An ICT Professional Development Implementation Plan for Educators in Trinidad & Tobago

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1 Acronyms

CARICOM	Caribbean Community and Common Market
CC	Creative Commons
CETT	Centre of Excellence for Teacher Training
COL	Commonwealth of Learning
CTPD	Continuing Teacher Professional Development
CSEC	Caribbean Secondary Education Certificate
CFT	Competency Framework for Teachers
CST	Competency Standards for Teachers
CXC	Caribbean Examination Council
DSS	Division of Schools Supervision
EMIS	Education Management and Information System
eCaL	eConnect and Learn Project
GCE	General Certificate of Education
GDP	Gross Domestic Product
GIS	Geographic Information System
GoRTT	Government of the Republic of Trinidad and Tobago
HRMD	Human Resources Management Division
IDB	Inter-American Development Bank
ICT	Information and Communication Technology
ICT4D	Information and Communication Technology for Development
ICTD	Information and Communications Technology Division
ISTE	International Society for Technology in Education
IT	Information Technology
M&E	Monitoring and Evaluation
MoE	Ministry of Education
NESC	National Energy Skills Corporation
NOSTT	National Open School of Trinidad and Tobago
OAS	Organisation of American States
ODL	Open and Distance Learning
OER	Open Educational Resources
T&T	Republic of Trinidad and Tobago
SEMP	Secondary Education Modernisation Programme
SEMPCU	Secondary Education Modernisation Programme Coordinating Unit
TETPPU	Teacher Education and Teacher Performance Project Unit
UNESCO	United Nations Educational Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
USC	University of Southern Caribbean
UTT	University of Trinidad and Tobago
UWI	University of West Indies
VLE	Virtual Learning Environment

2 Summary

The Ministry of Education (MoE) of the Republic of Trinidad and Tobago (T&T) has an ambitious vision for use of ICT in education. In support of this process, the Ministry, in collaboration with the Commonwealth of Learning (CoL), has also developed an ICT Professional Development Strategy for Teachers in the Republic of Trinidad and Tobago. The vision of that strategy is:

> *To develop a coherent and sustainable approach to teacher ICT professional development so that, through effective pedagogy and integration of ICT, learners are able to embrace technology and become globally competitive knowledge workers.*

That Strategy identified as its key objectives to:
- Ensure coherent management of teacher ICT professional development
- Enhance teaching and learning through ICT integration
- Build capacity to design and deliver professional development courseware
- Improve support and recognition at institutional level
- Monitor and evaluate implementation

Within this context, this document presents a detailed plan for continued implementation of the ICT Professional Development Strategy for Teachers in the Republic of Trinidad and Tobago. The focus of this implementation plan has been broadened to include all educators (in recognition that there are multiple target audiences for the Strategy).

Design of the ICT Professional Development Implementation Plan for Educators in T&T has been based on the following key principles and assumptions:
1) It is expected that in design/selection of professional development courses:
    a) All courses will be competency-based;
    b) The courses will include appropriate blends of face-to-face learning, in-school activities, and use of e-learning.
2) The current Strategy is committed to integration of the United Nations Educational Scientific and Cultural Organization (UNESCO) ICT Competency Standards for Teachers (CST) into the curriculum design of all courses.
3) Once in-service professional development courses aligned to the UNESCO ICT CFT have been approved by the T&T Accreditation Council, the Ministry will seek to submit relevant in-service courses and modules that it designs to the Virtual University for Small States of the Commonwealth (VUSSC) Transnational Qualifications Framework (TQF) for inclusion in the TQF.
4) The ICT Professional Development Strategy for Teachers will construct clear learning pathways for T&T teachers to move progressively from technology literacy to knowledge deepening through both pre-service teacher training and continuing professional development.
5) Courses and modules produced through the ICT Professional Development Strategy for Teachers will build on and adapt existing national and international courses and modules wherever possible.
6) The ICT Professional Development Strategy for Teachers will also facilitate sharing of all courses/modules and associated educational materials by releasing them as Open Educational Resources (OER) under an appropriate Creative Commons (CC) licence.
7) Regarding future implementation of ICT in T&T schools, it is assumed that:
    a) School administration teams will be expected to develop ICT Integration Plans as a key component of their overall School Plans.
    b) The current appointments of ICT Technicians at all Secondary schools in T&T will remain in place and that these personnel thus require professional development support.
    c) Secondary schools will, either through their own planning processes or – ideally – as a policy requirement, appoint teachers within their schools to function as Technology Coordinators, whose role will be to provide a first level of support to teachers within each school.

d) In order to ensure that all teachers are able to support students effectively to derive maximum educational benefit from a 1:1 learning environment, teachers will also be supplied their own laptops.

e) There will be sustained increases in Internet connectivity at all schools in T&T, but particularly all secondary schools, in order to leverage the educational benefits of 1:1 learning most effectively.

The Implementation Plan targets the following key audiences:
1) Curriculum Officers and School Supervisors;
2) School administrators (principals, vice-principals, heads of department, and deans);
3) Pre-service teachers;
4) In-service teachers;
5) Technology Coordinators;
6) ICT Technicians; and
7) Students.

The T&T ICT Professional Development Framework for Educators will incorporate various professional development courses, drawing on existing courses already being used in T&T, while ensuring that these are aligned to achievement of specific measurable competences as defined in key global ICT professional development frameworks.

Notional targets for each in-service professional development strategy are presented below. It is important to note that the key constraint in enrolments is the number of mentors available to facilitate courses (numbers below are based on an assumption that each group of 20 students will require one mentor/facilitator).
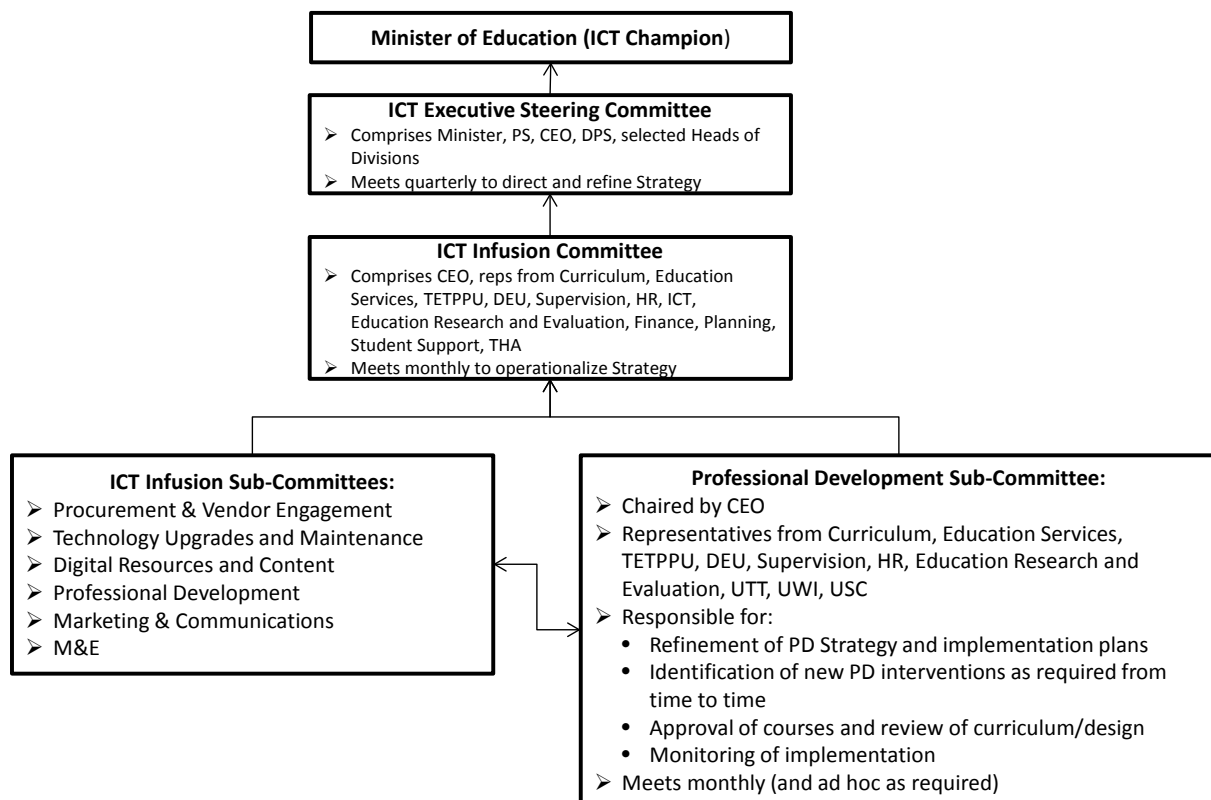
Table 1   Notional In-Service Course Enrolments

In-Service Course	2011	2012			2013			2014			Total
CCTI	50	100			150			150			450
Basic ICT Readiness Assessment	N/A	100	200	300	300	300	300	N/A	N/A	N.A	1,500
Basic ICT Readiness	N/A	N/A	100	200	300	300	300	300	N/A	N.A	1,500
Technology Literacy for Teachers	N/A	1,000	1,000	1,000	1,500	1,500	1,500	1,500	1,500	1,500	12,000
Knowledge Deepening for Teachers	N/A	N/A			1,500		1,500	2,250		2,250	7,500
ICT Integration for Administrators	N/A	150		150	500		500	500		500	2,300
ICT Integration for Technology Coordinators	N/A	N/A	N/A	100	100	100	100	100	100	100	700
ICT Technicians' Course	N/A	150			150			150			450
SSTC course	N/A	750			1,500			3,000			5,250

A simple management structure is proposed, which envisages the Ministry of Education assuming overall oversight responsibility for Implementation and is in line with structures already in place in the country and in line with the existing ICT in education policy. For the purposes of management, it is assumed that the management of the eCAL Project will again be subsumed into the ICT Infusion Committee, but that this will comprise a Committee structure similar to that deployed for the eCAL Project during its early phases of implementation.

The management structure can be represented diagrammatically as follows:

Figure 1   ICT Professional Development Management Structure

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│        Minister of Education (ICT Champion)       │
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│        ICT Executive Steering Committee           │
│  ➤ Comprises Minister, PS, CEO, DPS, selected     │
│    Heads of Divisions                             │
│  ➤ Meets quarterly to direct and refine Strategy  │
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                          ↑
┌─────────────────────────────────────────────────┐
│             ICT Infusion Committee                │
│  ➤ Comprises CEO, reps from Curriculum, Education │
│    Services, TETPPU, DEU, Supervision, HR, ICT,   │
│    Education Research and Evaluation, Finance,     │
│    Planning, Student Support, THA                 │
│  ➤ Meets monthly to operationalize Strategy       │
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ICT Infusion Sub-Committees:
➤ Procurement & Vendor Engagement
➤ Technology Upgrades and Maintenance
➤ Digital Resources and Content
➤ Professional Development
➤ Marketing & Communications
➤ M&E

Professional Development Sub-Committee:
➤ Chaired by CEO
➤ Representatives from Curriculum, Education Services, TETPPU, DEU, Supervision, HR, Education Research and Evaluation, UTT, UWI, USC
➤ Responsible for:
  • Refinement of PD Strategy and implementation plans
  • Identification of new PD interventions as required from time to time
  • Approval of courses and review of curriculum/design
  • Monitoring of implementation
➤ Meets monthly (and ad hoc as required)

Provision has been made for ongoing monitoring and evaluation of the ICT Professional Development Strategy for Educators in T&T. It is envisaged that this will comprise three key elements:

1) Completion of a detailed baseline survey to determine the level of ICT competence of teachers in T&T during 2012;

2) Design, development, and maintenance of a Monitoring System designed to track delivery of capacity building in response to the gaps identified in the baseline survey, updated in real time by the agencies delivering professional development, so that progress in delivery can be monitored on an ongoing basis;

3) Commissioning of a comprehensive external evaluation study, with biennial formative evaluation reports designed to feed into and improvement implementation of the ICT Professional Development Strategy for Educators in T&T.

3 A Professional Development Implementation Plan

3.1 Background

The Ministry of Education (MoE) of the Republic of Trinidad and Tobago (T&T) has an ambitious vision for use of ICT in education. An initial vision was enshrined in the ICT in Education Policy developed in 2005. The MoE recognizes that use of ICT is critical to the transformation of society.[1] Its philosophy is that ICT in education should enhance human capacity and produce responsible citizens who can function in a knowledge-based society. ICT will:

- *Create an environment that encourages creativity, innovation, critical thinking and decision making;*
- *Promote the kind of collaboration that is required in a knowledge-based society;*
- *Enhance teacher skills and abilities;*
- *Facilitate the development of partnerships between schools, communities and other public and private sector organizations; and*
- *Optimise the operations and the management of the Ministry of Education in providing the highest quality service to the nation.[2]*

Subsequently, significant progress has been registered in implementing this policy.[3] In addition, the policy vision has been significantly augmented by the launch of the eConnect and Learn Project, which is systematically providing students in secondary schools with their own laptops on a Form-by-Form basis. Ultimately, this will mean that all students in secondary schools should have their own laptop, thus enabling system-wide implementation of 1:1 learning environments in secondary schools. Simultaneously, primary schools have been equipped with sufficient ICT infrastructure to enable students to leave primary schooling with the necessary information literacies to be able to benefit optimally from immersion into a 1:1 learning environment.

In support of this process, the Ministry, in collaboration with the Commonwealth of Learning (CoL), has also developed an ICT Professional Development Strategy for Teachers in the Republic of Trinidad and Tobago. The vision of that strategy is:

To develop a coherent and sustainable approach to teacher ICT professional development so that, through effective pedagogy and integration of ICT, learners are able to embrace technology and become globally competitive knowledge workers.

That Strategy identified as its key objectives to:
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- Monitor and evaluate implementation

A detailed set of three-year and five-year results have been defined in that strategy (see Appendix One). Implementation of this plan has already commenced in 2011, particularly through the enrolment of several teachers, curriculum officers, and other Ministry officials in the Commonwealth Certificate for Teacher ICT Integration (CCTI), many of whom have already successfully completed the first module of this Certificate programme. These graduates are being prepared to function as

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[1] MoE of the GoRTT: Draft Policy for Information and Information Technology in Education (2005)
[2] ibid
[3] See *An ICT Professional Development Strategy for Teachers in the Republic of Trinidad and Tobago* (November, 2010) for details of progress made in implementation of ICT to 2010.

mentors in the implementation of professional development activities in T&T during 2012 and beyond.

Within this context, this document presents a detailed plan for continued implementation of the ICT Professional Development Strategy for Teachers in the Republic of Trinidad and Tobago. The focus of this implementation plan has been broadened to include all educators (in recognition that there are multiple target audiences for the Strategy). It begins by providing a systematic analysis of the target audiences and their professional development requirements, then presents a coherent framework of professional development options for each target audience, before defining clear, achievable targets for professional development in ICT in Education over the next three years (2012-2014). This is consolidated into a logical framework, accompanied by a high-level activity schedule and a three-year budget. The plan includes a proposed governance and management structure for the Professional Development Strategy, in order to ensure that the necessary capacity is in place for effective implementation. Before commencing this analysis, though, a set of principles and assumptions, on which the Implementation Plan is based is presented.

3.2 Key Principles and Assumptions

Design of the ICT Professional Development Implementation Plan for Educators in T&T has been based on the following key principles and assumptions:

8) It is expected that in design/selection of professional development courses:
    a) *All courses will be competency-based* (see next point), both in design of the curriculum and materials and in terms of how assessment is conducted.
    b) The courses will include *appropriate blends of face-to-face learning, in-school activities, and use of e-learning* (with the latter combining both use of Virtual Learning Environments – VLEs – and existing social networking platforms, which many teachers are already accessing on a regular basis). To minimize expenses, it is proposed that the MoE consider deploying a single VLE to be shared by all participants in the process. This approach will serve to ensure that the professional development activities have a direct and measurable impact on classroom practices, with support provided to teachers at various levels to enable them to implement the skills they acquire through professional development activities as soon as they have learned them.

9) The current Strategy is committed to *integration of the United Nations Educational Scientific and Cultural Organization (UNESCO) ICT Competency Standards for Teachers (CST)* into the curriculum design of all courses, as this set of Standards effectively identifies the teacher as central in developing student ICT capabilities. The UNESCO ICT Competency Framework for Teachers (CFT) creates a common core syllabus that can be used to develop learning materials sharable at a global level, provides a basic set of qualifications that allows teachers to integrate ICT into their teaching; extends teachers' professional development so as to advance their skills in pedagogy, collaboration, and school innovation using ICT, and harmonizes different views and vocabulary regarding the uses of ICTs in teacher education.

10) Following on from the above, once in-service professional development courses aligned to the UNESCO ICT CFT have been approved by the T&T Accreditation Council, the Ministry will seek to *submit relevant in-service courses and modules that it designs to the Virtual University for Small States of the Commonwealth (VUSSC) Transnational Qualifications Framework (TQF) for inclusion in the TQF*, in order to ensure that all professional development provided within the T&T ICT Professional Development Framework for Teachers is internationally recognized.

11) The ICT Professional Development Strategy for Teachers will *construct clear learning pathways for T&T teachers* to move progressively from technology literacy to knowledge deepening through both pre-service teacher training and continuing professional development.

12) Courses and modules produced through the ICT Professional Development Strategy for Teachers will *build on and adapt existing national and international courses and modules* wherever possible, in order to reduce the costs of development and to improve the quality of the courses offered. Examples of sources of existing content that will be explored for possible use will include:
    a) Resources and courses available through the Commonwealth of Learning, most notably within the recently re-designed Commonwealth Certificate for Teacher ICT Integration (CCTI), which is an Advanced Certificate in Education designed in accordance with the UNESCO ICT CFT and aimed at teachers and school leaders wishing to focus on ICT integration into school management, teaching, and learning;
    b) Materials and courses from Microsoft's Partners in Learning Programme, focusing on courses already being offered in T&T;
    c) Materials and courses from the Intel Teach Programme, again focusing on courses already being offered in T&T.

13) Extending the principle of harnessing existing content, the ICT Professional Development Strategy for Teachers will also facilitate sharing of all courses/modules and associated educational materials by *releasing them as Open Educational Resources (OER) under an appropriate Creative Commons (CC) licence,* so that they are openly accessible and shareable between the key participating institutions, as well as being accessible to all schools in T&T and to the broader global education community.

14) Regarding future implementation of ICT in T&T schools, it is assumed that:
    a) School administration teams, particularly at the secondary level, will be expected to develop ICT Integration Plans as a key component of their overall School Plans in order to demonstrate clearly how they expect to harness the extensive investments in ICT made through the eCAL Project. In line with current school planning norms, it is assumed that implementation of these plans will be monitored by the School Supervision Division.
    b) The current appointments of ICT Technicians at all Secondary schools in T&T will remain in place and that these personnel thus require professional development support.
    c) Given the extensive investment in ICT infrastructure, secondary schools will, either through their own planning processes or – ideally – as a policy requirement, appoint teachers within their schools to function as Technology Coordinators, whose role will be to provide a first level of support to teachers within each school. Given this, it is assumed that these appointees will require targeted professional development support.
    d) In order to ensure that all teachers are able to support students effectively to derive maximum educational benefit from a 1:1 learning environment, teachers will also be supplied their own laptops, thus removing the need to arrange dedicated computer laboratory facilities for training purposes.
    e) There will be sustained increases in Internet connectivity at all schools in T&T, but particularly all secondary schools, in order to leverage the educational benefits of 1:1 learning most effectively and that teachers will be able to use this connectivity to access online/blended professional development courses and participate in relevant online communities of practice.

3.2.1 Overview of Professional Development Needs

Drawing from the current Professional Development Strategy and analysis of the requirements of the eCAL Project, it is possible to analyse the specific requirements of each of the target groups as defined in the groups of occupational categories presented above:

8) Curriculum Officers and School Supervisors;
9) School administrators (principals, vice-principals, heads of department, and deans);
10) Pre-service teachers;
11) In-service teachers;
12) Technology Coordinators;
13) ICT Technicians; and
14) Students.

The professional development requirements of each group are outlined below.

School Administrators (Principals, vice-Principals, Heads of Department, and Deans)

The growing consensus is that, for instructional technologies to be implemented successfully, leadership and administrative support are critical. This means that it is important that school principals – who make policy and financial decisions – are trained in educational technology and have the resources they require to make informed decisions.

To ensure effective use of ICT at school, it is imperative that leadership in schools is supported in the role of ICT leadership for the school. The principal need not be the ICT champion, but he/she does need to be aware of debates surrounding use of ICT in education and of the important role that leaders play in ensuring successful use. Leaders need to be aware of the consequences of working with and maintaining ICT facilities, as well as the financial implications thereof. It is imperative that, after initial training, leaders become part of a broader community of practice, attending ICT conferences, receiving quarterly circulars, e-mail newsletters, participating in online discussion forums, and sharing expertise and experiences.

In addition, there may also be requirements to include specific focuses on use of specialized platforms, including: Human resource management systems; Education management information systems; Communication platforms; Portals to access government and systems information and education content; Administration and management systems; Financial and accounting systems; Security software; Timetabling systems; and Office productivity tools.

The focus in professional development in T&T will be on supporting school administrators to attain levels of competence as defined in the International Society for Technology in Education (ISTE), with the preliminary professional development drive being to ensure that all schools develop and implement effective ICT Integration Plans. These plans should include, at least:

• A long-term vision for use of ICT in the institution;
• Codes of conduct for ICT usage by learners, teachers, management and administration, and the wider community;
• Curriculum policies outlining how the school intends to use ICT to support teaching across learning levels and learning areas/subjects;
• A detailed assessment of ICT requirements;
• Timetables outlining how ICT will be integrated into the school's operations, and what levels of access will be made available to which learners;
• Professional development strategies on use and integration of ICT in educational, management, and administrative tasks;
• School strategies to cover operating costs of ICT;

- Guidelines on ICT application and educational content acquisition; and
- Strategies for ICT support and maintenance.

Through this process, it is expected that:

1) All secondary schools will, by the end of 2012, have prepared detailed ICT Integration Plans (based on a template to be supplied by the MoE) as an integrated component of their overall School Plans, implementation of which will be supported and monitored by the School Supervision Division.

2) All primary schools will, by the end of 2013, have prepared detailed ICT Integration Plans (based on a template to be supplied by the MoE) as an integrated component of their overall School Plans, implementation of which will be supported and monitored by the School Supervision Division.

3) School administrators will receive ongoing support through online communities of practices, in-school visits from Curriculum Officers and School Supervisors, and access to relevant professional development activities available from 2013 onwards to develop their capacity to manage implementation of their ICT Integration Plans.

Teachers

Teachers are at the heart of delivery of the curriculum. Teacher professional development in use of ICT is best introduced in a context of broader educational reform, which embraces a shift away from teacher-centred, lecture-based instruction toward student-centred, interactive, constructivist learning. Teacher professional development is essential if ICT in schools is to be used effectively. Thus, ongoing teacher training and professional development offerings are vital for successful use of ICT in education. Teachers play a pivotal role in the adaptation and integration of ICT in education as they are a key element in curriculum implementation and innovation. Studies show that insufficient understanding of the scope of an ICT resource leads to inappropriate or superficial uses in the curriculum.

To harness ICT effectively in support of curriculum delivery, teaching and lecturing staff require substantial support and stimulation to change entrenched practices. This support includes general approaches to integration of ICT within teaching and learning, support within specific areas of a subject specialization, and training and support on effective use of specific ICT applications and digital education content offerings. To support this, UNESCO's ICT Competency Standards for Teachers are located within a broader policy context of educational reform and sustainable development which views education as a cultural relay that inculcates societal values including the role of the citizen in economic development.

For UNESCO, educational change through ICT encompasses three approaches: technology literacy, knowledge deepening, and knowledge creation, and these approaches have different implications for pedagogy, teacher practice and professional development, curriculum and assessment, and school organization and administration. In relation to pedagogy, the use of ICT requires teachers to develop skills to develop innovative ways of using technology to enhance the learning environment, and to encourage technology literacy, knowledge deepening and knowledge creation. As such, teacher professional development has to focus on developing teachers' knowledge and skills to develop technology literacy, knowledge deepening, and knowledge creation in relation to components of the educational system, that is, policy, curriculum and assessment, pedagogy, the use of technology, school organization and administration, and teacher professional development.

According to UNESCO, the three approaches to educational reform have different demands for teacher education, with the technology literacy approach being the most basic and requiring the most basic policy changes as the aim of this approach is to encourage and facilitate student uptake of

new technologies to support social and economic development. Professional development aimed at supporting the technology literacy approach focuses on developing teachers' technological literacy to integrate basic ICT tools into the curriculum. This technology literacy approach requires a focus on equitable distribution of technological resources to enable access by as wide a population as possible to lessen the digital divide. The outlay of technological tools at this stage is a precursor for possible success of all three approaches to educational development.

Knowledge deepening educational changes are deeper and they are likely to have greater impact on learning. Knowledge deepening requires students as citizens to apply school knowledge for complex problem solving in the workplace to add value to national development, for example through innovation that provides solutions to national challenges. To achieve this approach to educational reform, teacher professional development should focus on providing teachers with the knowledge and skills to use more complex methodologies and technologies. Change in the curriculum should include establishing a complex relationship between school knowledge and real world problems and can involve collaboration between students at local and global levels with the teacher managing the learning environment.

The knowledge creation approach to educational improvement is the most complex as it aims to create a citizenry that engages in and benefits from knowledge creation, innovation, and participation in lifelong learning. Curriculum changes to achieve the aims of this approach are inculcating skills in collaboration, communication, creative thinking and innovation and critical thinking. Teachers can model these skills to their students through their own professional development where they develop more sophisticated skills on using technology and collaborate with peers to design projects that challenge students to exercise the aforementioned skills.

Given the nature of these above components, the focus in T&T will be on:
1) Ensuring that all new teachers entering the system have attained the 'Knowledge Deepening' level of competence through their pre-service training;
2) All teachers in T&T have attained the 'Technology Literacy' level of competence by the end of 2014;
3) At least 50% of all teachers in T&T have attained the 'Knowledge Deepening' level of competence by the end of 2014.

Curriculum Officers and School Supervisors

The leadership role of Ministry of Education personnel at the national and district levels in changing their own practice and supporting and monitoring schools in their uptake of ICT is pivotal to the success of Trinidad & Tobago's plans to roll out ICT in education. The areas in which MoE personnel require support include: leadership and vision; learning and teaching; productivity and professional practice; support, management, and operations; assessment and evaluation; and social, legal and ethical issues. From this perspective, the MoE within T&T has already commenced a process of implementation of the CCTI as a primary mechanism for building this competence within the MoE, both within Ministry officials and amongst a first group of teachers who are anticipated to become key mentors in the ongoing implementation of professional development courses and activities in T&T. A key approach to this professional development is to provide access to information, encourage communities of practice, and provide mentoring support to national and regional MoE personnel (and particularly Curriculum Officers and School Supervisors, as the first line of support) to manage their change in practice and support the schools for which they are responsible.

Technology Coordinators

The term 'Technology coordinator' refers to the individual staff member at a school who is assigned overall responsibility for developing and overseeing/driving implementation of a school's ICT

Integration Plan. As ICT has been deployed within T&T schools, there is already evidence that some schools are starting to make these appointments, although formalizing such appointments through national policy (and ideally a corresponding workload reduction for the appointed teacher to enable them to discharge the functions required of Technology Coordinators effectively) would help to develop this critical first line of support for teachers more effectively.

This staff member could be drawn from any of the job functions at a school. So, he/she may, for example, be a primary school principal, head of department, or senior teacher responsible for IT in secondary school. Some education systems, for example in Japan and Hong Kong, have recognized the special role of Technology Coordinators in schools, and therefore provide training to those occupying such positions. In other systems, there are not formal appointments of Technology Coordinators in schools, and usually the more competent ICT teachers will assume such roles in their schools.[4]

One of the Technology Coordinator's roles will be to act as the school point of contact on all ICT-related matters. Another is to promote creative use of computers in the development of educationally meaningful projects. There are also administrative requirements, where the ICT coordinator needs to work closely with school leaders to, for example:
• Develop a School ICT Integration Plan.
• Develop and ensure compliance with a code of conduct for computer usage within the school.
• Support teachers and lecturers in articulating their professional development needs in relation to ICT skills.
• Facilitate development and implementation of individual professional development pathways for school staff.
• Agree and oversee timetabling and booking systems for the ICT resources available in the school.
• Act as a point of contact for reporting maintenance and technical support requirements.
• Identify areas that can be enhanced by the use of ICT and support the implementation of suitable systems for, by way of example:
  – Reporting – academic achievement and personal development comments;
  – Timetabling;
  – Finance;
  – Communication; and
  – Human Resource systems.

As such, the Technology Coordinator has specific professional development requirements. These may overlap with the needs of school principals and with the professional development requirements of teaching staff, but there is a sufficiently common core of requirements that warrant defining Technology coordinators as a unique group. Resources, communities of practice, training, and professional development opportunities will be essential to support the person who is appointed to this role. They require support in technical, pedagogical and leadership areas.

ICT Technicians

ICT Technicians need to work closely with school management to ensure that the best possible use is made of ICT resources and facilities. Their technical roles would include, but not necessarily be limited to, the following:
• Issuing all users with their own log-in codes and private areas in which to store their data;
• Setting up e-mail services so that each user has a private e-mail account;
• Preventing bandwidth abuse where necessary by limiting the size of e-mail attachments and possibly blocking certain types of downloads;

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[4] Pelgrum, W.J. and Law, N. (2003) ICT in Education Around the World: Trends, Problems and Prospects. Unesco International Institute for Education Planning: Paris

- Keeping copies of e-mails sent and received so that there is evidence in cases involving complaints about abuse of e-mail services.

In particular, they will need to ensure that learners' safety is protected. This will involve:

- Protecting personal data;
- Blocking dangerous/harmful sites;
- Assisting educators to find and make available positive educational sites;
- Policing, monitoring, and logging Internet usage;
- Maintaining equipment in good running order; and
- Ensuring that equipment is set up with a view to preventing damage from bad ergonomics.

ICT Technicians would also have various security functions, including for example:

- Ensuring that the integrity of school data and systems is preserved by having adequate security policies and firewalling in place to protect against both internal (for example, from learners) and external threats;
- Having a network-wide anti-virus solution that is regularly updated;
- Ensuring that all servers and workstations are kept up to date with the required operating system updates and licensing agreements; and
- Creating backups of all important data on a regular basis, and keeping copies of these offsite.

The professional development needs of ICT Technicians would be to acquire the skills and competences necessary to perform functions such as those illustrated in the above lists. They need to be familiar with various ICT applications being used across schools and able to support the installation, use, and maintenance of these software applications. In a rapidly changing ICT environment, ICT support personnel need to be kept current with the latest security and maintenance techniques and offerings, so they will also require ongoing support and contact from colleagues within the same environment. They also need to be able to access specialist or expert support to resolve maintenance issues outside of their competence.

Students

Particularly at secondary level, the extent of ICT deployment though the eCAL Project suggests that formal technical support will be insufficient to ensure ongoing maintenance of ICT equipment. In addition, there are several emerging examples internationally (for example, in the United States of America, Macedonia, and Indonesia) that students can play an important role in supporting ICT maintenance and repair within schools. Such strategies have also been demonstrated to have significant positive educational and social outcomes for participating students. Consequently, T&T will explore development of Student Support Technician Clubs (SSTCs) at schools to provide technical support. This process can usefully be guided by a Computer Lab Sustainability Took Kit developed by AED, Cisco, and Qualcomm. The process will aim to develop technical and leadership skills in selected students to support technology teachers to maintain computers, troubleshoot problems, and support classroom teachers to integrate ICT for teaching and learning.

Summary

In summary, therefore, the immediate focus for professional development will be to develop a multi-tiered support structure for teachers that provides the necessary support and monitoring to ensure effective use of the extensive ICT infrastructure that has been deployed in T&T. This support structure will comprise:

1) A supportive school environment, with a comprehensive ICT Integration Plan being developed by the school administration in consultation with all key players, which serves to ensure that school administrators are supportive of teachers' efforts to use ICT effectively in their classrooms and that school targets in this regard are formally monitored.
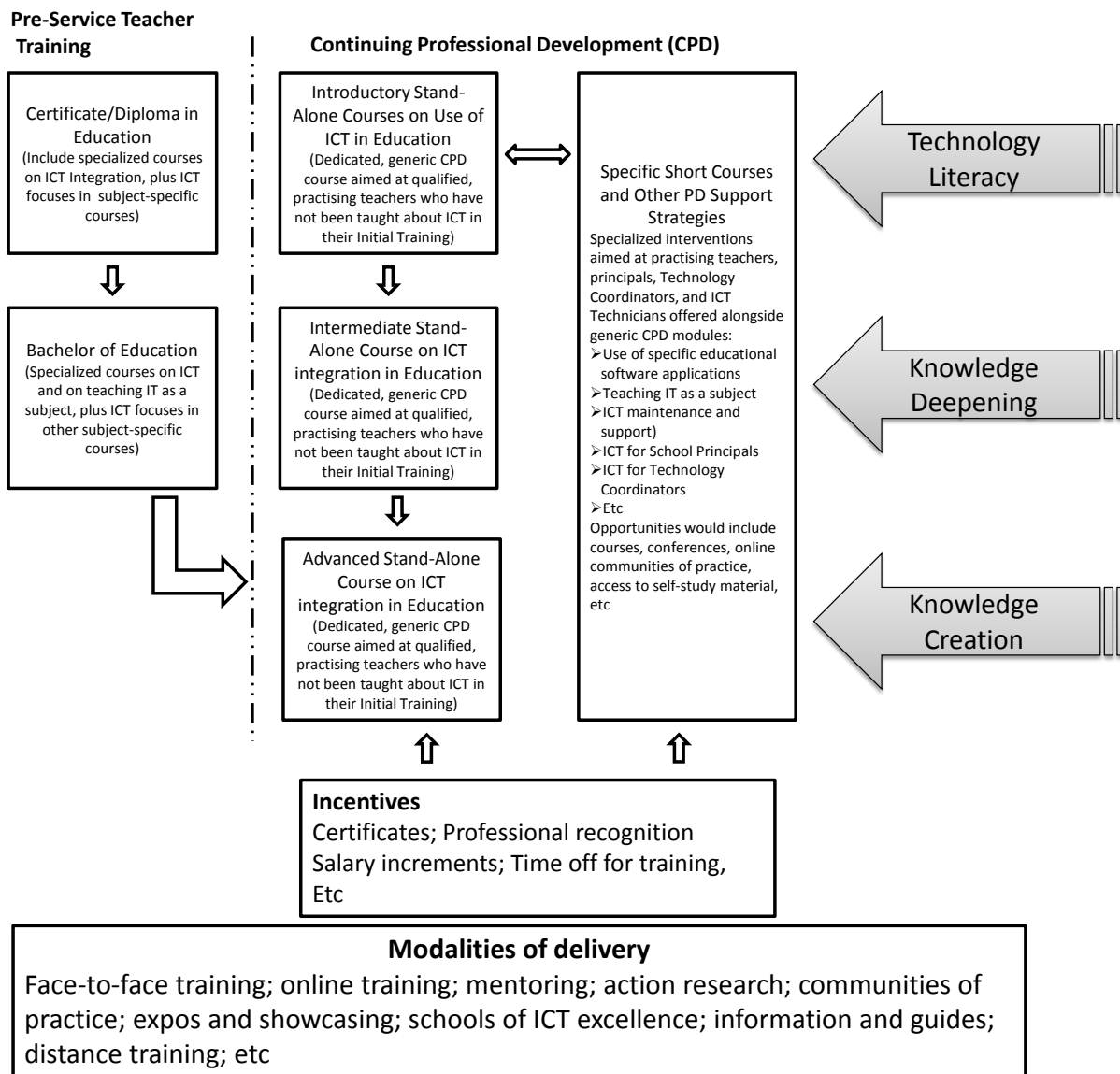
2) A first line of support for teachers being provided within the school through the appointment of Technology Coordinators and, at least at secondary level, ICT Technicians and SSTCs. Technology Coordinators particularly will be developed to provide ongoing pedagogical support to all teachers within schools regarding effective ICT Integration.

3) Access to three levels of professional development support for teachers, which seek to move them systematically from Basic ICT Readiness to Technology Literacy to Knowledge Deepening levels of competence (and, for some, beyond to Knowledge Creation). This professional development will be made accessible on an ongoing basis from the beginning of 2012, using as mentors those Curriculum Officers and teachers who are already being trained through the CCTI.

4) A teacher supply system (through pre-service teacher education programmes) which ensures that all new teachers entering the system have already attained the Knowledge Deepening level of competence, so that the requirement for ongoing professional development declines systematically over four years.

5) Access to online communities of practice, through which teachers in T&T can share knowledge, resources, and experiences, as well as seeking support from their peers.

This support structure already in development within T&T through the current Professional Development Strategy, and will be accelerated through implementation of this plan.

3.2.2 Trinidad & Tobago ICT Professional Development Framework for Educators

The T&T ICT Professional Development Framework for Educators can be presented diagrammatically as follows:

Figure 1   T&T ICT Professional Development Framework for Teachers

Pre-Service Teacher Training

Continuing Professional Development (CPD)

Certificate/Diploma in Education
(Include specialized courses on ICT Integration, plus ICT focuses in subject-specific courses)

Introductory Stand-Alone Courses on Use of ICT in Education
(Dedicated, generic CPD course aimed at qualified, practising teachers who have not been taught about ICT in their Initial Training)

Specific Short Courses and Other PD Support Strategies
Specialized interventions aimed at practising teachers, principals, Technology Coordinators, and ICT Technicians offered alongside generic CPD modules:
➢ Use of specific educational software applications
➢ Teaching IT as a subject
➢ ICT maintenance and support)
➢ ICT for School Principals
➢ ICT for Technology Coordinators
➢ Etc
Opportunities would include courses, conferences, online communities of practice, access to self-study material, etc

Technology Literacy

Bachelor of Education
(Specialized courses on ICT and on teaching IT as a subject, plus ICT focuses in other subject-specific courses)

Intermediate Stand-Alone Course on ICT integration in Education
(Dedicated, generic CPD course aimed at qualified, practising teachers who have not been taught about ICT in their Initial Training)

Knowledge Deepening

Advanced Stand-Alone Course on ICT integration in Education
(Dedicated, generic CPD course aimed at qualified, practising teachers who have not been taught about ICT in their Initial Training)

Knowledge Creation

Incentives
Certificates; Professional recognition
Salary increments; Time off for training, Etc

Modalities of delivery
Face-to-face training; online training; mentoring; action research; communities of practice; expos and showcasing; schools of ICT excellence; information and guides; distance training; etc

The T&T ICT Professional Development Framework for Educators will incorporate various professional development courses as outlined in Table 1 below. As this table illustrates, the courses will all draw on existing courses already being used in T&T, while ensuring that these are aligned to achievement of specific measurable competences as defined in key global ICT professional development frameworks.

Table 1   Professional Development Courses

Course and Launch Date	Target Audience	Provider	Methodology, Duration, Frequency	Outcomes	Source Courses
Commonwealth Certificate for Teacher ICT Integration Already launched	Teacher Mentors (drawn from Curriculum Officers, School Supervisors, Teacher Trainers, and Existing Teachers) Technology Coordinators	SchoolNet South Africa/ COL	320 Notional Learning hours over 18 months Predominantly online, with very limited face-to-face interaction New enrolments annually	Successful attainment of competences at Knowledge Deepening Level of UNESCO ICT CFT See curriculum of CCTI for detailed learning outcomes	Not applicable (programme already designed and operational)
Basic ICT Readiness Assessments commence in Jan 2012 Course launches in Feb 2012	In-service teachers with no prior experience of using ICT (basic assessment to be completed to determine requirement to complete this course)	Curriculum Division (Curriculum Officers/Teachers from CCTI to facilitate)	24 notional learning hours in a three-day workshop Face-to-face workshop in computer laboratory Three times annually until all teachers have completed course	Basic ICT skills developed in order to enable progression onto Level One Professional Development Participants assumed to enrol immediately in 'Technology Literacy for Teachers' to embed skills gained	ICT Skills for Teachers (Microsoft Partners in Learning)
Technology Literacy for Teachers March 2012	In-service teachers at Basic ICT Readiness level	Curriculum Division (Curriculum Officers/Teachers from CCTI to facilitate)	120-150 notional learning hours over 3-4 months Blended learning – limited face-to-face workshops, combined with online learning, in-class assessment activities, and school support visits	Successful attainment of competences at Technology Literacy Level of UNESCO ICT CFT Ideally, successful teachers will move onto to complete 'Knowledge Deepening for Teachers'	ICT and the Roles of the Educator (CCTI) Developing Digital Learning Resources (CCTI) Exploring and Developing Subject Resources (SchoolNet SA) Infusion of ICT into Curriculum Delivery (NESC)

Course and Launch Date	Target Audience	Provider	Methodology, Duration, Frequency	Outcomes	Source Courses
			Three times annually until all teachers have completed course	the year after they complete this course	One Step Further (Microsoft Partners in Learning)
Knowledge Deepening for Teachers Jan 2013	In-service teachers at Technology Literacy level	Curriculum Division (Curriculum Officers/Teachers from CCTI to facilitate)	120-150 notional learning hours over 3-4 months Blended learning – limited face-to-face workshops, combined with online learning, in-class assessment activities, and school support visits Twice annually	Successful attainment of competences at Knowledge Deepening Level of UNESCO ICT CFT	Project Based Approaches (Intel Teach Elements) Designing Learning through Project-Based Approaches (CCTI) ICT Integration through WebQuests (Microsoft Partners in Learning) Collaboration in the Digital Classroom (Intel Teach Elements) Learning, Teaching and Thinking with ICT (CCTI) Thinking Critically with Data (Intel Teach Elements) Managing Learning with ICT (CCTI) Assessment in the 21st Century Classroom (Intel Teach Elements) Assessing ICT Integration (CCTI)
ICT Integration for Administrators April, 2012	School Administrators	Curriculum Division (Curriculum Officers/Teachers from CCTI to facilitate)	120-150 notional learning hours over 6 months Blended learning – limited face-to-face workshops, combined with online learning, in-class assessment activities, and school support visits	Competences defined for principals in ISTE (see http://www.iste.org/standards/nets-for-administrators/nets-for-administrators-sandards.aspx)	ICT Skills for Principals (Microsoft Partners in Learning) Educational Leadership in the 21st Century (Intel Teach Elements) ICT Leadership in Schools (CCTI) ICT Planning in Schools (CCTI) ICT in Schools (CCTI)

Course and Launch Date	Target Audience	Provider	Methodology, Duration, Frequency	Outcomes	Source Courses
			Twice annually until all schools have developed ICT Integration Plans	All participating administrators will be expected to produce a functional ICT Integration Plan as part of their overall School Plan as a core outcome of this course	Peer Coaching (Microsoft Partners in Learning) Assessing 21st Century Learning (Intel) Building 21st Century Schools (Intel) Innovative School Programme (MOE/Microsoft)
ICT Integration for Technology Coordinators

September, 2012 | Technology Coordinators (should be at least at a level of Technology Literacy before commencing this course) | Curriculum Division (Curriculum Officers/Teachers from CCTI to facilitate) | 60 notional learning hours over two months

Online learning

Three times annually | | Materials still to be sourced from existing courses |
| ICT Technicians' Course

Jan 2012 | ICT Technicians | ICT Division and National Open School of Trinidad & Tobago (NOSTT) CISCO Academy | 40 notional hours of learning over one week, with follow-up online support

Face-to-face learning / online learning (alternating annually)

Six times annually | Competences to be defined by ICT Division

Rolling annual programme of professional development anticipated covering all | Materials still to be sourced from existing courses |
| SSTC course | Students | ICT Technicians | 24 notional hours of learning over three days, with follow-up online support and support from ICT Technicians

On demand at schools | See SSTC Toolkit | AED, Cisco, Qualcomm Toolkit |

3.3 Targets for the Professional Development Implementation Plan

Notional targets for each in-service professional development strategy are presented in table two. It is important to note that the key constraint in enrolments is the number of mentors available to facilitate courses (numbers below are based on an assumption that each group of 20 students will require one mentor/facilitator).

Table 2   Notional In-Service Course Enrolments

In-Service Course	2011	2012			2013			2014			Total
CCTI	50		100			150			150		450
Basic ICT Readiness Assessment	N/A	100	200	300	300	300	300	N/A	N/A	N.A	1,500
Basic ICT Readiness	N/A	N/A	100	200	300	300	300	300	N/A	N.A	1,500
Technology Literacy for Teachers	N/A	1,000	1,000	1,000	1,500	1,500	1,500	1,500	1,500	1,500	12,000
Knowledge Deepening for Teachers	N/A		N/A		1,500		1,500	2,250		2,250	7,500
ICT Integration for Administrators	N/A		150	150	500		500	500		500	2,300
ICT Integration for Technology Coordinators	N/A	N/A	N/A	100	100	100	100	100	100	100	700
ICT Technicians' Course	N/A		150			150			150		450
SSTC course	N/A		750			1,500			3,000		5,250

3.4 A Management Structure for the Implementation Plan

A simple management structure is proposed for the Implementation, which envisages the Ministry of Education assuming overall oversight responsibility for Implementation and is in line with structures already in place in the country and in line with the existing ICT in education policy. For the purposes of management, it is assumed that the management of the eCAL Project will again be subsumed into the ICT Infusion Committee, but that this will comprise a Committee structure similar to that deployed for the eCAL Project during its early phases of implementation.

The management structure can be represented diagrammatically as follows:

Figure 2   ICT Professional Development Management Structure
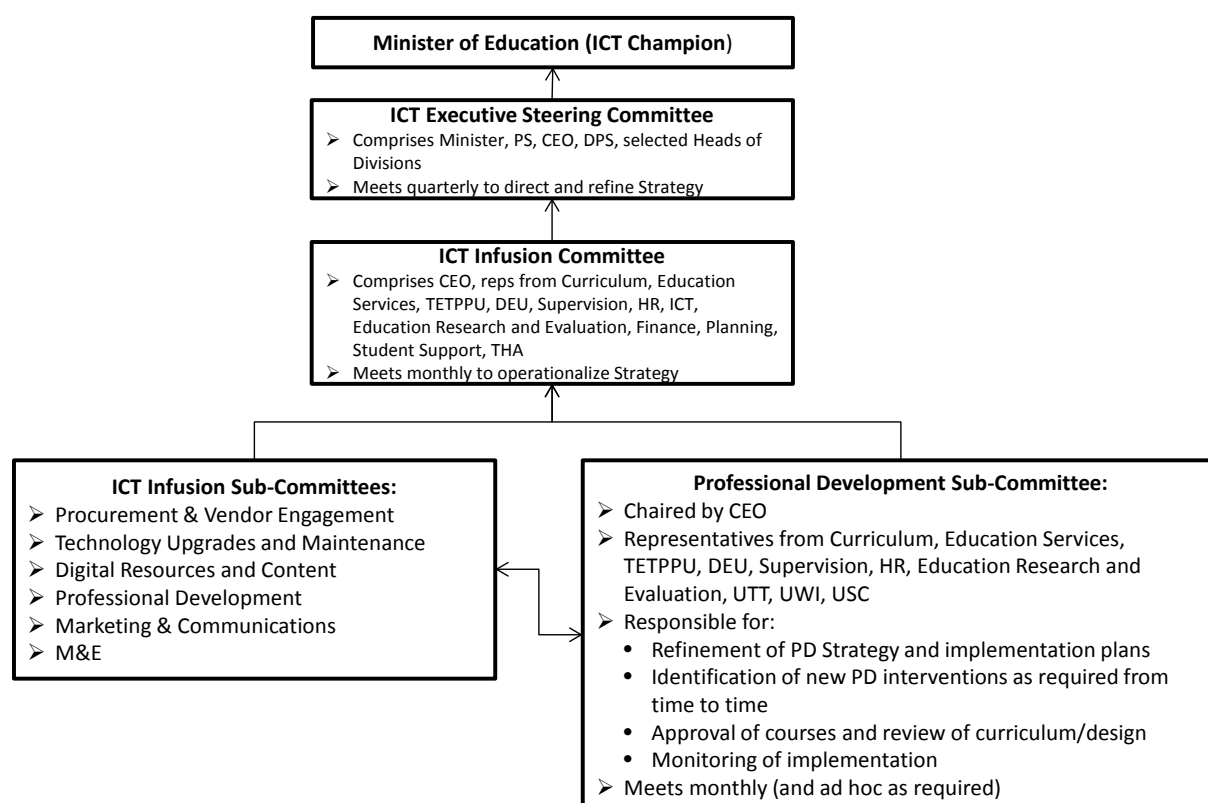
As can be seen, the above plan requires input from a wide range of players, whose roles are summarized in the table below:

Table 3   Roles of Key Agencies

Agency	Roles
Curriculum Division	• Dedicated unit established to coordinate implementation of PD Strategy • Manage enrolments onto courses • Manage teams of mentors/tutors for courses • Manage sub-contracting of third-party service providers for delivery of PD services as required • Design, establish, maintain monitoring system to ensure progress towards targets • Lead course design process • Provide inputs into PD Strategy/plan
TETPPU	• Coordinate development and refinement of PD Strategy/plan, as directed by PD sub-Committee • Provide inputs into course design activities • Provide oversight of achievement of targets
HR Division	• Provide inputs into PD Strategy/plans, while also ensuring that Strategy is aligned with relevant policies and HR Requirements • Provide inputs into course design activities • Define appropriate incentives for participation of teachers in in-service courses
Education Services Division	• Provide inputs into PD Strategy • Provide technical assistance to development /adaptation of materials for

Agency	Roles
	• courses as required • Coordinate use of RCLRC as needed for delivery of face-to-face components of courses
Distance Education Unit	• Provide inputs into PD Strategy • Provide technical assistance for course design and development/ adaptation of materials, with specific focus on implementation of blended learning approach and providing advice on effective use of OER
Education Research and Evaluation Division	• Provide inputs into PD Strategy • Conduct annual evaluation exercises to determine effectiveness of implementation of PD Strategy
School Supervision Division	• Provide inputs into PD Strategy • Conduct ongoing on-site monitoring as part of overall monitoring system to ensure achievement of PD targets
Universities (UTT, UWI, USC)	• Ensure that pre-service programmes incorporate courses to enable trainee teachers to attain at least a 'Knowledge Deepening' level before graduation • Possible development and provision of a menu of in-service courses (aligned with requirements of PD strategy) as agreed with PD sub-committee • Provide inputs into PD Strategy • Provide inputs into course design activities
National Energy Skills Corporation and other PD Service Providers	• Contracted from time to time as required to deliver PD courses at the technology literacy level (possibly including online courses where appropriate)
COL/COMSEC	• Key inter-governmental organizations, with strong interest in, and history of, supporting education in T&T • Able to offer technical assistance and support to the Strategy • Have an interest in replicating similar approaches in other countries if they are successful • Able to offer access to educational resources and materials that may be useful in the Plan, particularly – but not only – through the CCTI
Microsoft	• Key technology company, with strong interest in, and history of, supporting education in T&T • Currently a partner of COL and ComSec • Able to offer technical assistance and support to the Strategy • Able to offer access to educational resources and materials that may be useful in the Implementation Plan • Has an interest in replicating similar Strategies in other countries if it is successful

3.5 Logical Framework

The Strategy design is summarized in the logical framework presented below:

	Indicators	Sources of verification	Risks/Assumptions
General Objective			
• Develop a coherent and sustainable approach to teacher ICT professional development so that, through effective pedagogy and integration of ICT, learners are able to embrace technology and become globally competitive knowledge workers"			
Strategy Objectives			
• Ensure coherent management of teacher ICT professional development • Enhance teaching and learning through ICT integration • Build capacity to design and deliver professional development courseware • Improve support and recognition at institutional level • Monitor and evaluate implementation			
Results			
1) Design of Professional Development courses completed	• Basic ICT Readiness Assessment ready for implementation in February, 2012 • Basic ICT readiness (ICT Skills for Teachers course) course and materials completed and ready for implementation by January, 2012 • Technology Literacy course and materials completed and ready for implementation by March, 2012 • ICT Integration for Principals course and materials completed and ready for implementation by April, 2012 • ICT Integration for Technology Coordinators course and materials completed and ready for implementation by September, 2012 • SSTC course ready for use of ICT Technicians by April, 2012 • All pre-service programmes offered in T&T aligned to UNESCO ICT CFT by December, 2012	• Course curricula • Course materials • Online OER repository	• Existing courses from around the world can be identified and adapted for local delivery in T&T • Commitment is secured from all relevant parties to share curricula and materials online • Any emerging copyright issues can be resolved to enable release of materials under appropriate Creative Commons licences

		Indicators	Sources of verification	Risks/Assumptions
2)	Implementation of professional development activities	• In-service PD targets achieved annually (see table 2 above)	• Curriculum documents • Course materials • Course delivery schedules • Monitoring reports • Certificates of completion	• Mentors required for implementation of ICT Professional Development Strategy successfully complete CCTI and are available to function as mentors • Financial resources are secured to support implementation of new courses • Staff are released to complete courses • Staff participation in courses is sufficiently sustained to ensure successful completion
3)	Monitoring system established	• Design of monitoring system and accompanying capacity audits forms completed by April, 2012 • Monitoring system kept up to date in real time and made accessible to key players online as professional development activities are completed • External evaluation of progress with implementation of ICT Professional Development Strategy for Educators in T&T completed biennially, with first report completed in December, 2012 • Biennial evaluation activities completed	• Capacity audit instruments and report • Monitoring system design • Monitoring system reports • Evaluation reports	• Difficulties in accessing schools do not inhibit completion of baseline survey by identified deadline • Monitoring system can be hosted and accessed online • All participating organizations commit to logging activities within monitoring system to enable real-time monitoring

3.6 Activity Schedule

Drawing from the above Logical Framework, the following high-level schedule of activities for the defined Results has been prepared. Deadlines assume a start date of 1st January, 2012:

Activity	Deadline
1. Design of Professional Development courses completed	
For each course:	
1.1. Appoint consultant to support course development	Variable deadlines for each course
1.2. Complete scan of existing courses and materials that can be harnessed to create courses (where further development is necessary)	
1.3. Complete development of initial version of course, through adaptation of existing course materials in consultation with relevant stakeholders	
1.4. Pilot draft course and gather feedback from participants	
1.5. Review and improve course based on feedback from pilot	
1.6. Complete final packaging for course	
1.7. Ensure copyrights are cleared to enable released of course materials as OER	
1.8. Release course materials online via ComSec/COL repository	
2. Implementation of professional development activities	
2.1. Finalize and sign off PD Strategy and targets	January, 2012
2.2. Identify new participants to enrol in CCTI to develop local capacity	Every six months, commencing January, 2012
2.3. Establish dedicated unit to coordinate implementation of PD Strategy	March, 2012
2.4. Implement rolling programme of professional development, based on design of mentor support programme to achieve targets for professional development across all courses	Ongoing
3. Monitoring system established	
3.1. Appoint local research agency/consultant to complete baseline study of ICT competence of teachers and other relevant personnel	1st June, 2012
3.2. Prepare/adjust survey instruments	15th June, 2012
3.3. Pilot and refine survey instruments to ensure they work successfully	30th June, 2012
3.4. Administer survey	31st August, 2012
3.5. Compile results of survey and complete necessary analysis to identify key skills gaps	30th September, 2012
3.6. Use baseline survey to design appropriate monitoring system within MoE, in consultation with all key	31st October, 2012
3.7. Build monitoring system based on design	30th November, 2012
3.8. Ongoing input of data into monitoring system by key parties to ensure real-time monitoring of progress	Ongoing
3.9. Quarterly reports circulated on status of implementation	Ongoing
3.10. Identify evaluation agency to complete biennial external evaluation	1st July, 2012
3.11. Evaluation agency to prepare detailed implementation plan for	31st July, 2012

Activity	Deadline
evaluation process for approval by MoE	
3.12. Evaluation agency to implement plan and prepare annual evaluation reports for submission by 30th June every two years	Ongoing

3.7 Monitoring and Evaluation Strategy

As can be seen from the above logical framework and activity schedule, provision has been made for ongoing monitoring and evaluation of the ICT Professional Development Strategy for Educators in SVG. It is envisaged that this will comprise three key elements:

4) Completion of a detailed baseline survey to determine the level of ICT competence of teachers in T&T during 2012;

5) Design, development, and maintenance of a Monitoring System designed to track delivery of capacity building in response to the gaps identified in the baseline survey, updated in real time by the agencies delivering professional development, so that progress in delivery can be monitored on an ongoing basis;

6) Commissioning of a comprehensive external evaluation study, with biennial formative evaluation reports designed to feed into and improvement implementation of the ICT Professional Development Strategy for Educators in T&T.

Appendix One: Proposed Results in the ICT Professional Development Strategy for Teachers in the Republic of Trinidad and Tobago

Three-Year Results

The following results have been identified for the first three years of the ICT Professional Development Strategy for Teachers in the Republic of Trinidad and Tobago:
1) Revision of Education in ICT Policy to ensure greater cohesiveness in ICT in education initiatives.
2) An ICT Professional Development Framework for Teachers in the Republic of Trinidad and Tobago and accompanying implementation guidelines is developed, accepted by all key stakeholders, and underpins all ICT-related professional development in schools.
3) 60% of teachers in all Secondary Schools will be engaged in peer-to-peer collaboration and support as part of a whole-school staff development model.
4) Capacity in ICT integration of all relevant training staff at Universities, the MoE Curriculum Planning Division and in schools is developed sufficiently to enable successful implementation of the Technology Literacy and Knowledge Deepening levels of the ICT Professional Development Framework for Teachers in the Republic of Trinidad and Tobago.
5) 50% of teachers will have reached a stage where they are able to integrate ICT and show evidence of competencies related to the Technology Literacy and Knowledge Deepening levels of the ICT Professional Development Framework.
6) Course modules and associated materials developed and adopted as per requirements of the ICT Professional Development Framework for Teachers in the Republic of Trinidad and Tobago, adhering to the UNESCO ICT CST.
7) Teachers are using an e-Learning Platform and Education Portal to access curricula and content for teaching and learning and are able to upload teaching resources and communicate with each other about these resources.
8) Monitoring and evaluation system is established to track implementation of the strategy against key, defined metrics.

Five-Year Results

By five years, understanding that policy and strategy review may alter this goal as the education and learning environment may change, it is projected that further to the three-year results:
1) Capacity in ICT integration of all relevant training staff at Universities, the MoE Curriculum Planning Division and in schools is developed sufficiently to enable successful implementation of all levels of the ICT Professional Development Framework for Teachers in the Republic of Trinidad and Tobago
2) 90% of teachers in all Secondary Schools, and 30% of teachers in 50% of Primary Schools will be engaged in peer-to-peer collaboration and support as part of a whole-school staff development model.
3) 80% of teachers will have reached a stage where they are able to integrate ICT and show evidence of competencies related to the Technology Literacy and Knowledge Deepening levels of the ICT Professional Development Framework.

4) 50% of all teachers will have reached a stage where learning goes beyond a focus on knowledge of school subjects to explicitly include the 21st century skills that are needed to create new knowledge and engage in life-long learning—the ability to collaborate, communicate, create, innovate, and think critically.
5) Educational ICT conferences will be an established annual event on the MoE calendar.
6) Innovative teachers will be actively participating in national, regional and worldwide innovative education events.
7) An Innovative Schools Programme will enable leading T&T schools to join a worldwide community of innovative schools in mentoring and school development interventions.