

IT Implementation in ITE in the Limpopo Province (South Africa): A Dream or Reality?

Ratau John Monobe

University of Venda (Thohoyandou), Sibasa, South Africa

This paper describes the results of a survey about the most critical issues facing the implementation of IT (information technology) ITE (initial teacher education) in all the HBUs (historically black universities) in the Limpopo Province of South Africa. Over 250 responses were received and both universities in the Limpopo Province were represented. Reactions showed that the most critical problems were associated with access to IT equipment, prior learning, rapid technological change, the gap between pre-service and in-service education, gender bias and the age gap, the lack of accommodation for housing computers, the lack of planning, the lack of genuine sponsorship that can sustain the innovation, the lack of expertise in purchasing, the lack of appropriately trained IT teachers, the lack of IT integration in the classroom by teachers, the lack of consensus about the use of IT, the fear for innovation by teachers, budget controllers for IT, and the lack of stability by heads of institutions and the fluctuating budget from government. There were interesting recommendations which included resources should be bought, undergraduate programmes should offer computer literacy, outdated computers need to be provided to help student teachers, IT needs to be demystified through the involvement of both sexes, computer laboratories need to be established within the Faculties of Education, coordination between universities and government is needed, careful analysis of sponsorship need to be done, education planners need to be knowledgeable, curriculum for student teachers should include IT as a compulsory module, there is a need for consultation and cooperation between faculties and schools of education and computer centers and budget controllers need to know the importance of IT in teacher education.

Keywords: implementation, IT (information technology), ITE (initial teacher education), historical universities

Introduction

Many countries around the world are taking action to ensure that their educational systems are updated especially in as far as IT (information technology) is concerned. There have been a number of policy makers world-wide who recognized the fact that teachers needed to be trained for technology to take off (Davis, 1997, p. 1). Hoffman (2000, p. 56) and Duhaney and Zemel (2000, p. 67) saw the biggest hurdle for policy makers and those who are keen to see IT being implemented in TE (teacher education) as the unpreparedness of many teachers to use technology to support their classroom activities.

IT has a number of uses and benefits in education. Yildirin (2000, p. 479) believed that almost all jobs in the 21st century will involve computers in one way or another. It is, therefore, important that pre-service teachers should have appropriate IT training during their initial teacher training programme. For this reason,

teachers need to be skilled in the use of technology if they are to satisfy their learner's needs for the coming century. Ingwerson (2001) emphasized that: "... it is our ongoing challenge to deploy the benefits of technology in a creative that fully supports the needs of classroom teachers. We believe our children's future depends on it".

However, it is also important to note that computers are here to stay and that they must be used to the benefit of everyone in education. That is why it is important that teachers-to-be should be initiated into the use of computers as matter of urgency.

The Role of IT in Overcoming Educational Legacies in Rural Areas

The inclusion of IT in the curriculum in South Africa started to make inroads in ITE (initial teacher education) even before 1989 in historically white, Indian and colored universities (Sarinjewe, 1991, p. 201). HWU (historically white universities) are comparable to those of developed countries (Hodge & Miller, 1997, p. 20). However, the HBUs (historically black universities) have continued to offer initial teacher training programmes without IT in their curriculum. The HBUs are more badly resourced in general and only a handful of them are thinking in terms of introducing IT in TE (Hodge & Miller, 1997, p. 19). Most of these universities are situated in remote areas with a consequence lack of sponsorship.

These universities are mostly surrounded by black schools that lack resources, such as computers, proper computer laboratories and the manpower to implement IT where resources are available. Electricity and telephones have installed in the majority of schools, but because of lack of funding these resources cannot be used to the fullest. A recent development has been the connection of schools to the internet, under the umbrella of SA (South African) schools' network (Hodge & Miller, 1997, p. 19). It is hoped that this venture will access schools with information that is difficult to acquire without the Internet. However, it remains to be seen as to whether this will cover the majority of rural schools.

The foregoing discussion has raised a number of questions with respect to the implementation of IT in ITE in South Africa. These questions suggest that serious problems exist in the implementation of IT in ITE in HBUs. The respondents of this study consist of the lecturers in the faculties of education, student teachers, and deans in the faculties of education and IT directors and their staff at these universities. The decided to use the questionnaires for student teachers, lecturers were also given the questionnaires and deans and directors at computer centers were interviewed. It is, therefore, acknowledged that there is a need for IT training of student teachers at universities. On the basis of this discussion, the main reasons that hinder the implementation of IT in ITE were investigated.

Drawbacks in the Implementation of IT in TE

On the basis of the discussion in the previous paragraph, the main reasons that cause the drawback in the implementation of IT in SA schools can be underlined. The following are some of the findings that impact on the implementation of IT in TE.

Access to IT Equipment

In almost all HBUs, the issue of access has always being a problem as students battle to gain access IT laboratories. The successful implementation of IT must be accompanied by the access to computers and more often than not and this is not the case. Metrowich (1989, pp. 24-26) believed that "The cost-effective use of computers necessitates their use for a large part of the educational day" and this brings about the problem of

supervising the computers for the time that the laboratory will be open. In a study conducted by Monobe (2001, p. 132) in the Limpopo Province about the training of IT in ITE at the two residential universities, almost 100% of student teachers who responded said that there was no computer laboratory in the faculties of education, which meant that accessibility of the computer laboratories depended on somebody outside the faculties of education, and almost 70.3% of the respondents reported that there were no computer at the schools where they did teaching practice. This has implications that the student teachers would not be able to practice IT skills during practice.

Prior Learning

As a general rule, prior learning for any new learning helps in study conducted by Watson (1997, p. 255) in Australia, it was discovered that students entering a teacher-training course saw themselves as having low IT skills. This becomes a hindrance in the proper implementation of IT. Somekh and Davis (1997, p. 154) reported in their survey that students teachers that lacked the general initial skills “physically apprehensive of computers”. This is a problem in schools and institutions that deal with large classes. This, therefore, requires painstaking arrangement by the trainer and even sacrifices by those lecturers whose student teachers do not have the necessary prior learning for IT. It is easier to introduce computers to learners who have prior knowledge from primary throughout secondary schools. In a study conducted by Monobe (2001, p. 150), almost 85.5% of student teachers who responded said they did not have any computer literacy experience by the time reached their final teacher’s certificate at the university. This to some extent influences their understanding and how they can implement IT schools.

Rapid Technological Change

Muller (1989, pp. 76-77) and Taylor (1997, p. 235) concurred when they said that the technological development is rapid that it inhibits real commitment to the implementation of IT and whatever is bought today may be out of date within a short space of time. Baron and Bruillard (1997, p. 242) were worried that new technologies always supersede newer ones without having expressed all their potential. This becomes a very serious hurdle in historical black institutions that struggle to get equipment that become outdated after a few years. The problem is that all these institutions buy expensive computers, but they become outdated before they could be used to full capacity. This is because lecturers are not given the necessary professional development in IT. This, of course, leads to computer upgrading becoming too expensive.

The Gap Between Pre-Service and In-Service Education

Goodwyn, Clarke, and Adams (1997, p. 228), Makrakis (1997, p. 158), Baron and Bruillard (1997, p. 242), Scheffler and Logan (1999, p. 305) and West (1999, p. 16) agreed that although teacher education provides student teachers with a reasonable knowledge of IT, the great majority of serving teachers are still unskilled and are still to be convinced of the value of IT. Student teachers may get all the necessary training at the university, but they still need to do teaching practice at schools. For this reason, every IT knowledge acquired at the university will need to be put into practice at schools and this invariably, according to Watson (1997, p. 257) requires experienced trainers. The great differences that exist between schools and teacher training institutions are on factors, such as knowledge on IT and resources available at university colleges and schools (Baron & Bruillard, 1997, p. 242). Trained teachers and resources need to be available at schools to help student teachers acquire the necessary skills and knowledge.

Gender Bias and the Age Gap

Gender differences may have an impact on teacher uptake of IT. The problem is that computers are seen as the domain of males (Hawkridge, 1983, pp. 176-178; Martin & Hearne, 1989, pp. 47-51). This is exaggerated by the mathematical associations that computer subjects have for this reason, the implementation of IT may take some time. The discouraging issue discovered by Wishart (1997, p. 279) is that female student teachers see themselves as less able to deal with IT than male student teachers. The other very interesting aspect is that older men were found to be more likely scared of using a computer (Wishart, 1997, p. 281) and children are inclined to accept computers better than older people (Martin & Hearne, 1989, pp. 47-51).

Lack of Accommodation for Housing Computers

One of the biggest problems of implementing IT at initial teacher training is that the cost of establishing a computer laboratory is so high. This raises concerns about the cost effectiveness of such projects (Moja, 1991, p. 57; Mutshekwane, 1995, p. 299; West, 1999, p. 16), especially if the project is aimed at achieving the same goals that conventional teaching could achieve. This is exacerbated by the problem that IT is not necessarily a top priority in historical black rural universities which do not even have some of the basic necessities, such as classrooms, toilets, desks, libraries and others.

Lack of Planning and Lack of Computer Literacy Policy

The use and implementation of IT in ITE need proper planning and according Moja (1991, p. 58) "Despite good intentions of promoting and encouraging development", most projects are planned in rush in order to meet certain deadlines. Marshall (1993, p. 20) warned that when innovation is introduced, care should be not taken to over-sell this to users, as failure might lead to disillusion. This is evident when lecturers who were asked as to whether there was any IT policy, 88.9% of lecturers who responded said there was no computer literacy.

Lack of Genuine Sponsorship That Can Sustain the Innovation

The most worrying factor is that of sponsors. This comes about when sponsors are in favor of the innovation and they become very powerful sources for change. These sponsors usually provide the resources and can generate interest where there was none (Marshall, 1993, p. 19). However, sponsors have certain vested interest in an institution and once that disappears they also vanish into thin air. This leaves the institution that depended on such a sponsorship in order to implement IT helpless (Moja, 1991, p. 58).

Lack of Expertise in Purchasing

The Department of Education or universities sometimes purchase equipment without the necessary expertise and proper research about the product having been done (Briel, 1976, pp. 157-190; Muller, 1989, p. 77; Moja, 1991, p. 58). The lack of knowledge about software, time constraints and the lack of vision of IT potential for teaching are some of the constraints related to training (Makrakis, 1997, p. 158; Gonzales & Thompson, 1998, p. 164; West, 1999, p. 4). This leaves the department or university with outdated equipment gathering dust in storerooms.

Lack of Appropriately Trained IT Teachers

One of the inhibiting factors is lack of appropriately trained IT teachers or lecturers (Moldstad, 1975, p. 1; Briel, 1976, pp. 157-170; West, 1999, p. 16; Basinger, 1999, p. 24). This is worsened by the fact that IT is taught by teacher trainer with minimal pedagogical and educational computing education (Makrakis, 1997, p. 158). Brady (1993, p. 64) found that the lack of interest on the part of lecturers and weak knowledge of

computers were seen as significant barriers to better integration of IT into the curriculum. In this study, 80% of the respondents did not believe that lecturers in different faculties could use computers effectively. Almost 97% said that they did not have any training in computer literacy in their training as teachers.

Lack of IT in the Curriculum for TE

In other institutions, IT is not a part of teacher preparation and as a result new teacher graduate with limited knowledge on the integration of IT in the classroom (Baron & Bruillard, 1997, p. 242; Gonzales & Thompson, 1998, p. 163). This is the more so HBUs where an emphasis on IT is a new thing for trainers and student teachers. About 97.2% of student teachers indicated that they did not have computer literacy as a subject in their training.

Lack of IT Integration in Classroom by Teachers

Student teachers require lecturers to integrate IT in solving problems for classroom and school organization (Baron & Bruillard, 1997, p. 250). Lecturers should be seen to be integrating IT in their own teaching. According to Baron and Bruillard (1997, pp. 250-251), the difficulty of use in standard classrooms is certainly a very limiting factor; tutors do not use IT very often and are not convinced that it is important to show IT to trainees during the pre-service period. Wild (1998, p. 7), West (1999, p. 16) and Vannata and Beyerbach (2000, p. 132) were concerned that this is worsened by the fact that the majority of teacher preparation programmes concerning IT are weak because most teacher educators are themselves novice users of IT. This becomes evident as about 93.8% of the students said that lecturers and teachers did not have any theoretical knowledge on how a computer works in teaching.

Lack of Consensus About the Use of IT

In some institutions, IT is not used, because it has not prescribed by education authorities resulting in lack of consensus about its use (Baron & Bruillard, 1997, p. 243). Its use depends on the initiative of the institution and this means that IT can only spread where there is a strong agreement about its use in teacher education. This becomes very difficult as many teachers see IT as a threat to traditional literacy and especially to books although this is diminishing amongst new entrants to the profession (Goodwyn et al., 1997, pp. 228-229). This attitude, however, poses a problem for its implementation. One question which all respondents agreed on is the lack of consensus among faculties, computer centers, deans, lecturers and student teachers. This becomes one of the major hindrances in the introduction of IT in faculties of education.

Fear for Innovation by Teachers

Lecturers and teachers will have to battle with the secret fears that those who use IT are experts. It is, however, important that the mentoring team should help them feel they "belong to the broader community" of those committed to using IT and not because they are talented users but because they see the educational benefits for their learners (Gonzales & Thompson, 1998, pp. 169-170). The problem of computer phobia/techno-phobia was indicated as a serious as some members of staff were said to own computers that they did not even touch.

Budget Controllers for IT

Budget controllers can affect the scope and support for computer use. Members that support the budget in the faculty/school can have a positive impact or negative one depending on their attitude. These staff members can support an innovation and speed up changes. They have access to funds and equipment and can support an

innovation. On the other hand, they can slow down and divert funds to other projects that are close to their hearts (Marshall, 1993, p. 19) and especially where there is not enough hardware to enable them to continue accomplishments with technology (Brady, 1993, p. 64). Heads of departments indicated that the increase in budget is a must for the introduction and implementation of IT in ITE.

Lack of Stability by Heads of Institutions

Heads of institutions that are well traveled bring along a number of innovations with them and stimulate enthusiasm for changes in their institutions (Marshall, 1993, p. 18). However, they do not stay long enough in one place and as soon as they fall out of favor with that management of institutions their contracts are not renewed.

Fluctuating Budget From Government

Government funding for change often fluctuates each year and sometimes institutions that need funding the most are under-funded and sometimes institutions are given too short a time to accomplish their goals. The politics of government agency staffing and changing agendas of successive presidents means that "politically astute" principals quickly learn how to attract government funding even at the expense of abandoning successful projects in their institutions (Marshall, 1993, p. 20). The funding policy of the government makes it impossible for historically disadvantaged institutions to get enough funding for innovation.

These are just some of the major problems which hinder the implementation of IT at initial teacher training institutions. These could break or make the implementation of IT in ITE depending on the availability or non-availability of such a resource.

Suggested Solutions for Improvement

The discussion of the areas in which the major drawbacks occur provided, indirectly, the suggested solutions for improvements of IT implementation in South Africa are summarized as follows:

(1) Resources, such as computer laboratories, computers, software and a good support service staff should be provided. This should not only be provided but also should be made accessible to student teachers for them to have meaningful practice. This means properly organized timetables;

(2) As a general rule, prior learning for any learning helps. Therefore, student teachers are expected at least to have a general knowledge about IT from home or elsewhere. Undergraduate programmes should as a general offer computer literacy. This will help to greater extent in improving IT implementation for ITE;

(3) Although there is growing rapid technological change, a comforting view is that new technologies will always be based on previous ones and even the most outdated may serve as a foundation for IT implementation of IT;

(4) Student teachers may get all the necessary training at the university, but they still need to do teaching practice at schools. For this reason, IT knowledge acquired at the university will need to be put into practice at schools and this invariably, according to Watson (1997, p. 257) requires experienced trainers. Trained teachers and resources need to be available at schools (Baron & Bruillard, 1997, p. 242);

(5) More and more women are joining the teaching profession and the profession is becoming female dominated. This suggests that a more positive attitude should be developed in student teachers so that they also enjoy positive experiences with IT. The use of information technology will depend on the extent to which IT is demystified through the involvement of both sexes and in this way, every member of the institution has to be

involved in the planning and implementation of IT;

(6) The important implementation principle of IT in ITE is that resources determine the introduction of IT in ITE. The provision of computers must go hand in hand with the type of building in which these computers will be housed. While computers are important, computer laboratories need to be built, so that facilities for the network could be easily installed. This also means the computer laboratories, need to be secured properly so that the possibilities of vandalism and theft should be minimized;

(7) There is a need for proper planning when IT implementation is to be effected. Training institutions and teacher education needs to jointly do planning. Universities can create their own practice teaching schools; while on the other hand, the government can create a conducive environment for the implementation of IT. But this can only be done if there is coordination between universities and the government;

(8) Sponsorship should not be refused, but careful analysis of how it will be done in specific skills concerning IT and provision should be made for skills to be passed on to every staff member (Moja, 1991, p. 58). There is a need for lecturers and teachers to be trained in specific skills concerning IT and provision should be made for skills to be passed on to every staff member. It is, therefore, compulsory that everyone should be involved in planning the use of IT in ITE so that there should be effective implementation of IT in universities and schools;

(9) Education planners need to be knowledgeable, and planners and technology experts are not necessarily experts in designing and developing the curriculum. It is, therefore, compulsory that everyone should be involved in planning the use of IT in ITE so that there should be effective implementation of IT in universities and schools;

(10) Lecturers of student teachers at these institutions should be trained and retrained in the use of IT before access to computers is made. This could be done by having both short and long-term in-service training courses offered by experts within the university and by outsourcing where there is a need. This means that lecturers should be trained so that they can be comfortable with IT. The starting point will be to train lecturers in computer literacy and allow them to proceed with other advanced modules. For the success of IT implementation in ITE, lecturers and professors should be willing to be trained by even the most junior member of staff if they have the necessary expertise. The success of IT will depend on the supply of appropriately qualified lectures helped by an excellent in-service education. Training would also solve the problem of computer-phobia amongst staff members. The lack of knowledge on how to use equipment creates this computer-phobia;

(11) The curriculum for student teachers should include IT as a compulsory module in their programme. IT teaching and learning should be integrated into other subjects in the post-graduate teacher training programme and should not be limited to IT classes only. This means that IT teaching must focus on the integration of IT teaching and learning;

(12) Lecturers need to demonstrate how to integrate IT in the teaching learning situation. Student teachers require lecturers to integrate IT in solving problems for classroom and school organization. This suggests that lecturers should be seen to be integrating IT in their own teaching. Student teachers must be taught in the way lecturers expect them to teach and the lecturers must practice the kind of teaching methods they expect the student teacher to use in his/her teaching;

(13) For the effective implementation of IT at initial teacher training institutions especially in HBUs, there is a need for consultation and co-operation between faculties/schools of education and the computer centers.

Involvement of stakeholders (parents, student teachers, senate, and council of the university, former students, industry and sponsors) is required for the successful implementation of IT;

(14) The fear for innovation can be significantly reduced by proper training for lecturers. If lecturers understand most of the dos and don'ts of IT, they will accept innovation;

(15) Budget controllers can affect the scope and support for computer use. Deans that support the budget in their faculties can have a positive impact on the implementation of IT in their faculties. This, then, can make lecturers more effective as technology using educators;

(16) Good conditions of service need to be put in place for well traveled managers of faculties. For this reason, managers who come with innovation should be motivated to see through their contracts;

(17) Government funding for change need to be consistent with the policies for the implementation of IT. Government policies for education need to be followed up, even if new presidents are appointed. This means that good policies that were formulated in the past by the ministry need to be accomplished.

The implementation of these suggested recommendations could be practical as long as the deans at previously disadvantaged universities realize the importance of IT in ITE and how powerful IT can be in improving lives of many ordinary people in South Africa.

References

- Baron, G. L., & Bruillard, E. (1997). Information technology in French education: Implications for teacher education. *Journal of Information for Teacher Education*, 6(3).
- Basinger, J. (1999). Colleges fail to show teachers to use technology. *Chronicle of Higher Education*, 45(27), 24.
- Brady, H. (1993). New survey summarizes what top technology teachers have learned. *The Technology Age Classroom*. Oregon: Franklin, Beedle & Associates.
- Briel, R. M. (1976). An overview of audiovisual training in provincial institutions in the Transvaal (Master's thesis, Pretoria: Unisa).
- Davis, N. (1997). *Strategies for staff and institutional development for IT in education: Using information technology effectively in teaching and learning*. London: British Library Cataloguing in Publication Data.
- Duhaney, D. C., & Zemel, P. C. (2000). Technology and the educational process: Transforming classroom activities. *International Journal of Instructional Media*, 27(1), 67.
- Gonzales, C. L., & Thompson, V. (1998). Reciprocal mentoring in technology use: Reflecting with a literacy educator. *Journal of Information Technology for Teacher Education*, 7(2).
- Goodwyn, A., Clarke, S., & Adams, A. (1997). The future curriculum in English and IT: How teachers and student-teacher view the relationship. *Journal of Information Technology for Teacher Education*, 6(3).
- Hawkridge, D. (1983). *New information technology in education*. London: British Library Cataloguing.
- Hodge, J., & Miller, J. (1997). *Information technology in South Africa: The state-of-the art and implications for national IT policy* (Working paper No. 3 University of Cape Town: Development Policy Research Unit). Retrieved from <http://www.sn.apc.org/nitf/dpruwp.htm>
- Hoffman, A. (2000). Technology built for teachers. *The Journal*, 28(3), 56. Retrieved from <http://globalvgw.epnet.com/fulltext.asp?>
- Ingwerson, D. (2001). *Improving student achievement through technology*. Committee on Education and the Workforce.
- Makrakis, V. (1997). Perceived relevance of information technology courses to prospective teachers' professional needs: The case of Greece. *Journal of Information for Education*, 6(2).
- Marshall, G. (1993). The politics of educational change: Cautionary tales from the past. *Technology age classroom*. Oregon: Franklin, Beedle & Associates.
- Martin, B., & Hearne, J. D. (1989). Computer equity in education. *Educational Technology*, 29(9), 47-51.
- Metwovich, J. P. (1989). The implementation of computers in education for blacks (pp. 24-26). *The challenges: First South African Conference on Educational Technology*. Pretoria: HSRC.
- Moja, T. (1991). Educational technology: The politics of exclusion. *Matlhasedi*, 10(1).

- Moldstad, J. A. (1975). Role of technology in the improvement of instruction (pp. 1-11). *Viewpoints*. Indiana: Indiana University.
- Monobe, R. J. (2001). The use of information technology in initial teacher education in historically black universities in the Northern Province (Unpublished doctoral dissertation, University of Johannesburg).
- Muller, A. (1989). Strategic considerations in the implementation of educational technology in education and training. *First Southern African Conference on Educational Technology*. Pretoria: HSRC.
- Mutshekwane, A. M. (1995). Computer based learning and teaching of the post secondary geography. Proceedings of the *Conference of Educational Media Institute of SAARDHE*. Pretoria. September.
- Sarinjewe, D. (1991). *The computer in the classroom-from I to WE: Computers for transformation in education*. Plumstead: Wyvern Publications.
- Scheffler, F. L., & Logan, J. P. (1999). Computer technology in schools: What teachers should know and be able to. *Journal of research on computing in Education*, 31(3), 305.
- Somekh, B., & Davis, N. (1997). *Using information technology effectively in teaching and learning*. London: Routledge.
- Taylor, C. (1997). *Organizing IT resources in educational institutions: Using information technology effectively in teaching and learning*. London: Roulledge.
- Vannata, R. A., & Beyerbach, B. (2000). Facilitating a constructivist vision of technology. Integration among education faculty and preservice teachers. *Journal of Research on Computing*, 33(2), 132.
- Watson, G. (1997). Pre-service teachers' views on their information technology education. *Journal of Information Technology for Teacher Education*, 6(3).
- West, G. B. (1999). Teaching and technology in higher education: Changes and challenges. *Adult Learning*, 10(4), 16.
- Wild, M. (1998). Creating a role for performance support systems in teacher education. *Journal of Information Technology and Teacher Education*, 7(2).
- Wishart, J. (1997). Initial teacher training students' attitudes to use of information technology and individual technology and individual locus of control. *Journal of Information Technology for Education*, 6(3).
- Yildirin, S. (2000). Effects of an educational computing course on pre-service and in-service teachers: A discussion and analysis of attitudes and use. *Journal of Research on Computing*, 32(4), 479.