabwe, lent his support to our efforts to work through the Ministry. The Minister for Primary and Secondary Education, Comrade Fay Chung, gave approval in principle, but we were unable to contract co-workers in the time then remaining for the study.

In London and Paris. From the start, we benefited from the enthusiasm of Mr Michael Wills, Secretary of the Harold Macmillan Trust, and we are grateful to the Trustees for the grant made to the Open University for the study. We received encouragement

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John Radcliffe. We started this project with John Radcliffe, who worked for many years as a producer of educational television programmes for the BBC. He was for four years Executive Producer of the highly successful BBC Computer Literacy Project. He is now Head of the BBC Open University Production Centre. He has consulted on the Indian Computer Literacy Project, and in Brazil and Sri Lanka. We were very sorry indeed when pressure of BBC work forced him to drop out of the authoring team. For this study he worked with us on much initial planning and contacts, and visited Mauritius to set up our work there.

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Part I
Context

1 Are Computers needed in Developing Countries?

Are computers needed to satisfy the social and economic needs of developing countries? It is certainly true that governments of many of these countries have decided that computers are essential. Why have they done so? Why have computers entered the national economies of industrial nations so rapidly and pervasively? Are developing countries merely being forced to follow suit, or do they have their own reasons for using computers? In this introductory chapter we approach such questions and consider what functions computers serve in developing countries, what structures are needed for their introduction and what kinds of problems occur.

CREATIVE GALES OF DESTRUCTION

'Creative gales of destruction' are sweeping the economies of industrial countries, according to Schumpeter's (1939) classic study. These storms are accompanied by radical and pervasive changes, particularly in the technological foundations of industry and commerce. Schumpeter called them long cycles of innovation, because they occur over decades. Freeman (1987, 1988) refers to them as a series of new 'techno-economic paradigms, a concept first expounded by Perez (1985). Others have simply called them revolutions.

The latest gales to batter industrial economies are those of information technology, a combination of developments based on computers but including communications. Information technology is pervasive: it penetrates all sectors of these economies, creating new jobs and destroying others, obliterating many activities and enhancing many, requiring less energy than older technologies and using new materials. Freeman (1987) suggests that information technology provides for rapid changes in product and process design, close integration of design, production and procurement functions; reduced significance of economies of scale previously