Outcomes from Digital Technologies Expert Panel / Ministry of Education Process

The Ministry of Education and the Digital Technologies Expert Panel (DTEP) are pleased to jointly announce the high-level outcomes of the work of the DTEP.

1. ICT, Computing, and related technologies will be provided for in senior secondary education under the Technology Learning Area and will replace the existing technological area of ICT. This area will be called **Digital Technologies**.

2. As part of a comprehensive consultation process during July 2009, specific knowledge and skills under the Technology learning area will be categorised into **three areas**. These are proposed to be "Digital Technologies", "Graphics and Design", and "Material and Processing Technologies" and will sit alongside generic technology.

3. A **_Body of Knowledge_** for Digital Technologies is being created, outlining the specific knowledge and skills for this area. Digital Technologies is likely to contain the following **five sub-categories**, based on the draft Body of Knowledge.

   a. Electronics
   b. Programming & Computer Science
   c. Digital Information
   d. Digital Media
   e. Digital Infrastructure _(including networking, hardware, software, systems)_

4. **A set of Digital Technologies Achievement Standards will be created** to assess specific knowledge and skills not covered by the generic _Technology Achievement Standards_ or other existing achievement standards.

5. The Level 1 Achievement Standards will be available for use from **January 2011**, with Levels 2 and 3 available for use in 2012 and 2013 respectively, on a timeline consistent with current Ministry and NZQA timelines for NCEA Standards Alignment. These standards will contain an appropriate number of credits, yet to be determined. Draft material will be available from July 2010.

6. **_Teaching and Learning Guidelines_** will be created for Technology, with a well developed specific section for Digital Technologies based on the Body of Knowledge, and available to schools in draft form in late 2010.

7. The DTEP will nominate representatives to work with the Technology Reference Group, Digital Technologies Standards Writing Group and the group responsible for developing Digital Technologies Teaching and Learning Guidelines.

8. The DTEP will continue to exist until the **end of 2009** to provide input into the process as necessary and will meet as required.

The Digital Technologies Expert Panel thanks the Ministry for establishing the panel and working through this process in good faith. Both the Ministry and DTEP believe the outcomes will significantly improve ICT learning outcomes for schools and ultimately add value to New Zealand's economy and society.

Marg McLeod
Independent Chair
Digital Technologies Expert Panel (DTEP)

Tony Turnock
Manager – Secondary Outcomes
Ministry of Education

14 May 2009

Recommendations of the Digital Technologies Expert Panel (DTEP) – May 2009

The Digital Technologies Expert Panel (DTEP) was convened by the Ministry of Education to provide advice on the future of ICT education in schools.

The DTEP is made up of representatives from the teaching profession appointed by each of the Ministry of Education, NZIST (an ICT teacher group), PPTA, and the Secondary Principals' Association (SPANZ), as well as tertiary education representatives from NACCQ and the Vice Chancellor's Committee (NZVCC), plus industry representatives from ETITO, the NZ Computer Society (NZCS) and the NZ Software Association (NZSA).

These organisations selected and provided their appointed representatives independently to the Ministry. The Ministry appointed Marg McLeod, Project Director, CORE Education, to independently Chair the panel. Senior officials from the Ministry of Education and NZQA attend in an advisory role.

The Digital Technologies Expert Panel (DTEP) was convened to advise and make formal recommendations to the Ministry of Education on the development of an overarching statement that describes:

1. What digital technologies is about
2. Why students would study digital technologies
3. How learning in digital technologies could be structured
4. How learning in digital technologies is consistent with the NZC.

The panel was also asked to advise and make recommendations on the revision and development of existing assessment standards, including the creation of new Digital Technologies standards where appropriate. (These standards would be used in the senior secondary school and cover all Digital Technologies fields.)

As per the Terms of Reference, the Ministry of Education convened the group in good faith and intends, wherever practicable, to follow the advice and recommendations of the group. However it was made clear that decisions regarding operational policy and implementation of assessment for qualifications in schools rest with the Ministry of Education and the New Zealand Qualifications Authority (NZQA).

After significant and careful consideration of a range of issues related to ICT teaching in schools, the Digital Technologies Expert Panel formally recommends the actions contained within this document are taken to resolve a number of issues identified with this subject.

The Panel has taken a "Bird's Eye" approach while considering a significant amount of information pertaining to ICT in schools, including details of the New Zealand Curriculum, Technology Curriculum,

details of the current Alignment of Technology Standards Review, existing Achievement and Unit Standards, proposed new Achievement Standards, reports from stakeholders such as Teacher Groups and the New Zealand Computer Society, existing work programmes within the Ministry of Education (such as the Digital Technologies Guidelines), and other material.

The DTEP reviewed matters related to the teaching and assessment of ICT in schools only. It did not have a mandate to discuss other matters, such as ICT infrastructure. However in the process of the review of teaching and assessment, teacher professional learning was also identified as an area of need. While beyond the immediate scope of the panel's consideration, some recommendations have been made in this document because of the close connection with curriculum delivery.

Detailed work has been completed by subgroups of the DTEP which has led to some of the conclusions and hence recommendations of the Panel, however, in the interests of presenting a clear, concise, specific and step-by-step set of recommendations, additional detail has been deliberately excluded.

Through the Digital Technologies Expert Panel and the organisations represented on the DTEP, the wider ICT Sector stands ready to support the Ministry of Education to achieve the necessary change in this very important subject area. Members of DTEP believe that these recommendations can be widely supported by their respective organisations, and will encourage their organisations to assist with the implementation of the proposal.

Members of the DTEP have given their time freely (in many cases at significant cost to their own organisations) to map a future for ICT education in schools and produce these recommendations. The DTEP wishes to thank the Ministry of Education for taking the initiative to establish the expert panel, and strongly advocates that the Ministry use these recommendations appropriately.

Yours sincerely

Margaret McLeod
Independent Chair

*On behalf of the **Digital Technologies Expert Panel**:*

- Dr Tim Bell, Associate Professor, Canterbury University, NZ Vice Chancellor's Committee (NZVCC)

- Wayne Norrie, Director, Revera, NZ Software Association (NZSA)

- Paul Matthews, CEO, NZ Computer Society (NZCS)

- Calum McGonigle, Digital Technologies Teacher and Head of Department, Wellington High School, (Appointed by Ministry of Education)

- Paul Daly, Principal, Sancta Maria College, Secondary Principals Association of New Zealand (SPANZ)

- Peter Cook, ICT Manager, Post Primary Teachers Association (PPTA)

- Karen Fahy, Digital Technologies Teacher and Head of Department, Cashmere High School (Appointed by NZIST)

- Stephen Corich, Chair, NACCQ

- Ross Petersen, Training Manager for Schools, ETITO

Terminology Used in these Recommendations

The following terminology has been used in these recommendations:

- Where the generic term "ICT" is used, this should be taken to include "IT", "Computing", "Computer Science", and "Digital Technologies" - ie both the areas of ICT outlined below.

- "ICT as a Discipline" refers to those areas of ICT that would lead to a student potentially continuing in the discipline of ICT at either tertiary level or as a career, including the concepts and practice of Programming, Computer Science, Databases, Software Engineering, Electronics, Web Development, etc.

- "ICT as a Tool" refers to those areas of ICT which assist a student to utilise ICT as a tool for other learning or career areas. This includes core computing familiarity, "digital literacy", word processing, basic use of spreadsheets, etc.

The DTEP considers that these latter two areas of ICT are distinct from each other and both are vitally necessary. In practice, many facets of ICT fill the gray area between these two distinct areas, however it is important that these are considered as two distinct areas of the subject (each with a set of specialties). ICT as a *tool* is important for productivity in a wide range of areas; ICT as a *discipline* is important if NZ is to be an innovator, and has the potential to generate high value and increased productivity at near-zero distribution cost.

Digital Technologies Expert Panel (DTEP) Recommendations – May 2009

The DTEP formally recommends the following:

1. **"Technology" is not a natural home for ICT** and in the longer term the panel recommends that ICT become a Learning Area of the NZ Curriculum in its own right.

2. Notwithstanding recommendation 1, it is accepted that pragmatically **the very urgent needs of this subject can be best met as a subject within the Technology Learning Area** if the following provisions are made:

   2.1. An ICT "Body of Knowledge" ("Syllabus") is immediately created by ICT experts to outline core knowledge for this subject at school level *(see Rec 4);*

   2.2. A set of Achievement Standards (18-24 credits), separate but complementary to the generic Technology Achievement Standards, be created for specialist areas of ICT based on the areas provided in this Body of Knowledge. Existing Achievement Standards would be used where feasible, however large parts of the ICT Body of Knowledge are unlikely to be covered by the generic standards *(see Rec 6);*

   2.3. The DTEP is maintained during this process in its current form to have an oversight of this work and ensure it is aligned with the needs of the wider ICT sector *(see Rec 10);*

   2.4. The DTEP strongly recommends that, as per most other subjects, future decisions related to content and structure of the Body of Knowledge, as well as supporting material and assessments, be made by individuals with specific knowledge of the domain, and that ICT experts (both educational and ICT professionals) be involved (via DTEP) in all stages of the resolution outlined in this document.

3. The DTEP recognises that **the Digital Technologies Guidelines (DTG) Project forms a solid foundation for ICT in schools**, however:

   3.1. DTEP believes that there is a need for alignment with ICT as defined by the wider sector (ie including tertiary and the ICT profession/industry);

   3.2. Some areas of the DTG, such as Computer Science and Programming in particular, are not well aligned to tertiary and industry expectations and should be modified to more accurately reflect these expectations;

   3.3. Given the intention and nature of the DTG, it would be appropriate to use the current DTG core structure and content as a starting point for a separate and independent Body of Knowledge, managed by subject experts. The DTG would then be based on this Body of Knowledge.

4. **An ICT "Body of Knowledge" (BoK) should be immediately created** with the following principles:

   4.1. The BoK should be constructed by ICT knowledge experts, including specialist ICT teachers, ICT professionals, tertiary ICT experts, and others. The creation of ICT content and structure at school level should not be completed by those without ICT-specific knowledge, or outside the guidance of those with ICT-specific knowledge;

   4.2. The DTG structure should be used as a starting point, with modification as recommended by a separate DTEP BoK group of experts (this work has already begun);

   4.3. This BoK needs to provide more significantly and thoroughly for the "ICT as a Discipline" areas of ICT;

   4.4. Once a draft BoK has been created, the DTEP BoK Group should liaise with Technology Curriculum experts and DTG Representatives to ensure the BoK can be provided for within the Technology Learning Area;

   4.5. The DTEP should act in a facilitating role to help achieve this alignment, and effectively have oversight of the Body of Knowledge;

   4.6. Should the DTEP BoK Group, DTG Representatives and Technology Curriculum Experts not agree as to how a BoK may provide for the necessary areas of ICT whilst fulfilling the needs of the Technology Curriculum, and the wider DTEP be unable to find a solution, ICT should be separated from Technology and become an independent senior subject (in a similar manner to Accounting and others).

5. Through the ICT Body of Knowledge, **ICT-related terminology used within schools** (such as "ICT", "IT", "IS", "Computer Science", "Information Management", etc) **should be aligned with that of tertiary, industry, and the international community**.

   [ICT-related terminology has sometimes been used inconsistently or differently from international norms, which leads to confusion for students and teachers about how topics relate to tertiary and industry paths which use more standard terminology. The DTEP BoK group is preparing a glossary of such terms based on a rich variety of internationally accepted definitions, including disambiguation where local usage has developed alternative meanings, which would be included in the Body of Knowledge]

6. **A set of subject-specific Achievement Standards should be constructed for ICT** based on the following principles:

6.1. In the view of the DTEP, ICT is not adequately provided for within the existing or proposed generic Technology Achievement Standards. This is especially the case for "ICT as a Discipline" specialist subject areas;

6.2. The ICT Body of Knowledge should be utilised as the foundation of new ICT Achievement Standards;

6.3. An alignment of the ICT Body of Knowledge and existing Technology Achievement Standards should be conducted to ensure no duplication between these proposed new Achievement Standards and Technology Achievement Standards;

6.4. As with most other subjects, a **minimum of 18-24 credits** at each level, specific to ICT, is required if ICT is to be adequately provided for in the education system.

[This will bring ICT into line with most other subject areas which have at least 24 credits available at each level. ICT requires 18-24 credits due to the large domain of knowledge these standards need to cover i.e. programming, networking, 3D modelling/animation, web development, electronics, etc. This number of credits will also give ICT a similar "credit status" as other subject areas. Note that at least 14 credits are required for University "approved subjects" recognition, or 18 for entry to some courses at the University of Auckland.]

6.5. The new ICT Achievement Standards should be prepared in a "matrix" or some such distinct manner, and named "ICT Achievement Standards" or similar, to ensure they can be viewed as distinct from the generic standards and to ensure recognition by tertiary providers;

[Currently "Technology" is not recognised as suitable for entrance to a number of courses in some Universities in New Zealand. For example, neither Technology nor ICT within Technology, as it currently stands, is listed in the University of Auckland's list of acceptable subjects required to count towards entry to a Bachelors of Architectural Studies, Business and Information Management, Commerce, Engineering (Hons), Health Sciences or Property, meaning that those studying ICT in schools under the current structure cannot use this for entry to these courses. Structuring the standards as above, and with sufficient credits completed (18 in the case of the University of Auckland), will enable stakeholders to make a case to the tertiary community for ICT to become a recognised academic subject]

6.6. There is significant concern within the DTEP as to the current state of ICT-related Achievement Standards and the impact this is having on education in this area, hence the Panel strongly recommends the provision of these standards is fast-tracked on an aggressive timeline rather than aligning with the current wider standards review timeline *(Please see Recommendation 8 below).*

7. Urgent measures are taken to **boost teacher Professional Development in areas of "ICT as a Discipline":**

   7.1. With a new Body of Knowledge and new Achievement Standards being developed, priority should be given to teacher development to ensure ICT can be taught appropriately and competently and teachers have sufficient support to do so;

   7.2. Steps should be taken to engage the Tertiary community to assist with the provision of professional development to teachers;

   7.3. Other independent parties involved in ICT skills and education, such as NZACDITT (the new Subject Association), NZCS, NACCQ, and other tertiary providers should be consulted as to the most effective means of professional development for teachers in the future;

   7.4. Providing professional development options in this area should be prioritised, and dedicated funding provided through appropriate channels;

   7.5. Incentives should be provided to attract ICT experts into the teaching profession, either by attracting those already trained in the area, or providing incentives for suitable trainee teachers to specialise in this area.

8. DTEP notes that, based on the information available, **the proposed generic Technology Achievement Standards are a significant improvement on the existing standards**, however they still do not adequately provide for senior specialist subjects such as ICT.

9. The DTEP believes it is essential that **the creation and availability of Achievement Standards is highly prioritised and completed on an aggressive timeline**. This includes Year 11 (NCEA Level 1) for implementation by **2010** and NCEA levels 2 and 3 at least ready for critiquing and further refinement by this time, for implementation at the earliest possible opportunity (which should be ahead of the wider standards review timeframe suggested by the Ministry if at all possible).

   [By publishing the standards of all 3 levels at the outset, teachers and students will be able to see the pathway through Level 1, Level 2 and Level 3. This will add credibility and may encourage more students to opt for the course. Having the Level 3 standards available, together with sample assessment tasks and, where appropriate, exemplars, teachers will be better able to design appropriate courses and identify their own professional development needs. It will also give more time to develop resources than if the standards are published a year at a time.]

10. As a bare minimum, a **commitment to the following timeline** would be required to ensure this work is carried out in a timely fashion, but also allow sufficient time for a quality output:

    * DTEP BoK Group to convene early May 2009;
    * Larger "Subject Expert Group", including representatives from the DTEP BoK Group, DTG Programme, and Technology Curriculum experts convene in late May 2009. Several meetings in short succession may be required;

- DTEP to re-convene in June 2009 to review recommendations from Subject Expert Group and proposed Body of Knowledge, and make recommendations in terms of areas within the Body of Knowledge to which Achievement Standards could be written;
- Further DTEP meetings should be convened as required to consider further work such as the matrix/framework for the new ICT Achievement Standards;
- Achievement Standards written and passed through the Ministry processes June – November 2009;
- DTEP meets December 2009 to review and assist as required;
- Achievement Standards available to be used for at least Year 11 (NCEA level 1) at the start of 2010;
- A group similar to the DTEP (including nominees from independent bodies representing tertiary providers, ICT teachers, ICT professionals, ICT Industry, secondary principals and other relevant groups) meets on an annual basis thereafter to review the Body of Knowledge and wider issues and make recommendations.