Intel® Teach to the Future Programme South Africa Year One Evaluation Report

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SchoolNet South Africa and the Intel® Teach to the Future Programme in South Africa

By
Neil Butcher and Associates[1]

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CONTENTS

EXECUTIVE SUMMARY

The Intel® Teach to the Future programme was launched in South Africa in January 2003. In July 2003 an independent evaluator, Neil Butcher and Associates, was appointed to conduct the evaluation for the first year of the programme. The first phase of the evaluation, of which this report is the final output, took place from July 2003 to January 2004. Phase one of the evaluation was designed to explore the range of schooling contexts in South Africa in order to understand factors supporting and impeding Intel® Teach to the Future in South Africa at the school level. In addition, the background of Intel® Teach to the Future in South Africa has been documented and the implementation model of the programme assessed.

The evaluation research had three overall objectives, being to:

1. Document and assess the implementation of the Intel® Teach to the Future programme across a range of schooling contexts within South Africa;
2. Assess the extent to which the aims of the Intel Teach to the Future programme are being achieved thus far; and
3. Develop an evaluation plan for year two of the project that focuses on impact.

The following three research questions were asked in the South African Intel® Teach to the Future year one evaluation.

1. How is the Intel® Teach to the Future programme implemented in a range of South African schooling contexts?
2. What are the experiences (positive and negative) of participants (project management, senior facilitators, facilitators, and educators) in the programme?
3. What opportunities and pitfalls can be identified in implementation of the Intel® Teach to the Future programme?

A case study approach has been adopted for this phase, focusing on eight schools in KwaZulu-Natal, Gauteng, and Limpopo provinces. The schools were chosen to represent as wide a range of South African schooling contexts as possible. This means there is a mix of rural, urban, and peri-urban schools, a range of socio-economic contexts, and a spread of primary, secondary and high schools. In addition, the community centre model of computer provision is included in the case study sample. The case studies have been documented in detail and provide rich contextual descriptions of how the Intel® Teach to the Future programme is being implemented at the school level. In addition to the case studies, pre-training questionnaires, and post-training questionnaires completed by educators and facilitators have been analysed.

At the time of writing this report,[2] 347 schools had been accepted into the programme and 36 had been rejected. In addition, 250 facilitators had successfully completed training, and 237 potential facilitators had indicated their interest to be trained. Further, 426 educators had successfully completed training, 1102 were taking part in training programmes, and 84 educators had dropped out.

[2] As per Intel® Teach to the Future South Africa database, available at http://teach.schoolnet.org.za, 29/01/04. It should be noted that participants in the Northern Cape are not able to access the online database, thus these statistics do not include a small section of participants.

Overall, this evaluation research has shown that the Intel® Teach to the Future programme is regarded very favourably by those taking part in the programme. Much learning has taken place, and many educators who previously did not know how to use computers for teaching and learning now have a range of creative ideas and new skills. All participants reported increases in both their ICT skills and pedagogic understanding. In addition, awareness of the potential of computers and the value of linking technology and curricula has been raised at the educator and school levels. The Intel® Teach to the Future materials and educational approach are sound and are valued by participants.

In the post-training questionnaire, 82% of participants reported that the skills they learned would 'definitely' help them to successfully integrate technology into learners' activities. 92% will definitely recommend the course to a friend or colleague (and some noted in their optional comments that they already have). The facilitators and senior trainers were also highly rated. In no instance was a rating of 'poor' given, and most responses clustered in the 'good' and 'excellent' categories. With respect to the pedagogical outcomes of the Intel® Teach to the Future training, 85% of respondents reported that the training focused on integration of technology into the curriculum to a 'great extent', 65% reported that training provided teaching strategies to apply with learners to a 'great extent', 76% felt that the course illustrated effective uses of technology to a 'great extent' and 64% noted that the training provided opportunities to collaborate with other educators to a 'great extent'. In addition, there were clear self-reported improvements after training for all ICT skills.

The case studies highlighted the range of contexts in which the Intel® Teach to the Future programme is being implemented in South African schools. The range of factors affecting the success of the Intel® Teach to the Future programme were evident. While all schools were very positive about the Intel® Teach to the Future programme, several challenges were also noted. The main challenges faced by schools include the time constraints of the training, the low levels of ICT skills of the majority of educators, and the poor ICT resource levels at many schools. The lack of sufficient computers is likely to remain a constraining factor for some time, as will the ICT skills and general educational level of educators. However, as efforts to develop ICT infrastructure and capacity within the education sector proceeds the importance of having educators trained at the level offered by Intel® Teach to the Future should not be underestimated. The Intel® Teach to the Future programme has an extremely valuable role to play – particularly in bringing technology and pedagogy together, and this value was recognised by all in the research process.

In general, the Intel® Teach to the Future programme was found to be most effectively implemented at the very well resourced independent school facing few of the same challenges as the majority of South African previously disadvantaged schools. A poor rural school was also doing very well with respect to conducting Intel® Teach to the Future training, however, many concerns were raised by educators about implementing what is learnt during training because of the poor ICT resources of the school. This contextual detail is essential as it helps to interrogate the assumptions underlying the Intel® Teach to the Future programme and also highlights that in South Africa there are many factors affecting implementation at the school level over which the Intel® Teach to the Future programme has little or no control.

In addition to factors over which the programme has little control, the findings have shown that the Intel® Teach to the Future programme in South Africa faces two main challenges to

success. These are the relatively low numbers of educators taking part and the overall low level of ICT skills (and general poor quality of educator training in the past) in the country, which means that the majority of educators taking part in the training do not come prepared with the requisite skills levels. There is a shortage of appropriate candidates to be trained as senior facilitators and as facilitators at the school level. Some facilitators fail to start training in their schools. In addition, the participating educators often come with lower than ideal levels of ICT skills. As a result, training at the school level takes place very slowly and the time commitment expected of both facilitators and educators becomes increasingly taxing. Recommendations for dealing with the low ICT skills levels included adding a module 0 that covers basic ICT skills; supporting schools to take part in other basic ICT training options; and to develop an online tutorial for educators who require additional support.

The case studies revealed that while all school principals were supportive of the Intel® Teach to the Future programme few were aware of exactly what the programme is about. Developing more active support at the school management level is important and may also help to encourage more educators to take part in training.

Although the complex education landscape in South Africa is a challenge to implementation, by bringing ICT skills and curriculum together, the Intel® Teach to the Future Programme is well placed to play a role in supporting the achievement of national ideals as reflected in the 2003 draft White Paper on e-Education. In fact, the Intel® Teach to the Future programme is listed in the draft White Paper as one of three professional development initiatives in the country supporting efforts to bridge the digital divide in schools.

INTRODUCTION

The Intel® Teach to the Future programme was launched in South Africa in January 2003. In July 2003 an independent evaluator, Neil Butcher and Associates, was appointed to conduct the evaluation for the first year of the programme. The South African Intel® Teach to the Future programme has adopted a phased approach to evaluation. The first phase of the evaluation, of which this report is the final output, took place from July 2003 to January 2004. Phase one of the evaluation was designed to explore the range of schooling contexts in South Africa in order to understand factors supporting and impeding Intel® Teach to the Future in South Africa at the school level. In addition, the background of Intel® Teach to the Future in South Africa has been documented and the implementation model of the programme assessed.

This report begins with a brief overview of the South African schooling context. The research design and methodology are presented next. This is followed by an overview of the Intel® Teach to the Future Programme in South Africa, outlining the implementation model and raising particular implementation issues of relevance. The report then presents findings from the evaluation research. These are structured as follows:

- Case studies;
- Pre-training results;
- Post-training results;
- Strengths and weaknesses; and
- Comments from participants.

Finally the report is concluded by a brief consideration of recommendations going into year two of project implementation.

SOUTH AFRICAN SCHOOLING CONTEXT

The South African education landscape is complex, with schools that differ widely with respect to resources, and management expertise, and educator capacity and commitment. Many of these differences are a legacy of the apartheid regime. In addition, provincial differences with respect to management capacity as well as financial status further complicate the situation. The extract below, taken from a report detailing the complexities of the South African situation, is important to consider when interpreting evaluation findings.

> South Africa is a unique country, even in the African context. It is widely, and accurately, regarded as the powerhouse of Africa, the wealthiest country in Sub-Saharan Africa, the most industrialized in Africa, and it produces some of Africa's, indeed the world's greatest innovations. Yet studies have exposed South African education's severe shortcomings, especially in Maths and Science teaching. The average South African educator is less qualified than those in many other African countries. The divisive political past of this country has resulted in the majority of the schools being badly under-resourced, under-supplied and over-crowded. Educators themselves have been disadvantaged through the lack of affordability of and accessibility to pre-service training. On the other hand, South Africa boasts of independent schools that rank amongst the finest in the world. Even in that sector the dichotomy continues, because some of the poorest schools in the country are also independent schools. Some of the finest, most creative teachers in the country will be found in under-resourced township schools – some decidedly ordinary teachers can be found in top independent schools. In essence, it is simply impossible to make assumptions about this educational environment. Similarly, it is simply not possible to reflect experiences of other Third World countries onto the South African context.[3]

Further, since 1994, the South African education system, at all levels, has been in a state of transformation. This transformation has involved all areas of the schooling system,[4] including for example, governance and management, curriculum development, and moves to outcomes-based education and learner-centred approaches. In the area of educator training, a range of policies and new structures has emerged to cover curriculum issues, norms and standards for educators, and the institutional base for educators[5]. However, while there has certainly been an improvement in some schools, many have yet to experience the benefits of new policies.

The School Register of Needs Survey[6] of 2000 reported that, of the 27,148 schools in the country, 27.3% had no access to water, 42.9% to electricity, 9.2% to toilets, and 35.5% to telephones. In addition, the survey found an increase, compared to 1996 figures, in the number of schools that reported weak and very weak buildings. The country's learner-educator ratio was 32:1 and the learner-classroom ratio was 38:1. While there are wide variations from province to province, these national statistics provide an overview of the extent of the challenges facing the education sector.

[3] Roos, G (2003). Understanding the South African Programme context.
[4] See the 1996 South African Schools Act, No 84 of 1996.
[5] Lewin, K; Samuel, M & Sayed, Y (2002). Changing Patterns of Teacher Education in South Africa. Policy, practice and prospects. South Africa: Heinemann.
[6] Report on the School Register of Needs 2000 Survey. Pretoria: Department of Education.

In the area of ICTs, while significant divides still exist across provinces and schools, much progress has been made in the past few years. In August 2003, the South African Department of Education released the Draft White Paper on e-Education.[7] This reflects the stated commitment of government to addressing the digital divide within the schooling sector and recognition of the valuable role that ICT can play, when used appropriately, to support teaching and learning as well as school administration and management. The table below, taken from the draft White Paper,[8] provides a breakdown of computer availability in schools across the nine provinces.

PROVINCE	SCHOOLS WITH COMPUTERS	SCHOOLS WITH COMPUTERS FOR TEACHING AND LEARNING
Eastern Cape	8.8%	4.5%
Free State	25.6%	12.6%
Gauteng	88.5%	45.4%
KwaZulu-Natal	16.6%	10.4%
Mpumalanga	22.9%	12.4%
Northern Cape	76.3%	43.3%
Limpopo	13.3%	4.9%
North West	30.5%	22.9%
Western Cape	82.4%	56.8%
National	39.2%	26.5

These statistics highlight the diversity of the ICT context of schools across the country. Particularly notable is the low percentage of schools with computers for teaching and learning. A survey conducted in 2000 found that the principal factors preventing schools from using computers as a tool for teaching and learning included: insufficient funds; inadequate numbers of computers; lack of computer literacy among teachers; lack of subject teachers trained to integrate computers into different learning areas; and the absence of properly developed curriculum for teaching computer skills.[9]

While these statistics may seem to portray a bleak picture, it should be noted that the number of schools with computers for teaching and learning has increased by 12.3% between 1996 and 2002. Further, government has committed, in this draft White Paper, to the goal of ensuring that all schools have computers by 2013.

The concept of e-Education reflects much more than access to ICTs alone, 'e-Education revolves around use of ICTs to accelerate the achievement of national education goals'[10]. E-education implies that learners and educators are ICT-capable, rather than ICT literate only, and includes the abilities to:

- Apply ICT skills to access, analyse, evaluate, integrate, present and communicate information;

[7] Department of Education, 2003. Draft White Paper on e-Education. Transforming Learning and Teaching through Information and Communication Technologies.
[8] Ibid, p.5.
[9] Lundall, P & Howell, C (2000). Computers in Schools. A National Survey of Information and Communication Technology in South African Schools. Education Policy Unit, University of the Western Cape.
[10] Department of Education, (2003). Draft White Paper on e-Education. Transforming Learning and Teaching through Information and Communication Technologies, p.7.

- Create knowledge and new information by adapting, applying, designing, inventing, and authoring information;
- Enhance teaching and learning through communication and collaboration by using ICTs; and
- Function in a knowledge society by using appropriate technology and mastering communication and collaboration skills.[11]

While these are laudable aims, an additional factor to lack of computers that will affect the achievement of the goal of educational improvement is that many educators were poorly trained in the past and as such do not have a good conceptual knowledge of the subjects that they teach nor of teaching methods.[12] Educator professional development is thus an essential aspect of educational transformation in the country.

Although the complex education landscape in South Africa is a challenge to implementation, by bringing ICT skills and curriculum together, the Intel® Teach to the Future Programme is well placed to play a role in supporting the achievement of these national ideals. In fact, the programme is listed in the draft White Paper as one of three professional development initiatives in the country supporting efforts to bridge the digital divide in schools.

[11] Ibid, p.7.

[12] See for example:
Adler J & Reed, Y (eds), (2002). Challenges of Teacher Development: An investigation of take-up in South Africa. Pretoria: Van Schaik Publishers.
Lewin, K; Samuel, M & Sayed, Y (2002). Changing Patterns of Teacher Education in South Africa. Policy, practice and prospects. South Africa: Heinemann.

RESEARCH DESIGN

Given the complexity of the South African education context described above, the evaluation has been designed to assess the implementation of the Intel® Teach to the Future programme across a range of schooling contexts. A phased approach has been adopted and the first phase (July 2003 to January 2004) was designed to be exploratory, providing input into the next stages of evaluation that will focus more on impact and, importantly, to provide evaluation findings that will enable project management to improve the programme going into year two and beyond. In addition, this six-month study has allowed for testing of the case study methodology and for a piloting of the Intel® Teach to the Future Post Training Survey that will be more widely administered from 2004.

EVALUATION OBJECTIVES

This first year evaluation is formative in nature, specifically seeking to document lessons that will enhance the project in the coming two years. No impact assessment has been conducted during this phase of the evaluation process, since few schools have progressed far enough to allow for impact data to be collected. However, baseline data that can be used to assess impact as the Intel® Teach to the Future programme progresses was collected.

The evaluation research had three overall objectives, being to:

1. ~~1.~~4. Document and assess the implementation of the Intel® Teach to the Future programme across a range of schooling contexts within South Africa;
2. ~~2.~~5. Assess the extent to which the aims of the Intel Teach to the Future programme are being achieved thus far; and
3. ~~3.~~6. Develop an evaluation plan for year two of the project that focuses on impact.

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EVALUATION QUESTIONS

The following three research questions were asked in the South African Intel® Teach to the Future year one evaluation.

1. ~~1.~~4. How is the Intel® Teach to the Future programme implemented in a range of South African schooling contexts?
2. ~~2.~~5. What are the experiences (positive and negative) of participants (project management, senior facilitators, facilitators, and educators) in the programme?
3. ~~3.~~6. What opportunities and pitfalls can be identified in implementation of the Intel® Teach to the Future programme?

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A case study approach has been adopted for this phase, focusing on eight schools (to fit within the evaluation budget) in three provinces. Schools were taken from KwaZulu-Natal, Gauteng, and Limpopo provinces. The schools were chosen, together with Intel® Teach to the Future staff, to represent as wide a range of South African schooling contexts as possible. This means there is a mix of rural, urban, and peri-urban schools, a range of socio-economic contexts, and a spread of primary, secondary and high schools. In addition, the community centre model of computer provision is included in the case study sample. This is where a community centre, which provides computer facilities to schools in the area who do not have their own computers, hosts the Intel® Teach to the Future training. Teachers from a range of

nearby schools attend training at the computer center. Each school has an allocated time to bring their learners to the centre to make use of the computers.

The table below provides an overview of school characteristics. The names of the schools are not provided, as some schools specifically requested to remain anonymous. The last two columns – 'number of educators registered' and 'level of educator ICT skills' – are taken from the online form completed by the school when enrolling for the programme[13].

School Number	Province	Geographic Area	Socio-Economic Context	No. Educators Registered	Level of Educator ICT Skills
1 (Secondary School)	KZN	Rural Township	Low to middle	15	Few computer literate
2 (Community Centre)	KZN	Rural township	Low	20	Many computer literate
3 (Secondary School)	KZN	Township	Low	12	Almost all computer literate
4 (Secondary School)	Gauteng	Urban	Middle	17	Few computer literate
5 (all levels – grade 0 to post grade 12)	Gauteng	Urban	High (Independent)	22	Many computer literate
6 (Secondary School)	Limpopo	Rural township	Very Low	20	Few computer literate
7 (Primary School)	Limpopo	Urban	Middle (Independent)	1	Almost all computer literate
8 (Primary School)	Limpopo	Urban	Middle (ex-Model C)	40	Few computer literate

During this phase of the evaluation, each school was visited twice, once before or right at the start of training and once after ten weeks to compare how schools work through the ten-week programme and to gather perceptions from school management, facilitators, and educators about the programme. Detailed case study reports from each of the eight schools can be found in Appendix One.

Value of Case Study Approach

Given the costs, both monetary and in terms of time, associated with conducting case studies compared to surveys, it is useful to briefly reflect on the value of the case study approach.

An education case study has been defined by Bassey[14] as an empirical enquiry that is:

[13] See, http://teach.schoolnet.org.za

[14] Bassey, M (2002). Case Study Research, p109. In, M Coleman and ARJ Briggs (eds). Research Methods in Educational Leadership and Management (pp 108-121).

- Conducted within a localised boundary of space and time;
- Into interesting aspects of an educational activity, programme or institution, or system;
- Mainly in its natural context and within an ethic of respect for persons;
- In order to inform the judgements and decisions of practitioners or policy makers, of theoreticians who are working to these ends; and
- Such that sufficient data are collected for the researcher to be able to:
  - explore significant features of the case;
  - create plausible interpretations of what is found;
  - test for the trustworthiness of these interpretations;
  - construct a worthwhile argument or story;
  - relate the argument or story to any relevant research in the literature;
  - convey convincingly to an audience this argument or story; and
  - provide an audit trail by which other researchers may validate or challenge the findings, or construct alternative arguments.

Along similar lines, Hartley provides the following definition of the case study research approach:

> Case study research consists of a detailed investigation, often with data collected over a period of time, of one or more organizations, or groups within organizations, with a view to providing an analysis of the context and processes involved in the phenomenon under study. The phenomenon is not isolated from its context (as in, laboratory research) but it is of interest precisely because it is in relation to its context. (Hartley 1994: 209)[15]

Both of the above definitions of case studies highlight the importance of understanding an educational intervention within the context in which it takes place, and it is in fact how the intervention and context interact that is of interest. The case study approach facilitates the exploration of both the *uniqueness* of each context, and also what is of more general interest and significance. Because the education context of South Africa is complex and varied, and because the South African education context differs in many ways from other countries understanding and evaluating a programme like Intel® Teach to the Future requires a thorough exploration of contextual factors. Case studies allow the researcher to "take multiple perspectives into account and attempt to understand the influences of multilevel social systems on subjects' perspectives and behaviours"[16].

Case studies are usually qualitative in nature and make no claim to be representative, but generate rich and detailed information and analyses. A major advantage of the case study method is that, because the researcher concentrates on specific situations, it is more likely that issues that may be hidden in a large-scale survey are identified and explored. Due to the complexity of supporting educational transformation and development these 'hidden' issues often impact on the success or otherwise of an educational intervention, such as Intel® Teach to the Future.

[15] Hartley, J.F. 1994. Case studies in organizational research. In: Cassel, C. and Gillian, S. (eds). Qualitative methods in organizational research - A practical guide. Sage Publications: London

[16] Babbie, E & Mouton, J (2001). The practice of Social Research. South African Edition, p.281. Cape Town: Oxford University Press Southern Africa.

RESEARCH METHODS AND LIMITATIONS[17]

In conducting this evaluation, the following research methods have been used:

1. Review of project documentation (Please see Appendix Three for a full list of documentation collected and reviewed).
2. Brief self-administered questionnaires for educators in the 8 selected schools taking part in the Intel® Teach to the Future training – one at the start of training to assess expectations, and one after training to evaluate the training programme.
3. Observations of Intel® Teach to the Future training sessions
4. Interviews (using a semi-structured questionnaire):
    a. Project level – key project staff, including project management and senior facilitators;[18] and
    b. School level – with school management, Intel facilitators, educators taking part in the training.
5. Lesson observations

In addition, the facilitator training self-reflection and post-training evaluation forms that were already being collected as part of the Intel® Teach to the Future training programme were analysed, and contribute to the overall evaluation. As such, this report is based a range of data sources, which has allowed for triangulation and verification of data.

Given the range of research methods used and the contextual factors noted above, it was expected that there would be certain research limitations. In some instances it was not possible to collect all the data required when visiting a school because of school-specific factors. For example, although the research visit was planned in advance, one school was closing at 11am on the day of the research visit for the matric dance. At all of the schools visited, the researchers found it a challenge to conduct educator focus groups as the time made available for these groups was at break time, and hence only about 20minutes were available. This resulted in rushed discussion. At schools where the principal participated in the focus groups, it was also found that educators felt less comfortable to talk freely about the programme and the school. This limitation notwithstanding, each educator also completed pre and post-training questionnaires, which included questions that overlapped with the focus groups. This was done in order to verify questionnaire data, but also served as a backup data source in those instances where educators were reluctant to talk in focus groups. In addition, during training observations and whilst visiting schools, the researchers also had informal conversations with educators and other staff members during which specific issues could be raised as needed. In this way data triangulation took place.

At each school lesson observations were conducted. The aim was to observe four lessons in each school, although due to timetabling, and the need to collect a range of other information this was not always possible. Lessons of educators taking place in the Intel® Teach to the Future were observed. The lesson observations were done to provide an indication of how teaching and learning takes place prior to Intel® Teach to the Future training. This information will provide baseline data for later stages of the evaluation, which will focus on

[17] Please see Appendix Two for all research instruments used during this evaluation.

[18] Semi-structured interviews were conducted with Janet Thomson, the Intel® Teach to the Future Project Manager; Parthy Chetty, the Regional Education Manager for Intel South Africa; and Gerald Roos, a consultant to the project. In addition, informal interviews were conducted with two senior facilitators, Andrew Moore in Gaunteng and Estia Warmenhoven in Limpopo.

implementation at the classroom level. As such, little reference is made to lesson observations in this report.

The final research limitation relates to the timing of the research visits. At the outset of the study is was planned that schools would be visited before or in the first week of training and then again after ten weeks to assess how far each school had progressed. For most schools this was not problematic, but for independent schools, such as School 5 with different terms, timing was not always ideal and in one instance the research visit corresponded with school examinations.

INTEL® TEACH TO THE FUTURE IN SOUTH AFRICA[19]

HISTORY

The Intel® Teach to the Future programme began in South Africa in January 2002 when the Intel Regional Manager for Europe, the Middle East and Africa (EMEA) did a feasibility study to assess the ICT readiness of the country. At the same time, he identified Non Governmental Organisations (NGOs) with potential to become the Regional Training Authority (RTA) for South Africa. SchoolNet South Africa was appointed as South Africa's RTA in November/December 2002. In South Africa, the Intel® Teach to the Future Programme is endorsed by the South African Council of Educators (SACE). The programme was officially launched on 10th March, 2003.

In January 2003, Intel's Regional Education Manager for South Africa, Mr Chetty, began to meet with provincial education departments to negotiate their involvement in the Intel® Teach to the Future Programme. In addition, a project information pack was sent to all provinces. At the time of the interview with Mr Chetty on 3rd September 2003, Free State, North West, Eastern Cape, and Mpumalanga provinces had all adopted the project. KwaZulu-Natal and the Northern Cape were yet to respond, and in Gauteng discussions had begun (and Intel® Teach to the Future is likely to work together with Gauteng Online).

In addition to this 'top-down' advocacy work to promote the programme, a range of other strategies is used to market the programme. An advertisement is placed in each edition of *The Teacher*, a news publication for educators in South Africa. Each facilitator who is trained is provided with posters and fliers to promote the programme, although these are generally not well distributed. Posters and fliers have also been sent to every district office in Gauteng, and they are displayed at all SchoolNet South Africa conferences. All educators and mentors who have taken part in previous SchoolNet South Africa projects were emailed with project information. A website is available with project information and selection criteria at http://teach.school.org.za. Educators apply to participate in the programme online via this website. Intel Innovation in Education also launched a new website for South Africa in December 2003. This site can be viewed at http://www.intel.com/za/education.

During 2002, the University of Pretoria was commissioned to adapt the American-focused materials for the South African educational environment. This proved to be a complicated process and resulted in some difficulties with the first versions of the materials used. Materials review is an ongoing process, and the CD is currently in its third version. In addition, work is underway to compile South African facilitator and educators' portfolios as an additional resource. Four senior trainers were trained during the first week of March 2003, and the first facilitator training session took place in March/April in the Western Cape and in Gauteng (the latter for both North West and Gauteng Provinces). Training has taken place every school holiday period since then.

[19] This section is based on interviews conducted with key project staff, as well as the review of a wide range if Intel® Teach to the Future documents (see Appendix three for a list).

At the time of writing this report,[20] 347 schools had been accepted into the programme and 36 had been rejected. The table below shows a breakdown of schools per province.

PROVINCE	NUMBER OF SCHOOLS ACCEPTED	PERCENTAGE OF SCHOOLS ACCEPTED	NUMBER OF SCHOOLS REJECTED	PERCENTAGE OF SCHOOLS REJECTED
Eastern Cape	24	6.9%	2	5.6%
Free State	36	10.4%	2	5.6%
Gauteng	48	13.8%	2	5.6%
KwaZulu-Natal	51	14.7%	14	38.9%
Limpopo	38	11.0%	3	8.3%
Mpumalanga	42	12.1%	12	33.3%
North-West	37	10.7%	1	2.8%
Northern Cape	10	2.9%	0	0%
Western Cape	61	17.6%	0	0%
Total	347	100.1%	36	100.1%

In addition, 250 facilitators had successfully completed training, and 237 potential facilitators had indicated their interest to be trained. Further, 426 educators had successfully completed training, 1102 were taking part in training programmes, and 84 educators had dropped out. In several instances, facilitators are not beginning training at there schools. A snapshot analysis of the progress of facilitators and educators who received training in April and June of 2003 revealed that, of the 67% who reported themselves as 'active' with training in their schools, 43% had not recorded completion of any modules[21]. While, in some instances, this may be explained by the fact that not all facilitators feel comfortable using the online database system and so do not regularly update their training status, it is likely that in many schools training has yet to begin. These numbers are substantially lower than those expected by Intel and those noted as project deliverables for 2003 in a document entitled *Implementation principles and processes*[22], which stated that up to 50 facilitators would be trained per province and up to 4000 educators across all provinces in 2003. By the end of 2004, 40,000 educators should have been trained.

The fact that lower numbers than anticipated and expected by Intel are being reached in South Africa has been and continues to be a fundamental tension in the project with wide ranging implications, especially with respect to budgets. The South African Intel® Teach to the Future team submitted a memo in September 2003 to Intel outlining the unique context in South Africa and why it is important to achieve a balance between quality and quantity given the education landscape. Intel's response, as communicated by Intel South Africa, indicated some understanding, but noted clearly that the programme strategy for all participating countries is to conduct large-scale programmes training a significant number of teachers. Perhaps what needs to be re-thought in the South African context is what 'a significant number of teachers' should be. The key evaluation findings presented below provide additional evidence of relevance to this debate, both in support of the valuable role that the Intel® Teach to the Future programme is having as well as highlighting why in the South

[20] As per Intel® Teach to the Future South Africa database, available at http://teach.schoolnet.org.za, 29/01/04. It should be noted that participants in the Northern Cape are not able to access the online database, thus these statistics do not include a small section of participants.
[21] Personal communication with and graphic representation provided by Gerald Roos, 2003.
[22] Document provided by Mr Chetty during interview.

African context reaching large numbers of educators is going to remain problematic, at least in the short term.

IMPLEMENTATION MODEL

The goal of the Intel® Teach to the Future programme is:

> To train classroom educators how to promote project-based learning and effectively integrate the use of computers into Curriculum 2005 and Revised National Curriculum Statements so that learners will increase their learning achievement.[23]

This is done using a 'cascade' model of delivery. SchoolNet South Africa manages the programme, and works closely with the Regional Education Manager of Intel South Africa. The implementation model works as follows:

- Initially four senior trainers were given one-week training (additional senior trainers have now been trained bringing the total number to twelve).
- Senior trainers provide one-week training for potential facilitators (nominated by a school).
- Facilitators go back to their schools and run training, having agreed to train at least five (but preferably more) additional educators.

At the end of the facilitator training, the senior trainers review each candidate facilitator's portfolio. Those deemed fit to run training in their schools are passed and become facilitators. In some cases, the senior facilitators have passed on the condition that they work together for the first training session, and, in others, educators who are not up to being facilitators are invited to attend the following facilitator training session. Each facilitator is provided with a facilitator's manual and a supporting CD, and those who successfully complete the training are provided with educator manuals and supporting CDs for each of the educators who will be taking part in training at their school.

The model assumes that, from the original training of senior facilitators, over time 40,000 educators will be trained as more facilitators are trained and provide training within their schools for several educators each. During interviews, Intel® Teach to the Future programme staff noted their concerns about this model of delivery, given the low level of ICT and pedagogical skills among many educators. Further, the cascade model of delivery is also not reaching the numbers anticipated.

One possible reason for the slower than expected uptake may relate to provision of incentives for facilitators. As noted previously, no payment is made for facilitators who hold training in their schools in the cascade model. At the outset of the programme, Intel® Teach to the Future South Africa had an agreement with the Digital Partnership project to provide 450 refurbished laptops as incentives for facilitators who were active trainers in their schools. Fifty agreements were signed with individual schools that were to receive laptops. Unfortunately these laptops were not provided, and some facilitators who had been expecting a laptop then stopped training. Fifty laptops have now been acquired to meet the agreements made with schools. However, the issue of incentives, especially in cases where facilitators are running their third set of training, and in some cases in the evenings, remains an issue.

[23] Intel® Teach to the Future Manual, 3.2.1.

CRITERIA FOR PARTICIPATION

The programme sets clear criteria for schools, educators and facilitators to qualify to take part. These are all documented on the Intel® Teach to the Future South Africa website. In addition to qualifying criteria, criteria for selection of participating schools, conditions for participating educators and conditions for participating facilitators are also specified.

The following are the qualification criteria for schools, educators and facilitators.[24]

Schools
- All schools that have computers with Internet access are welcome to apply;
- Note the criteria for selection of participating schools;
- Computers and the Internet should be accessible to educators;
- One computer should be accessible to each educator receiving training;
- A school may register before finding a suitable facilitator to provide the training, but the school should nominate a suitable facilitator before it is able to proceed with the programme; and
- Note what is expected of participating schools.

Educators
- Have basic ICT skills;
- Be practising educators;
- Commit to attend the course of at least 40 hours, plus 20 hours of take home activity, over a period of time that has been negotiated with the educators involved; and
- Note the conditions for participating educators.

Facilitators
- Note the criteria for selection of facilitators;
- Should have well-established ICT and training skills;
- Could be nominated by the school or could nominate themselves;
- Must be associated (either as a staff member or as the nominated facilitator) with a registered Intel Teach to the Future school when applying;
- Should live or work within close proximity of the school;
- May recruit educators from neighbouring schools to attend the training, in collaboration with the school hosting the training; and
- Note the conditions for participating facilitators.

Each school or candidate facilitator applies online. The Intel® Teach to the Future project manager then goes online, checks through each application, and either accepts or rejects it. Online applications are also followed up with an email or telephone call. While these criteria and more detailed criteria are clearly specified and verified as far as possible through the process just described, many educators do not take account of the criteria that they should meet, and in some instances information in the online application form is incorrect. An example in point is School 1 in the case study examples. In the online application, this school has reported having Internet access, however, school visits revealed that the school has never had Internet access. In addition, since facilitators recruit educators from their schools to take part in the training, it is likely that in many instances participating educators have not seen the relevant criteria for educators. It should be the responsibility of facilitators to make this information available, but the evaluation has found that facilitators are somewhat reluctant to

[24] Taken from http://teach.schoolnet.org.za, additional details on conditions for participation can be found here.

turn educators away, especially in schools where most educators have low ICT skill levels. This is problematic as the Intel® Teach to the Future programme assumes a relatively high level of ICT skills and, in cases where this condition is not met, training progresses very slowly.

EVALUATION RESULTS

CASE STUDIES

The eight case studies conducted during this evaluation make up the core of the data. Through these case studies, we have documented examples of how the Intel® Teach to the Future programme is implemented at school level. In this section, some key issues emerging from the case studies are raised, but the reader is referred to Appendix One for the full set of case study reports, which describe the specific successes and challenges in a range of different schools. The value of the case study approach lies in the detail documented in Appendix One.

The case studies made clear the range of contexts in which Intel® Teach to the Future is implemented. The various successes and challenges experienced by the different schools showed that many school-specific contextual factors affect the success of a programme like Intel® Teach to the Future, but are out of control of the programme. Examples include internal school politics, schools' access to technology, presence of an ICT champion, and support of school management. All schools were very positive about the Intel® Teach to the Future programme, and clearly expressed how much they had gained from the training. The two major challenges reported were the time requirements of the Intel® Teach to the Future training and for later implementation, as well as the difficulty of managing access to scarce computer resources in the school.

At only school 5 did most educators use computers for teaching and learning prior to the Intel® Teach to the Future training. Even at school 3, where most of the educators had done several Educators' Network (EDN) modules in the past, few educators reported using computers for teaching and learning. This trend highlights that, while ICT professional development is an essential component of efforts to integrate ICTs into teaching and learning, training alone will not solve the infrastructure issues faced by many schools. Educators at all the schools, except for school 5, noted that they require more support to find innovative ways of using scarce ICT resources.

One of the aims of the case studies was to document how the Intel® Teach to the Future training took place in different schools. The case studies showed that each school adopted a different time schedule, depending on the specific needs of participating educators and the structure of the school timetable. The Intel® Teach to the Future programme originally anticipated that it would take ten weeks for a school to complete training. As such, each of the schools was visited just before or during the first week of training and then again after ten weeks. After ten weeks, it was found that each school had reached a different point in the training. Two schools had not started training, while two had completed their first set of training and had embarked on a second or even third training group. The remaining three schools had reached module 4, 6, and 8. Reasons for progressing at such varying speeds included the low levels of ICT skills at some skills which meant that facilitators had to

provide basic ICT training as well as facilitate the Intel® Teach to the Future training. Some schools had to work around examinations, school holidays, and religious holidays. At some schools, educators worked four evenings per week to complete their training, while in others educators were less willing to give up their free time. In some cases, absenteeism from training was a problem and time was spent at the start of each training session recapping what was covered previously. These differences highlight the need to ensure that the Intel® Teach to the Future implementation model remains flexible, the ten-week model proposed in the training materials is unlikely to be used in most cases. Allowing for this flexibility is essential to maintain quality and to take account of the different circumstances facing educators, facilitators, and schools.

The extended time requirements for Intel® Teach to the Future training does not mean that the training is unsuccessful. On the contrary, at all schools, evidence of the extent of learning taking place was clear. However, while much learning was taking place, at most schools visited, the use of questions to develop high-level thinking skills and other pedagogical aspects of the course was found to be difficult as many of the concepts were new to participating educators, and even some of the facilitators.

Educators and facilitators at several of the schools visited noted that it was important to make allowances for educators with lower levels of ICT skills. Some suggested splitting training into two groups: those who need to learn basic ICT skills and those who already have these skills. Another suggestion made at more than one school is to provide materials for basic ICT training, either by helping schools to access such programmes or by including an additional module with which those educators without the requisite skills could begin.

Finally, it was found that, while school principals were generally supportive of the Intel® Teach to the Future programme and saw the value for the school, few really knew much about the programme, and researchers were often asked to provide background information about the programme. In some instances, educators felt that the school could support them more effectively or recognise the commitment that they were making to this professional development exercise. Support of school management is often noted as an important factor in the success of ICT initiatives.[25] Given that fewer educators than anticipated have been trained thus far, promoting the programme to school principals might be one way of encouraging wider participation. It is thus recommended that Intel® Teach to the Future programme staff make sure that the principal of each school receives an Intel® Teach to the Future information pack once the school has been accepted into the programme.

PRE-TRAINING RESULTS

During the school visits, all educators taking part in the Intel® Teach to the Future programme were asked to complete a pre-training questionnaire. The purpose of this questionnaire was to assess, among other things, educators' expectations of the programme, their ICT skills levels, why they decided to take part, and the challenges they foresaw. The questionnaire was composed of mostly open-ended questions. This was done so as not to pre-empt responses of educators as can happen when a respondent has a list of options from

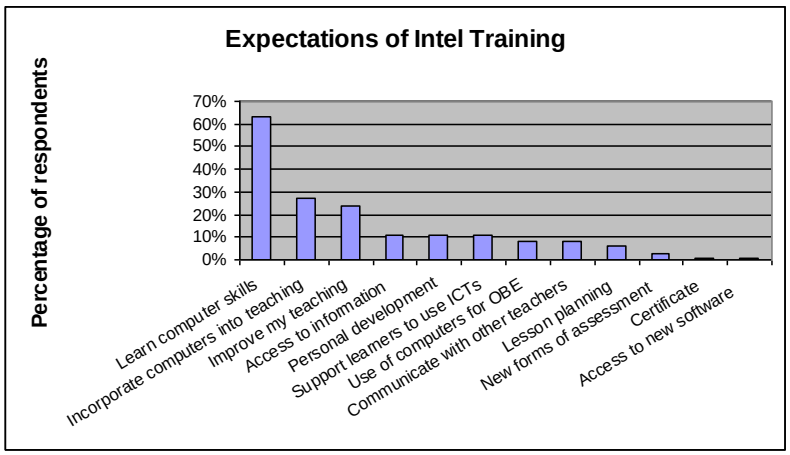
[25] See for example Carlson, S & Tidane Gadio, C (2002). Teacher Professional Development in the Use of Technology. In W Haddad & A Draxler. Technologies of Education. Potentials, parameters and prospects. UNESCO.

which to choose. Based on the range of responses received, a coding schedule was drawn up and responses categorised accordingly. This ensures that the expectations and challenges, for example, are issues raised by the educators themselves.

School-specific results from this questionnaire are presented in the individual case studies. In this section, some results from the full set of questionnaires are presented. Altogether, 105 pre-training questionnaires were completed and analysed.

Educators signing up for training had a range of qualification levels: 26% had a diploma, 14% a first degree, 30% a post-graduate teaching diploma, and 10% had postgraduate degrees. This ten percent came largely from School 5, the independent school in Johannesburg. When asked why they decided to take part in the training, 58% of the respondents stated that they wished to learn ICT skills, while 40% wanted to learn how to integrate computers into the classroom or into their specific subject area. In addition, 17% of the respondents noted that they wished to become a better teacher and 17% noted that they wanted to learn new methods of teaching to benefit their learners. Personal development was noted as one of the reasons for taking part by 15% of educators who completed the questionnaire. One educator joined to overcome a fear of computers.

Educators were also asked what they expected to gain from taking part in the training. The most common responses are presented graphically below.



We see that the most commonly stated expectation was to learn computer skills (63%), followed by learning how to incorporate computers into teaching (27%).

Similar responses were found in the educator focus groups. Some of the more common expectations included:

- The hope to be better equipped with the tools to deal with specific year and age groups.
- To feel more comfortable and capable to share computer knowledge with learners.
- To understand computers better.
- To gain computer skills.
- To improve learners' quality of learning by using computers.

- To 'get up to pace' with learners who have a better knowledge of computers than educators.
- To develop computer skills and have the ability to share this with others.
- To learn the variety of ways that computers can be used.
- To become more effective as a teacher.
- You have learner's attention when you use computers, especially for the boys.
- We need to keep a step ahead of the learners and it is hard to catch up with them (another participant joked "you never will!").
- To use computers as a tool for lessons.
- How to integrate my computer knowledge into my teaching and how to get my learners to become actively engaged with computers and the Internet.
- To learn new strategies for teaching.
- To learn how to design a website.
- To help learners take possession of knowledge.
- To be well acquainted with a computer.
- To have access to information available on the Internet.
- To be able to give learners projects and assignments where they are able to use computers.

In order to assess the level of ICT skills at the outset of training educators, were asked to indicate whether they were able to perform a range of ICT skills. The results are presented in the table below.

ICT Skills	Number Answering Yes (n=105)	Percentage Answering Yes
1. Open a new file in a word processing programme (i.e. Microsoft Word) and save it	93	89%
2. Troubleshoot computer problems (i.e. Solve minor problems such as when somebody can't get a document to print, or when one of the toolbars suddenly 'disappears')	61	58%
3. Insert a table into a document in a Word Processing programme	76	72%
4. Insert page numbers into a document	66	63%
5. Use a spreadsheet programme such as Lotus or Excel – add a column of numbers, for example	53	50%
6. Activate the Internet and search the World Wide Web for information	55	52%
7. Send an email message	73	70%
8. Connect to the Internet and find a specific site you are looking for (i.e. type in a particular address)	58	55%
9. Attach a document to an email message	53	50%
10. Design your own learning materials on the computer	46	44%
11. Create overhead transparencies	16	15%

This table showing the composite results indicates an average to good level of ICT skills among participating educators. However, a more detailed look at the self-reported skills for educators within each school shows that educators in some schools, such as school 3 and 5 had relatively higher levels of skills than educators from schools 4 and 8, hence these composite figures should be interpreted with caution. Details can be found in Appendix One.

When asked what challenges were anticipated, the following responses were given:

- Time requirements of the training (27%);

- Lack of ICT resources (24%);
- Low levels of ICT skills (21%);
- Personal leaning styles (16%);
- Time for practising(9%);
- Workload (6%);
- Specifically stated that they did not foresee any challenges (15%).

Finally, educators were asked what benefits they thought computers bring for their learners. Learning computer skills was noted by 39% as the main benefit, while 28% thought that computers make lessons more interesting, so benefiting learners. Access to more or new information was noted by 25% and 21% felt that computers support learner-centred approaches and allow learners to work at their own pace.

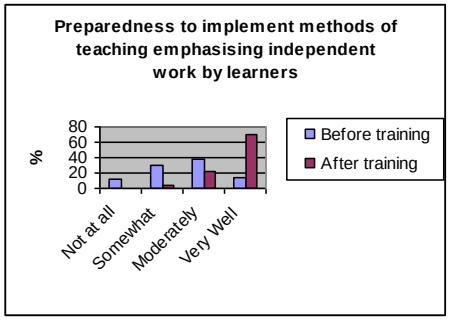
POST-TRAINING RESULTS

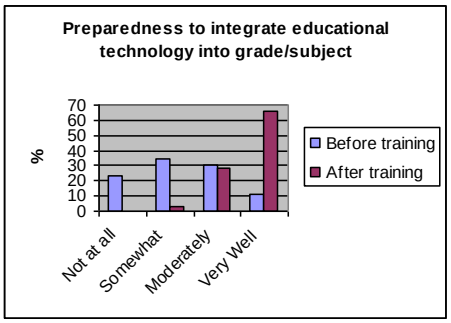
Two forms of post-training questionnaire data were available for use in this evaluation study. The main focus of this section is on the results from the standard Intel® Teach to the Future post-training questionnaire used in all countries, with some additional questions added for the South African evaluation. At schools where training was completed, educators were requested to complete a hard copy version of the questionnaire. Additional educators and facilitators also completed the form online. Altogether, a sample of 149 participants (45 facilitators and 104 educators) completed the forms.

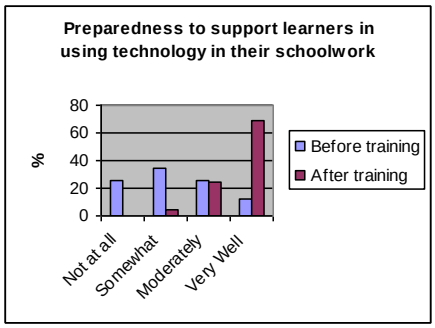
In general, the response to the Intel® Teach to the Future training in South Africa has been very positive. We see that 82% of participants report that the skills they learned will 'definitely' help them to successfully integrate technology into learners' activities. 92% will definitely recommend the course to a friend or colleague (and some noted in their optional comments that they already have). The facilitators and senior trainers were also highly rated. In no instance was a rating of 'poor' given, and most responses clustered in the 'good' and 'excellent' categories. 56% of facilitators reported that they felt 'very confident' to run the course in their schools after attending the training, 25% felt mostly confident, 11% 'fairly confident' and 7% felt 'not at all confident'. These 7% are likely to be those who entered the training without the requisite ICT skills levels, or those who felt that the lack of computers and other facilities in their school would be a hindrance to training provision.

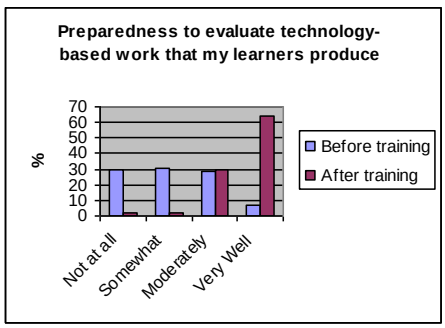
With respect to pace of the course, a response of 'just right' (48%) was very slightly higher than 'too fast' (45%). Only 4% of participants rated the course as 'too slow'. Given the intensity of the Intel® Teach to the Future programme and the range of content covered it is expected that some participants would find the course too fast. This is particularly the case where participants enter the programme with low levels of ICT skills.

With respect to the pedagogical outcomes of the Intel® Teach to the Future training, we again see positive responses. 85% of respondents reported that the training focused on integration of technology into the curriculum to a 'great extent', 65% reported that training provided teaching strategies to apply with learners to a 'great extent', 76% felt that the course illustrated effective uses of technology to a 'great extent' and 64% noted that the training provided opportunities to collaborate with other educators to a 'great extent'. The following set of graphs show that in all cases, clear self-reported improvements after training are noted by the majority of participants.

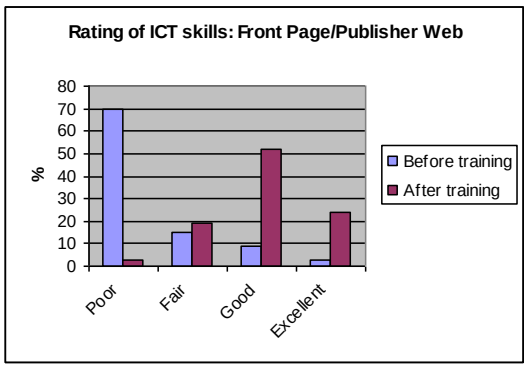








Similar self-reported improvements were also noted with respect to ICT skills specifically. For example, the graph below illustrates reported improvement in skills to use Front Page/ Publisher Web. 70% of participants rated their skills in Front Page/Publisher Web as 'poor' before training. After training, only 3% rated their skills in this area as poor. Before training 9% rated their skills as 'good' and 3% as 'excellent'. After training, 52% rated their skills as good and 24% as excellent.



With respect to file management, 30% rated their ability as poor before training and only 7% as excellent. After training nobody rated their file management skills as poor and 46% rated

their ability as excellent. Similarly for PowerPoint, before training 53% rated themselves as poor and 7% as excellent, while after training 2% rated themselves as poor and 50% as excellent.

Most of the respondents found the Intel® Teach to the Future Manual and CD either 'very useful' or 'useful'. 11% found the manual 'fairly useful', 8% found the CD 'fairly useful', and 2% found the CD to be 'not useful at all'. These results are supported by the focus group discussions and interviews conducted. Specific comments of interest about the CD and manual that were made included that fact that the thickness of the manual was intimidating, the manual tended to 'fall apart' and the CD contained too many American[26] examples. On the positive side, most educators and facilitators felt that both the manual and CD would be resources that they would refer to in the future as they continued to practice and use their new skills.

POST-TRAINING RESULTS (FACILITATOR TRAINING)

As noted above, before the introduction of the standard Intel® Teach to the Future post-training evaluation form, the Intel® Teach to the Future South Africa programme had been using their own post-training evaluation forms. In this section, selected results from an analysis of these forms are presented. This data applies specifically to the facilitator training. Educators training to be facilitators in the following training sessions completed 59 questionnaires:

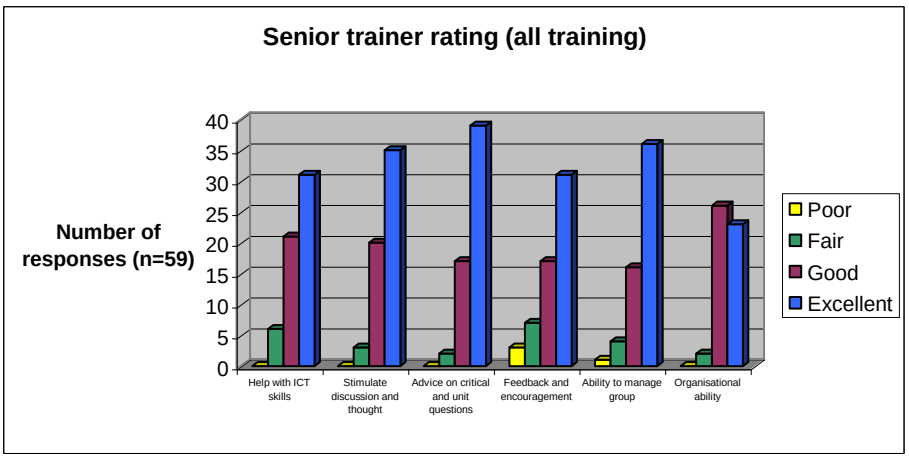
- Gauteng and Limpopo April 2003,
- KwaZulu-Natal July 2003,
- Western Cape July 2003,
- Eastern Cape September 2003,
- KwaZulu-Natal September 2003,
- Mpumalanga September 2003

As was reported above, facilitators indicated an improvement in both ICT skills and pedagogical skills as a result of the training. As may be expected, least improvement was reported for MS Word, as trainees are likely to be most conversant with that program. The greatest improvement was with Publisher and Front Page/Publisher Web, as before training trainees were least familiar with these programmes. With respect to pedagogical skills, critical questions and copyright laws are the two areas in which most improvement was noted. Given the strong emphasis of the Intel® Teach to the Future programme on technology integrated into pedagogical practice, rather than the learning of ICT skills alone, the relatively high self-rated improvement in the use of critical questions is promising.

Both the manual and CD were spoken of highly (see optional comments below) and the *very useful* ratings of 74 and 76% respectively, reflect this. The Gauteng-Limpopo April 2003 trainees made much of the fact that links on the CD did not function. This is likely to be a reflection of the problems with the first version of the CD, which has subsequently been revised.

[26] As noted above, work is currently underway to compile examples of portfolios produced by South African educators. As this work progresses more South African specific examples will become available.

While observation of facilitator training and reports from programme staff indicate that some senior facilitators may not be well suited to their role, particularly with respect to pedagogical aspects of the programme, in general we see that Intel® Teach to the Future senior facilitators are highly rated by trainee facilitators, with 'excellent' being the dominant response. The one exception is organisational ability, where more participants rated the senior trainer as 'good' than excellent. We see a small number of participants in the overall graph rated 'feedback and encouragement' as 'poor'. This is of concern given the importance of feedback and encouragement – however, more detailed analysis shows that this response is in fact peculiar to the Eastern Cape in September 2003, rather than being a general trend. At this particular training session several participants were members of a rural laptop programme run by the university. Unfortunately many were unable to manage even the basics of the Intel® Teach to the Future programme.



With respect to the pace of the course, only two trainees rated the course as *too slow*. A few more (46%) rated it *too fast* than *just right* (44%). In view of the demanding nature of the course, trainers can take some satisfaction that 44% rated the course as *just right* in pace. An exception occurred in the Gauteng-Limpopo training, where three times as many found the pace *just right* (n=15) compared to *too fast* (n=5). These statistics are interesting, since all of the facilitators interviewed at the case study schools reported that while they found the facilitator training to have prepared them well for running training in their schools, completing everything in one week was difficult. Some reported having to 'stick with what they knew' to complete the training and hence not being fully conversant with all programmes, Publisher in particular, that educators in their school wished to use. When asked about how confident they felt to run the programme in their schools after the facilitator training, 42% said they were very confident, 44% were mostly confident, and 14% were fairly confident.

STRENGTHS AND WEAKNESSES OF THE INTEL® TEACH TO THE FUTURE PROGRAMME

During the evaluation, questions were asked of programme staff and facilitators about what they perceived to be the strengths and weaknesses of the programme.

The following lists summarise facilitators' responses. Strengths included*:*

- CDs provide valuable information about OBE and how to plan lessons, assess learners and other things related to OBE that we have been battling with.
- Teachers are likely to be more confident for both ICT and OBE after doing the training.
- Teachers will learn how to plan lessons on computers and these plans can be used again the following year with small changes made as needed.
- Learners' learning should improve if teachers use what they learn here.
- PowerPoint presentations, Internet and publisher skills that will be learnt will help to make learning more interesting for learners.
- Teachers will be better equipped as teachers and we learn to look at both teachers and learners in a different light.
- The possibility to encourage learners to develop higher order thinking skills.
- The course demands a fulltime commitment from educators to complete it so the training helps to breed people who stick at it and don't give up too easily.
- The hook is the promise of learning technology skills, but actually the educators get much more than this from the course.
- Sharing ideas with other educators.
- The use of ICTs.
- The inclusion of curriculum statements.
- The inclusion of weblinks.
- The user-friendly navigation system of the CD.
- The range of useful resources included on the CD.

Weaknesses included:

- Most people don't have computer skills so as a facilitator I will have to do some basic ICT training for teachers first.
- The time required for the training is a weakness because most educators do not have this much time available for training, and teachers don't want to use all their spare time if they are not being paid for it.
- No incentives for running training sessions.
- Our principals don't understand the importance of computers so we also need some training for the principals too.
- The course is a lot of work for teachers and I am not sure if they will all be able to stomach it, also many have other commitments after school so attending training might be difficult.
- Teachers are scared because all of this is new to them, some have no computer experience at all.
- Teachers do not have computers at home so it makes practicing and take-home work difficult.
- The first manual had lots of problems, but the second one is better.
- Too many American examples, which are less relevant and sometimes almost paternalistic.

- There is no incentive for teachers to train more than the 5 people that they are required to teach, yet it is the hope that they would train many more. What is the incentive for teachers to give so much of their time for this training?
- Not enough orientation before facilitator training begins. It would be helpful to distribute the CDs before training so that facilitators have a sense of what the training is about before they arrive.
- The programme takes for granted that everyone is aware of what OBE is and that it is being implemented in their schools.
- No way of testing each individual's level of IT skills before the facilitator training. This means that some people had to spend a lot of time during the training helping others who did not have the required IT skills.

The following lists summarise programme staff's responses**.** Strengths included:

- Intel® Teach to the Future is educationally very sound from an IT point of view.
- It is not technology for technology's sake: it is contextualised and authentic.
- No charge is made for the training; it is free.
- The project is aimed at teachers' educational development in using ICTs in teaching, and not at generic ICTs skills.
- The project covers Curriculum 2005 and the Revised National Curriculum Statement.
- The US materials provide the basis for adaptation in terms of Curriculum 2005 terminology and Critical and Specific Outcomes.
- The project contributes substantially to the provinces' training needs.
- The project materials are not static, but are upgraded and reviewed as necessary.
- The project is relevant.
- It is well-illustrated with examples.
- The materials are thorough.
- There are many support resources in the CD.
- The training of facilitators takes place face-to-face and not at a distance.
- Teachers are trained on-site in their schools by a colleague (who has been trained as a facilitator).

Weaknesses included:

- The cascade model isn't working.
- Given the "just in case: just in time" dichotomy in ICTs, there is content that may be interpreted as "just in case". This is not appropriate, given the low entry level of the teachers.
- There is a misperception that the project caters for the elite, as the majority of trainees come from independent and ex-Model C schools. But the fact is that trainees must be computer literate and from schools that have the necessary IT infrastructure. If would-be trainees have successfully gone through the Thintana i-Learn and Educators' Network projects, they are at the correct level for Intel® Teach to the Future.
- The project does not factor in continuing support for trainees.
- To succeed, one must start with well-trained and competent people who can return to train their colleagues. In South Africa there is a problem identifying Senior Trainers. Many candidates do not have the necessary questioning skills: they do not have a grasp of what constitutes open questions. They may have a good grasp of IT, but must also have a sound grasp of "essential" and "unit" questions so as to be able to facilitate learners to formulate suitable questions for a unit.
- The candidates' own pedagogical practice is often deficient, as well as their IT skills.

- A high percentage of trained facilitators are not starting courses in their schools, and the numbers of trained teachers expected by Intel are not being achieved.
- The advocacy campaign is largely top-down when it should be the reverse. This sometimes creates political pressure in identifying entrants to courses—provincial departments identify schools with computers and allocate schools to attend training. Trainees selected in this way are often not suitable.
- Wrong assumptions are made that the trainees are comfortable with English and that they will acquire the necessary skills (pedagogical and IT) quickly.
- The facilitators' course is overly intensive (ten modules in five days); so is the training conducted by facilitators in schools—four hours a week for ten weeks (it is in reality taking twice as long).
- As the training demands are much more intensive than is assumed by the designers of the project, two senior trainers are required for each course (as against the one allocated). This means that the cost-effectiveness of training is lower.

COMMENTS FROM PARTICIPANTS

Having looked at a summary of the statistical results of the pre- and post-training questionnaires, it is useful to present a selection of optional comments made by participants to add a more personal touch to the statistics. A short selection of representative comments is presented below.

Optional comments on reasons for taking part and expectations

> It is because in this world everything has changed. Technology is advanced. So Intel® Teach to the Future Programme is the better thing to be done. Children have computers in their homes, so they like to do things that involve them. It is important for an educator to do these programmes.
>
> I want to develop myself more in information and communication technologies. Maybe this programme will help learners to work more independently under the guidance of the educator and they will work at their own pace.
>
> I want to learn new ways of planning, preparing and presenting my lessons
> To be developed as an educator so I would be in a position to develop my learners.
>
> Everything we do is increasingly dependent on technology – I foresee that computers will become an integrate part of teaching and in the classroom.

Optional comments on questions related to the Intel® Teach to the Future training session just completed

> I believe being in contact with educators from outside my school during the training would have been great.
>
> Every educator was keen to help or to be helped. Besides educators can share different ways of solving one problem on their websites.
>
> Integrating educational technology into the grade and subject I teach will not be a problem, but the only stumbling block is the number of learners I have in my class which is +/- 50 with no computers.

Pupils get excited when working with computers. Therefore it is motivating to them and they could learn contextual topics easily in an exciting and independent way.

It was worthwhile doing this course it was and still is an "eye breaker" because I ended up understanding how could teaching be implemented by using computer programs.

The course was too fast because it is not the only thing we are doing. We also have many other deadlines.

I felt that the course was slow at first, as students had different levels of computer skills and I wasted time. However, as the course progressed, I managed my time better and felt that the pace was right.

Optional comments on the manual and CD

The way it is big, I find it somehow intimidating. Though if you take your time it is good and detailed.

The manual allows you to go back and refresh skills that may not have been used for a while.

Intel Teach Manual in nicely organized and has step-to-step details. It has pictures to enforce the learning and is easy to understand.

The CD guided us in many instances and came to my rescue many times.

When I got stuck and no one was around to help me, I was able to help myself.

Optional comments on facilitator's confidence to run training in their school

Die aanbieding is 'n groot uitdaging omrede die fasiliteerders by my skool nog nie die intreevaardighede het om die kursus gemaklik te voltooi nie. Ek sal eers moet terug gaan en die fasiliteerders gaan oplei om die rekenaar na behore te gebruik en dan sal die kursus eers met hulle suksesvol gedoen kan word. *(English translation: The presentation is going to be a big challenge since the educators in my school do not have the entry requirements needed to complete the course easily. I will need to first go back and train the educators to use the computer properly before this course will be successful with them)*

I know I would be able to run this course. I pick up a lot of reactions from the group that did the course with me that will help me to make this a worthwhile experience to the teachers.

At the beginning of training I was not very confident…. But now I AM VERY CONFIDENT! My PC skills improved so much, I was able to help others with problems that I had, earlier in the week.

I am concerned about the reliability of my new Internet connection and want to be sure it is working properly before I start. Want to work on some of the technical skills on my own first. Would like to work with Front Page a lot before I try and work with others with it.

I feel with a little revision, its all systems go.

Additional comments noted under 'any comments or suggestions for how this training could be improved'

It would be helpful and essential if there was a follow-up to this course because it is quite informative and interesting.

I feel that the course could be given long months so that educators could more fully understand the course. The modules are long and need time.

I feel that the portfolios should be published so that other educators can view them. This can encourage some educators to become more creative as they now have the ability to do so.

I personally believe the course is exceptionally well, but more time could be allocated as most educators are still illiterate as far as the computer is concerned. Above all it is needed as technology is something we cannot wish away.

I think it would be far better if this project could be extended further so that every teacher in the teaching fraternity could get this opportunity to ensure that he or she keep abreast with what is going on in the world of information technology. This will not only enhance the educator alone but the learner as well. This is by far the best project.

The course was very helpful. It also uplifted the standard of teaching in our schools. I wish it could be implemented in many schools so that we can have better learning in our country.

Perhaps the group could be differentiated into ability groups. The teachers that lacked plenty of skills soon lost confidence trying to keep up with the group who moved too fast for them. As a result, they dropped out of the course, which is a pity.

Thank you for providing an educationally sound extremely useful course to the educators around the world. Your vision is greatly appreciated. Thank you also to our excellent facilitator.

CONCLUSIONS AND RECOMMENDATIONS

Having presented in detail the results of the evaluation research in the previous section, this section highlights a few key issues and makes recommendations for Intel® Teach to the Future South Africa going into year two. The many positive points about the Intel® Teach to the Future programme are clear from the results presented above, thus in this section we will focus in more detail on the central challenges to success and recommendations for addressing these.

Overall, this evaluation research has shown that the Intel® Teach to the Future programme is regarded very favourably by those taking part in the programme. Much learning has taken place, and many educators who previously did not know how to use computers for teaching and learning now have a range of creative ideas and new skills. In addition, awareness of the potential of computers and the value of linking technology and curricula has been raised at the educator and school levels. The Intel® Teach to the Future materials and educational approach are sound and are valued by participants.

The research also documented the range of schooling contexts within which Intel® Teach to the Future is being implemented. In general, the Intel® Teach to the Future programme was found to be most effectively implemented at school 5. School 5 is a very well resourced independent school facing few of the same challenges as the majority of South African previously disadvantaged schools. School 6, a poor rural school was doing very well with respect to conducting Intel® Teach to the Future training, however, many concerns were raised about implementing what is learnt during training because of the poor ICT resources of the school. This contextual detail is essential as it helps to interrogate the assumptions underlying the Intel® Teach to the Future programme, originally designed in a developed country context, and also highlights that in South Africa there are many factors affecting implementation at the school level over which the Intel® Teach to the Future programme has little or no control. It is important to understand these factors when making claims about the impact of the programme in later evaluations.

The most obvious of these is the lack of access to sufficient ICT resources. While government has committed to addressing this issue, it is likely to remain a factor for some time to come. Although the Intel® Teach to the Future programme cannot solve infrastructural problems directly, this constraint needs to be more actively embraced by the Intel® Teach to the Future programme to enhance relevance of the programme, especially for poorer schools. During training, educators need to be provided with more direct support and ideas for how they and their schools can make the most effective use of their limited resources. One component of this support could be some form of ongoing interaction between educators from different schools through which successes, challenges and lessons could be shared. Several educators and facilitators noted that they would value more exchange with other educators[27]. Such support is essential to counter the sense of hopelessness expressed by several educators when asked about implementing what they have learnt in the training.

[27] One means of encouraging this exchange is through the publishing of educator's portfolios. This is already in process to some extent. A consultant has been reviewing portfolios and preparing them for publication on an Intel® Teach to the Future CD. The best portfolios might also be made available via the Intel® Teach to the Future website.

In addition to factors over which the programme has little control, the findings have shown that the Intel® Teach to the Future programme in South Africa faces two main challenges to success. These are the relatively low numbers of educators taking part and the overall low level of ICT skills (and general poor quality of educator training in the past) in the country, which means that the majority of educators taking part in the training do not come prepared with the requisite skills levels. Both factors are closely related and as such will be dealt with simultaneously.

The first factor, that of lower than anticipated numbers being reached, perhaps requires that the Intel® Teach to the Future programme team review the implementation model being employed. The research findings show that there are reservations about the cascade model of implementation. There is a shortage of appropriate candidates to be trained as senior facilitators and as facilitators at the school level. Some facilitators fail to start training in their schools. In addition, the participating educators often come with lower than ideal levels of ICT skills. As a result, training at the school level takes place very slowly and the time commitment expected of both facilitators and educators becomes increasingly taxing. Other countries have chosen different implementation models, and it is recommended that Intel® Teach to the Future staff explore other possibilities. While the concept of a cascade model is desirable for several reasons, the schooling context in South Africa is perhaps too complex to support this model.

An additional factor that is likely to be affecting the numbers of educators taking part is that of incentives. First, the promise of laptops to facilitators that did not materialise, created expectations that were not met, and hence facilitators were in some instances demoralised. In addition, the cascade model assumes that each facilitator will train at least five educators, although the expectation is that many more will be trained if required numbers are to be met. Given that the training takes at least 40 hours of a facilitator's time, but in most cases more, it is unrealistic to expect facilitators to run more than their one required set of training. There are many examples of dedicated individuals who do just this (for example the facilitators from case study schools 5 and 6 who have both done three sets of training), but this is not yet a general trend. Without incentives to encourage facilitators, it is unlikely that overall numbers being trained will increase in the short term. The concept of incentives needs to be explored in a broad manner. While monetary and 'gift' type incentives are the first that come to mind expanding possibilities of accreditation for those taking part in, and those facilitating training, are also likely to attract more participants. Educators responded well to receiving a certificate on completion and to endorsement of the programme by SACE and it is likely that more formal forms of accreditation would have a positive effect on numbers.

The case studies revealed that few school principals are aware of what the Intel® Teach to the Future programme is about. In most cases, the facilitator briefly presented the idea to the principal and then took the process forward. Developing more active support at the school management level is important and may also help to encourage more educators to take part in training.

The other major challenge noted is that of the low levels of computer skills of educators taking part. This is a challenge in and of itself, as the programme assumes relatively high levels of skills, but it also affects the numbers of educators taking part. When educators lack the required ICT skills, they tend to focus on the ICT aspect of the training in order to get through rather than the important pedagogic aspects. As with the problem of lack of computer

resources in schools, this is partly a contextual issue related to the complex South African education landscape and the relative disadvantage of many schools. Research suggests that educators pass through several stages as they adopt and learn to use ICTs[28]. The Intel® Teach to the Future programme assumes that educators are relatively advanced in this progression which is not the case for the majority in South Africa, hence some of the challenges noted in this study. However, as efforts to develop ICT infrastructure and capacity within the education sector proceeds the importance of having educators trained at the level offered by Intel® Teach to the Future should not be underestimated. The Intel® Teach to the Future programme has an extremely valuable role to play – particularly in bringing technology and pedagogy together, and this value was recognised by all in the research process.

Several of the educators and facilitators interviewed during this evaluation study made suggestions for dealing with the low ICT skills levels. Based on these ideas and the researchers' observations the following three possibilities are suggested:

- Link the Intel® Teach to the Future programme more clearly with the Educators' Network (EDN) modules or other basic computer training options such as Microsoft's International Computer Driving Licence (ICDL), or at least support schools to enrol in the EDN programmes. Several schools noted that they did not know how to join more basic level ICT programmes and hence decided to take part in the Intel® Teach to the Future programme even though educators did not have computer skills.
- Develop a module 0 to accompany the current Intel® Teach to the Future modules. Educators wishing to take part in the programme could then be assessed and those without the requisite schools requested to first complete Module 0 before starting the programme.
- Develop an online tutorial facility that educators who need additional support can make use of. Such a facility will take some of the pressure of providing both basic ICT training and Intel® Teach to the Future training off the facilitator. Such a facility could also be used when educators miss training sessions or struggle with a particular aspect of the training.

In conclusion then, it is hoped that this year one formative evaluation has highlighted the many achievements and valuable role being played by the Intel® Teach to the Future programme in South Africa, as well as developed a deeper understanding of the range of South African contexts and factors that hinder implementation, so facilitating programme improvement.

[28] See for example, UNESCO (2002). Information and Communication Technologies in Teacher Education. A Planning Guide. Paris: UNESCO.

APPENDICES