The South African Institute of Computer Science
and
Information Technology

The 1997 National Research and Development Conference

Riverside Sun
Vanderbijlpark
13 & 14 November

Hosted by

Potchefstroomse Universiteit
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The Department of Computer Science and Information Systems
Potchefstroom University for Christian Higher Education
Vaal Triangle Campus

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PROCEEDINGS

Edited by L.M. Venter & R.R. Lombard

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and
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Proceedings

of the

The 1997 National

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Conference

Towards 2000

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The views expressed in this book are those of the individual authors

Foreword

This book contains a collection of papers presented at a Research and Development conference of the South African Institute of Computer Scientists and Information Technologists (SAICSIT). The conference was held on 13 & 14 November 1997 at the Riverside Sun, Vanderbijlpark. Most of the organization for the conference was done by the Department of Computer Science and Information Technology of the Vaal Triangle Campus, Potchefstroom University for Christian Higher Education.

The programming committee accepted a wide selection of papers for the conference. The papers range from detailed technical research work to reports of work in progress. The papers originate mainly from Academia, but also describe work done in and for Industry. It is hoped that the papers give a true reflection of the current research scene in Computer Science and Information Technology in South Africa. Since one of the aims of the conference is Research development, the papers were not subjected to a refereeing process.

A number of people spent numerous hours helping with the organization of this conference. In this regard, we wish to thank the members of the Organizing committee, and the Programming committee who had very little time to screen the abstracts and compile the program. A special thanks goes to the secretary of the department, Mrs Helei Jooste, whose very able work was interrupted by the birth of her first child.

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USING MULTIMEDIA TECHNOLOGY FOR SOCIAL UP-LIFTMENT IN DEPRIVED COMMUNITIES OF SOUTHERN AFRICA

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EXTENDED ABSTRACT

Introduction

In recent years individualized instruction and the use of computer technology to facilitate learning at all levels of education and training has received increased emphasis. The use of computers in education has been widely suggested as a possible solution to the considerable educational problems which face South Africa. Education is concerned with helping people be both more autonomous and more responsible to society in their choices. Education has for many years been provided along segregated lines. The challenge for people of South Africa is to offer education for all those who have been denied learning over the years.

Many countries, developed and underdeveloped, are looking to computer-based instruction (CBI) as means of maximizing the impact of the amount of money spent per-pupil. CBI refers to computer -presented instruction that is individualized, interactive, and guided. Instructional technologies, such as telecommunication and computers, hold great promise as a means of increasing education cost efficiencies.

South Africa, and very much Southern Africa, is in a process of change. Many people live in deprived socio-economic circumstances in their communities with a very low living standard. Basic knowledge, education and skills are lacking and therefore self-improvement is difficult. The type of education that is needed urgently in these deprived communities include: basic health care, child care, literacy skills, basic education, etc. South Africa spends billions of rands a year on health care - but it's people are far less healthy than in comparable countries. Developing countries are struggling to improve health care and enhance the quality of life for their people. Education is essential and is seen as an affective tool in long range development.

It is not easy to improve the knowledge and skills of the people living in deprived communities, because of poverty and lack of communication skills. A further problem is that very few institutes are active in educating these deprived people, mainly because of lack of funds, manpower and equipment. The solution is to take education to these communities and offer it to them in an easy, basic format to use when desired. The lack of skills forms a major obstacle to the development of a modern economy able to support a decent living standard for all our people. Educating these people will definitely contribute to uplifting the socio-economic circumstances and basic way of life. Modern technology, re multimedia technology, can be used with great success to address these problems. Multimedia is the integration of graphics, animation, text, sound, and video with the interactive power of the computer.

Why use multimedia? Multimedia brings to bear dynamic visual information. We, as human beings, process that data very efficiently. The power of visual information combined with interactivity allows every person to discover knowledge in the pattern that fits their paradigm for

learning - the way they learn best, individualized. Zero travel time, flexible scheduling, self-pacing, high retention, continuous availability, and a non-threatening learning environment are all positive benefits of this technology-based learning.

It is important to provide opportunities for people to develop themselves in order to improve the quality of their own lives and the standard of living of their communities.

Educating through multimedia

The aim of the project was to determine in what way multimedia technology could be used for the up-liftment of people living in underdeveloped communities in South Africa. The first step was to determine, in conjunction with local communities which type of basic educational programmes are needed within the communities. Primary health care was identified as an important sector where training and education is needed and the primary health care services in Port Elizabeth were approached. Through their involvement it was determined that one of the priority areas in Port Elizabeth, and indeed in the Eastern Cape regarding primary health care, is the treatment and prevention of Tuberculosis (TB). The multimedia program was therefore developed around the subject of TB.

In order to determine whether multimedia technology could be used for educational purposes, the multimedia programme had to be evaluated. The objective of the evaluation was to determine whether the technology had a positive impact on the level of knowledge, and with what level of ease the respondents could adjust to and learn to use the technology.

The test group where the programme was evaluated was accessed through the Zwide Clinic in Port Elizabeth. The respondents were selected from a list of patients on a random basis. All the respondents were Xhosa speaking, although all but two could be communicated with in English or Afrikaans. The age of the respondents ranged from 22 - 74 years. The highest qualified respondents fell in the std 8-9 group with approximately 72 % being below functional literacy level, i.e. with less than 7 years of schooling. All the respondents had no previous training or knowledge of computers.

Pre-tests were conducted with the respondents to determine their knowledge on TB and their experience with computers. This was done approximately one week before they became involved in the programme. The multimedia program was then installed at the Zwide Clinic. The programme was run over two weeks, with the respondents having been divided into two groups of which each group had access to the programme for one week. Observations were conducted on a daily basis so that the behaviour of the respondents towards to technology could be monitored and change over time be accessed. The respondents were also divided in terms of two different technologies, viz touch screen and "mouse", so that it could be accessed whether there would be a significant difference between the two regarding the results obtained.

As mentioned earlier, the sample consisted of TB patients who had to visit the clinic on a daily basis. They were requested to visit the program and run through it at least once a day, for the week. The post-test was conducted approximately one month after completing the programme. The lapse of one month was allowed to compensate for the role that short term memory could play in the learning process, as the longer term effect was deemed of greater importance. There were thus two levels at which the programme was assessed, viz the change in behaviour of the respondents while operating the technology, and equally importantly the extent to which knowledge increased.

Conclusions

In all aspects, namely the transfer of knowledge, the coping with the computer technology and the way in which the respondents experienced the programme, positive results were obtained. There appears to be no statistically significant difference between the "mouse" technology and the touch screen, which indicates that both technologies can be used with equal success.

The extent of the positive results is a clear indication that there are grounds to believe that multimedia technology can be used with success in educational programmes aimed at computer illiterate people, even though their general literacy level may be low. It is recommended that there is enough grounds to proceed with further in-depth research in the utilising of multimedia computer technology in developing and presenting educational programmes to computer illiterate people. It is necessary to include a larger sample and to research in more depth such aspects as use of language, the manner in which instructions should be given, the use of colour codes Vs images, etc. With the new age of technology and information it has become imperative that these technologies be utilised in reaching out and educating the population. With the positive results obtained in this project, it is clear that further funds should be secured to further the research and enable the further development of other educational programmes.