The proceedings of the

National Forum on the Role and Support Structures for School Laboratory Technicians in Australian Secondary Schools

Thursday 8 July 2010, held at the Mercure Hotel, Sydney

Present: See Appendix 1

Apologies: Geoff Quinton (ACARA) to attend later in the day.

Chair of Forum: Peter Turnbull, Immediate Past President, ASTA.

1: The purpose of the Forum, and the history of events to this point (Peter Turnbull)

Peter outlined the history of events that has led to this Forum, confirmed the agenda, and indicated the key outcomes that ASTA hoped would come from the meeting.
- ASTA recognises and highly values the vital supporting role that school science technicians play in the high quality teaching and learning of science in schools. There is widespread concern that, over time, the complexity of the role and the skill set required have greatly increased, yet the levels of school science technician support and servicing has been declining. This is a particular issue with the inquiry based and investigative nature of school science, and a new Australian Curriculum that values Science Inquiry Skills as a key strand.
- ASTA has a policy of inclusion of school science technicians. A lab technician program has been a key feature of CONASTA conferences for the last ten years.
- ASTA has been collaborating with SETA to advocate the importance of the role of school science technicians since 2003. This was difficult at first as the issue needed evidence and research backing. DEEWR was able to provide funding for a research project as a collaboration of SETA, ASTA and Edith Cowan University through Professor Mark Hackling. This led to the national survey that was conducted in 2008, and the subsequent research report by Mark Hackling that was released by DEEWR and launched at the CONASTA Conference in Launceston in July 2009.
- Since then ASTA and SETA have been investigating ways to progress the implementation of the report recommendations. This forum is the first step, and has been made possible through the further support of DEEWR.

The attention of delegates was drawn to the three intended outcomes of the Forum:
- increased awareness by education sectors of issues and challenges facing the training and support of school science and technology technicians
- a commitment to developing guidelines for minimum standards of training and induction of school technicians and for servicing levels
- an agreement to pursue the establishment of a national online advisory service for school science and technology

2: The findings of the DEEWR Research Report (Prof Mark Hackling)

Mark addressed the Forum, outlining the processes used in the national survey, and summarising the key findings and recommendations of the research report.

- o Executive Summary of the report was distributed to delegates. Mark acknowledged the support of DEEWR, and the collaboration between ECU, ASTA and SETA. References used from earlier work done by ASE and the Royal Society (UK) leading to CLEAPSS, and Victorian Laboratory Technicians Association.
- o He noted the importance of lab tech support as Australian Curriculum focuses on inquiry approach.
- o No national Australian research had been previously done in this area.
- o In much of Australia there is a move to appoint more generalist support staff in schools; OHS concerns were some of the reasons which prompted the research.
- o The survey was sent to 2011 schools across Australia. It was sent to school principals, who decided whether or not to participate. Very small/ remote schools were not included. All educational jurisdictions participated (except for NSW government schools). The return rate 33% (from 607 schools) was pleasing, and gave a good representation of schools.
- o 40% experienced difficulty in recruiting new staff, noting a poor match between increasing responsibilities of the role and remuneration. Technicians have diverse and demanding roles.
- o Available laboratory technician training is not geared around work in school science context, but for medical or industrial applications. Lack of access to training once in schools, and an increase in people doing job with no training or experience are important issues. Most technicians indicated that they have obtained support through internet. A large proportion did not feel confident in performing laboratory skills, setting up equipment, safety procedures.
- o Median results: 1 technician supports 700 students and 4 labs; teachers indicated if more lab support then teachers and students would do more practical and science investigative work.
- o Mark referred to the ASE and Royal Society (UK) study which established "service factors standards". (Service Factor = number of hours of school science technician time divided by the number of hours of science teaching in the school). A great majority of Australian schools are below the lowest standard identified by UK ASE research.
- o The report grouped results by jurisdiction (government, catholic, independent) and by state/ territory, however the jurisdictions and states/ territories are not identified. The problems identified in the report apply to all jurisdictions and states/ territories.
- o There is a responsibility to provide training for technicians to keep themselves and students safe. They need access to accurate and authoritative advice through online means. Ongoing training needs to be provided. There needs to be recognition of the complexity of the role, sets of duties statements, and minimum standards to be established nationally.
- o Recommendations: there are 8 recommendations. These are included in full in the Executive Summary (Appendix 2). In summary:
  1. VET sector to develop and offer courses for initial training of school science technicians
  2. Minimum standards be established for school science technicians
  3. Nationally consistent job specifications be developed for various levels that can be linked to appropriate salary scales
  4. Mechanisms for availability and participation in ongoing training
  5. A minimum standard for school science technician servicing
  6. A national internet based on-line advisory service for school technicians and teachers

7. ASTA and SETA to be resourced to facilitate leadership of the development of national standards and support mechanisms
8. Further research and development to be funded regarding effective deployment of paraprofessionals in schools

o The purpose of the forum is for all stakeholders to be aware of the background, and for this group to commit to investigating minimum standards and to planning the online advisory service. We now have evidence to support the concerns. There is a need to advocate the position to educational and school leadership.

Further discussion followed.
o Question: How did we get into this situation? Australian education culture to link science to students' everyday experiences. Budget constraints, allocation to other priorities such as ICT, clerical, financial management. Formulaic allocation of general support staff is divided on local school needs. In Tasmania lab technicians are separated from other support staff in schools and funded centrally. Principal support lab technicians but need increase in budget.
o Consideration and recognition of teacher support is also needed in primary schools (especially where Year 7 students are located in primary schools) to support the new Australian Curriculum.
o There is concern if safety issues or accidents happen that the resultant policy could be to reduce hands on, investigative and inquiry for students as a means of risk management, with the resultant impact on learning. A greater use of ICT simulations and more theory would reduce the quality of learning experiences for students.
o A draft briefing could result from the forum for sectors and systems to take back and progress up through their own organisations.

3: Issues and Challenges from a SETA perspective (Teresa Gigengack)

Teresa addressed the forum, presenting the SETA viewpoint of the issues.
o SETA thanks ASTA for their advocacy, and DEEWR for their support in funding the research and the forum.
o Issues and problems are not unique to any one school or sector or system.
o Feedback on report:
  ▪ Role: technical support essential for teaching science. The role needs a wide range of skills including the use and repair specialist equipment, understanding of legislative requirements, OHS, problem solving to trial and adapt new experiments, good management skills, good communication skills. No professional standards exist for job descriptors. There is a perception that the role is simply about menial tasks such as washing up test tubes and cleaning up after science teachers. There is a need to change the perception of this role, and a need to define the role.
  ▪ Recruitment: there is a mismatch between duties and salaries. Current lab technicians may not have the skills set to meet the needs of the Australian Curriculum emphasis on inquiry learning.
  ▪ Minimum requirements: none established. We need to aim for nationally described qualifications and requirements. Training and qualifications need to be described for a school context. Many support people are currently untrained in these roles. Frameworks are needed for initial training and also ongoing training.
  ▪ On-going training and PD: issues are funding, time, geographical isolation, suitability of training, and incentives for technicians to attend training as there is

mostly no recognition of qualifications. Updates are needed for things such as new legislative requirements and new technologies. Providers of training and mechanisms of delivery need to be identified.

- Level of servicing: no standards apply in Australia (see UK for examples). We need to establish benchmark servicing standards. Usually no replacement staff are available when technicians are absent. There is a need to develop mechanisms whereby schools can report against standards.
- Access to technical information and advice to support Technicians and Teachers: there is currently no authoritative advice source. We need a means to provide national online consistent and reliable advice. This will provide valuable support for implementing the Australian Curriculum.

o We need a team approach between HOD, technicians and teachers. Technicians are highly valued by teachers and it is important that their role is recognised.

4: Training of Laboratory Technicians (VET sector and other training institutions)

Ruth Kempton (DET WA) addressed the Forum.
o Ruth tabled a proposed outline of minimum standards that could apply for "Basic" (equivalent Cert 1), "Intermediate" (equivalent Cert 2) and "Advanced" (equivalent Cert 3). (See Appendix 3).
o She outlined the WA model of Regional Technicians. This allows for ongoing support and training including site visits, and with one-on-one communication (can be phone, internet).
o More support will be needed to implement the Australian Curriculum proposal of open ended investigating, particularly the individual extended investigations in senior years.
o Regional technicians conduct training each term, with specialised workshops based on the needs of networks. This includes taking courses to regional centres. Each year they run a 3 day conference that is skills focused (220 technicians), mandatory Hazmat training for government schools, required safety audit for all schools including district high schools (without lab technicians). Communications include Filter (email mail list), web site, Safety Laboratory Manual, individual email and phone. Future video conferencing through distance education for regional schools is planned. Compulsory OSH workshops are being conducted for all principals.

Hazel Law (Para West Adult Campus SA) described the entry level course that she delivers in SA.
o The training course was developed at Para West (a government adult re-entry campus) and is conducted by Hazel. It has been successfully operating for 14 years, and has provided introductory training for many participants.
o The course includes hands on work that includes school laboratory facilities, but can be completed by distance education. Participants are linked to a mentor (usually an experienced technician in the city, sometimes a science teacher or coordinator in the country). The course is 40 hours, includes assignments and assessment, and often takes up to a year to complete. A certificate of completion is given.
o The course is self funded (a minimal charge of $100) and not financially supported by DECS SA. However it (or equivalent) is listed by DECS as the minimum entry qualification for school science technician work.

Geoff Gleadall (SETA, Vic) reported on the training undertaken by LTAV. This provides training for members but is not accredited or recognised nationally.

Sam Vonarx (Box Hill TAFE, Vic) described the courses that would be available through Box There are no nationally consistent Hill.

- o Both "short courses" (1- 2 days) designed to up skill technicians, and longer accredited courses were available.
- o These are generic but the modules can be selected so as to suit specific needs eg school science technicians as they are "competency" based. They could be designed to suit this need.
- o These courses are not currently accessed by school science technicians to any great extent, but by other clients. A recent Vic education departmental offer of grants for school support staff (included basic skills) resulted in a very poor uptake by science technicians.
- o Box Hill TAFE is keen to support school science technician training, and recognises that there is a demand. However training needs to be supplied on a commercially funded basis. Training needs to be supported by systems as individual technicians or intending technicians do not have the funds.
- o Possible ideas:
    - ▪ Both short courses, (1 or 2 days non accredited) and certificate (accredited) courses would be available.
    - ▪ Accredited courses would be generic laboratory technician courses but with selected competencies to suit a school science technician context. Students could access this from anywhere in Australia, with delivery being a combination of face to face (at Box Hill) and distance education. A critical enrolment of 20 would be required in order to be viable.
    - ▪ In response to a question, participants would need to attend Box Hill for the face to face component. As this course would be the intellectual property of Box Hill, it would not be available through the other TAFE institutions.
    - ▪ In response to a question, the course would not include "on site" work and experience in an actual school science teaching (laboratory) area.

Jan McGaw (SETA Qld) reported that
- o A similar course was previously available in Queensland, but had lapsed due to lack of uptake.
- o There is now a career structure in Queensland that would reward higher levels of training, therefore a financial incentive, however the course is no longer available.

It was generally agreed that school science technician courses were required both for basic entry level qualification, and for higher level and accredited purposes. External drivers were needed for people to undertake courses. These should be requirements for employment in the field (entry level) and career structures (higher level courses).

5: System Programs and Support. What is the current situation in each of the jurisdictions?

This session comprised of delegates from each of the represented the jurisdictions giving a brief overview of the current position with respect to school science technicians. Questions and discussion followed.

- o Western Australia- Louise Nielsen. Louise noted the Regional Technician structure earlier reported by Ruth. Training programs in Levels 1, 2, 3, 4, 5 were established, and were being successfully implemented. This program had resulted from much strong advocacy.

- o Northern Territory- John Shanahan. The NT has no formal structure, requirements or position responsible for these positions, and no association or network of technicians. There are around 25 to 30 people working in these roles.

- o Queensland- Jan McGaw. EQ now has a system with a school science technician career path matched partly to qualifications (certificates 2, 3, 4, and Diploma). There is also a staffing formula that sets the (theoretical) technician numbers with respect to student enrolments (1 for 400, 2 for 700, 3 for 1500 etc). However schools can and do make local decisions that divert technician time to other duties.

- o South Australia- Jan Brooks. Jan noted that Peter Turnbull has a long history of working with SA school science technicians as Science Project Officer managing the Science Equipment Scheme, and deferred to him. Peter noted that the minimum entry level to the role was stated as the Para West course (or equivalent) previously described by Hazel Law. In practice this was not always met. There were difficulties particularly in rural and remote schools, and overall a significant number of officers lacking training or training opportunities. There was also a great deal of high level school science technician expertise in SA, and there are some very strong and successful networks. These include the Lab Managers Association and SASTA, both of whom offer membership and excellent networking and PD opportunities. However both the PD offered and the uptake, are very ad hoc. There is no career path recognition of training, and no coordination of who undertakes which PD components.
Service levels are an issue for the great majority of schools.

- o ACT- Sylvia Towers. Sylvia noted that there are around 20 technicians in each of the government and independent sectors. No formal requirements are needed. Training is mandated but difficult to access. There is no association. Incremental career path models have been established.

- o New South Wales- Glen Sawle. Glen reported that there were no designated lab technician positions in NSW, as they were included in the general ancillary positions, and that roles were allocated by individual school leaders. There are mandated training requirements for all school staff (including teachers) eg basic Chemical Safety in Schools Training (CSIS). There are no qualification or training requirements other than mandatory CSIS training specific to school science technicians. There is however, work place training available as self-paced modules and packages developed by DET. It is an issue that there are no incentives. Technician work is perceived as difficult and not financially rewarded, and ancillary staff can earn the same salary doing easier work eg photocopying.

- o Vic- Kate Parker. There are no designated science technician positions. There is a 5 level range of school service officers, with most school science technicians being level 2. Staffing formula was historically based on student numbers; now a budget is given to schools and schools make their own staffing decisions. Only mandated legislative requirements are mandated. No training courses or qualifications are needed. Training is generalised to all school support staff, and specialist technician training is not provided to staff.
Geoff noted that there is informal training through LTAV. Staffing levels for lab technicians are declining. There are limited PD opportunities, and most principals will not allow access to courses offered.

- WA- Marilyn Miles. The WA Catholic and Independent sectors formed their own school science technicians' association. Meetings are conducted 4 times per year.
- Tas- Jenny Westren. The lab technician association is the only provider of PD. There is no longer a Science curriculum officer; curriculum positions are now generic. There are about 80 technicians in the government sector. Technician staff allocation is per a formula: 1.5 technicians per 700 students; all schools get some allocation, centrally funded and allocated. Technicians need a Diploma for employment. Amalgamated award system opportunities for career structures. Hard to find suitable staff.
- Independent Schools- Jenene Rosser. There is enormous variation across the Independent sector; conditions are determined at individual school level. Training is ad hoc.
  With respect to this issue, we could learn from other professional associations such as ACHPER and their advocacy kit. Communication is needed at different levels. We need to work with strategic HR sections. Also look at Australian Arts group and their campaign to get Arts in Australian Curriculum. Create supporting partnerships with organisations such as Australian Academy of Science, ATSE, associations of school leadership. Risk management to avoid possible litigation is a powerful incentive.
- Catholic Schools- Gary Carey. Gary noted that this is a decentralised system, and that although there is probably similarity, he was really only qualified to talk about his own diocese in NSW. There is a huge variation in qualifications. Those with no qualifications are expected to obtain further training. Levels 2 to 4 need higher qualifications, and the roles link to student supervision. NSW has no association, but does have regional groups. PD is at discretion of Principals. CEO runs some PD for technicians. Some programs run for all schools in the diocese.
- Secondary Principals Association- Jim Davies. We should consider what do we want lab technicians to be? We need a futures orientation for standards more than a baseline discussion. Demarcation issues can arise regarding the role of technicians in servicing labs, and the role of technician regarding students. This needs clarification. There is a need for discussion about general directions for technicians.
- ACARA- Geoff Quinton. Geoff noted the discussion around Australian Science Curriculum re Year 7. Where Year 7 is in Primary, resource provision needs to be provided.
- ASTA- Anna Davis. The extended investigations (as in the draft Senior Secondary curriculum) creates a resourcing issue for implementation for K-12. This will need lab technicians and teachers working together to implement the curriculum.

Discussion followed.
- Career pathways for technicians should be facilitated. The WA Regional Technicians advisory model could be a good starting point. Technicians commonly work in teams of 1 or 2. The status of the role needs to be promoted. The centralised appointments systems in Tas and Qld were noted and approved. Reclassification of positions occurs at school level and is often difficult.
- We could look at Early Childhood model to see how this works. This is a potential model for how to make a system work on a bigger scale.
- We need a clearly defined role and a clear case to put before Ed and OHS Acts.
- What can be achieved today?

6: National On-line Advisory Service

The forum discussed the merits of establishing a national online advisory service to support school science technicians and teachers.

- CLEAPSS in UK. Marilyn Miles outlined the highly successful and effective CLEAPSS UK program which could become a model for an Australian online advisory service. Some printed details were circulated (see Appendix 4). This program was started through initial seed funding, and quickly grew to become self funding and supporting as its benefits were appreciated. All participating schools pay membership fees according to school population (around 25 cents per student). The vast majority of schools participate in the program.
- Mark addressed the forum on why a National Online Advisory Service is needed. The great majority of technicians lack confidence, and need reliable advice and support across a wide range of matters including professional work procedures and OHS issues. This need is reflected by the participation in existing discussion forums. However the advice offered by existing discussion forums is often inconsistent, incomplete or inaccurate, and this raises concerns regarding OHS and risk management. Quality assured authoritative and consistent advice that backed by indemnity insurance is required. Many teachers and technicians would value this advice. Questions include whether it should include both primary and secondary, and whether it should go beyond science to other learning areas such as D&T. Research shows that advice is easiest for technicians to access in web based form. The website could include information updates, and expert email advice responses. Written advice could then be forwarded by technicians to responsible people in schools. A telephone advisory service could be included. Advice could be provided about matters such as techniques, procedures, management, lab design, safety, hazardous substances management, storage and disposal, and legislative requirements. The proposed national online advisory service would not only support the teachers of Science (many of whom are teaching outside their areas of expertise) but also technical staff in ways to work with teachers on how to improve student learning.
- A possible project scope: the National Online Advisory Service would need a Project Manager and perhaps 2 other staff, plus possibly some clerical support. It would need to be hosted by another organisation such as a jurisdiction. It would be initially funded for 3 years, with the intention of moving towards self funding in that time. There was discussion about the various functions the service could provide (training of PLFs for site visits, building of expertise and central resources, web based publications on topics of need etc).
- Jim noted that this agenda might fit with the recent Science Media Centre established at the Royal Institute of Australia (RiAus) established in Adelaide. Perhaps they could become the host. (Contact person is Professor Gavin Brown).
- Need to engage jurisdictions as they are the employers of the technicians and teachers. Hopefully they would see the value during the trial period and would contribute to the ongoing sustainability. Other partnerships could be included.
- Peter Turnbull asked Scott Lambert (DEEWR) if he knew of any similar national projects that could serve as models for this project. Scott is not aware of any. However the move towards new national initiatives is noted. However there would not be a Commonwealth involvement unless the jurisdictions drive the agenda. This would mean working with State Ministers and encouraging a ground swell of appropriate champions eg the Chief Scientists network. For funding, this item would be best served by accessing the agenda of AEEYSOC (CEOs & DGs). It was pointed out that the non government sectors are not represented by this group. Convincing Ministers of the importance of this agenda would be a key.
- Advocacy kits could assist a communication strategy. It is important to link the project with benefits to student learning outcomes. This needs to be very clearly articulated and linked to a student inquiry based approach.

- It must also link to the key initiative of the implementation of the Australian Curriculum. Links to existing programs such as Primary Connections, Science by Doing and STELR are also important.
- The DIISR Inspiring Australia report suggests that in order to attract funding, prospective projects would need to be seen to fit within these broader linked objectives. For this reason establishing strong links with existing valued projects would be important (see dot point above).

There was agreement by consensus that the forum members were in favour of exploring ways to implement a National On-line Advisory Service.

7: Future Directions- Where To From Here?

Discussion followed regarding the objectives of the forum. All delegates agreed to being placed on an email list for future communications about this project, and to forwarding communications to the relevant persons.

Objective 1: Raising awareness by the education sectors of the issues and challenges facing the training and support of school science and technology technicians.

This forum is seen as an important first step.

Objective 2: A commitment to developing guidelines for minimum standards for school science technicians, and for service levels.

There was a commitment to developing a set of national minimum standards of training and induction for school science technicians. This was seen as a 2 step process; the development of a role description, then the development of standards.

Discussion followed.
- The standards should not be retrospective and seen to threaten people with no formal qualifications who are currently in system and have learned on the job.
- There is a need for a clear definition of role of technician. The duty of care for students remains primarily with teachers. This could limit future directions but consider implications for teachers.
- LTAV has developed role statements in Vic that could be a starting point. These are available on the LTAV website www.ltav.org.au
- All attendees at the forum agreed that they would like to be included in an email list for ongoing discussion. The list can be increased to include those who were not able to attend, and also other relevant people within jurisdictions. (Sheryl Hoffmann to be added). Peter Russo has the current email list and is to expand it as required.

The forum agreed to establish a working party to develop draft role descriptions and minimum standards for circulation to the whole group and, hopefully, to reach an agreed position.
- The nominated working party members are
  - Teresa Gigengack (SETA WA, Chair)
  - Ruth Kempton (DE WA)
  - Geoff Gleadall (SETA Vic)
  - Desi Karlovassitis(SETA SA)
  - John Shanahan (DET NT)
  - Gary Carey (CEO NSW)
  - Peter Turnbull (ASTA)

- o There needs to be clarification between qualifications and RPL (recognition of prior learning).
- o Working party to develop drafts for circulation by Friday 27 August 2010 (7 weeks). Correspondence initially by email, then a teleconference before reporting back.
- o Names to Peter Russo of additional people to include in correspondence.

Objective 3: **An agreement to pursue the establishment of a national online advisory service for school science and technology.**

The forum agreed to establish a working party to develop a proposal or strategy to advance the online advisory service.
- o The nominated working party members are
  - ▪ Louise Nielsen (DE WA)
  - ▪ DET NSW delegate (to be advised by Glen)
  - ▪ DET Vic delegate (to be advised by Kate)
  - ▪ Dale Carroll (SETA Vic)
  - ▪ Anna Davis (ASTA, Chair)
  - ▪ Mark Hackling (ECU WA)
  - ▪ Toni Fox (DETA Qld)

- o Working party is to develop draft plans and report to the whole group by 22 October 2010.

Briefing Notes for distribution to jurisdictional staff.
It was agreed that it would be useful to develop briefing notes around the forum and its proceedings for distribution to key jurisdictional people.

- o Briefing notes to be provided and electronic copies of all documents tabled.
- o Introduction and history to be included.
- o Own jurisdiction information can be added.
- o Briefing from ASTA to (DG/ CE) with accompanying letter copied to members of inaugural forum (attendees and who they represent). Peter Russo to develop the briefing.
- o Timeline for draft briefing is 3 weeks (by 30 July 2010). The draft is to be circulated to the working parties for comment and feedback.
- o Jurisdictional delegates are to forward details of name, title, email address of the relevant people to receive the briefing to Peter Russo at ASTA.

8: Any Other Business

- o ASTA thanked Prof Mark Hackling (ECU) for his outstanding input and support, and Scott Lambert and his team (DEEWR) for the support that has made possible the national survey, the research report, and now the forum.
- o SETA members thanked Peter Turnbull, Peter Russo and ASTA for their support and help in advancing this important issue. Peter Russo was particularly thanked for his organisation of the forum.
- o A group photograph was taken to record the event. This may be used for publicity purposes.
- o Louise Nielsen was thanked for taking the minutes of the forum.
- o All participants were thanked for their attendance and their very positive contributions to the proceedings of the forum.

Appendix 1: List of attendees.

Mr Scott Lambert	Dept of Education, Employment & Workplace Relations (DEEWR)
Mr David Wintle	Dept of Education & Training, ACT
Mr Glen Sawle	Dept of Education & Training, NSW
Mr Gary Carey	Catholic Education Office, Sydney, NSW
Mr John Shanahan	Department of Education and Training, NT
Ms Toni Fox	Department of Education, Training and the Arts, QLD
Ms Jan Brooks	Department of Education and Children's Services, SA
Ms Ruth Kempton	Department of Education and Training, WA
Ms Louise Nielsen	Department of Education and Training, WA
Ms Kate Parker	Department of Education and Training, Vic
Mr Peter Turnbull	ASTA, and Department of Education and Children's Services, SA
Ms Anna Davis	ASTA
Mr Peter Russo	ASTA
Prof Mark Hackling	Edith Cowan University
Ms Teresa Gigengack	SETA Facilitator, WA
Ms Marilyn Miles	SETA, WA
Ms Sylvia Towers	SETA, ACT
Ms Margaret Croucher	SETA, NSW
Ms Jan McGaw	SETA, QLD
Ms Desi Karlovassitis	SETA, SA
Ms Jennifer Westren	SETA, TAS
Mr Dale Carroll	SETA, VIC
Mr Geoff Gleadall	SETA, VIC
Mr Jim Davies	Australian Secondary Principals Association
Ms Hazel Law	Para West Adult Campus, SA
Mr Sam Vonarx	Box Hill TAFE, VIC
Ms Jenene Rosser	Independent Schools Council of Australia
Mr Geoff Quinton	ACARA

Appendix 2: Executive Summary of "The Status of School Science Laboratory Technicians in Australian Secondary Schools", Professor Mark Hackling, Edith Cowan University.

**The Status of School Science Laboratory
Technicians in Australian Secondary Schools
Research report prepared for the Department of Education,
Employment and Workplace Relations**

Prepared by
Professor Mark Hackling Education Research Institute School of
Education Edith Cowan University
May 2009
A study conducted by ECU in collaboration with ASTA and SETA

*[This Executive Summary has been reprinted from the research report for the
purpose of the school science Laboratory Technicians Forum held in Sydney on
Thursday 8 July 2010.]*

Context

Australia needs a scientifically literate society and a supply of scientists and technologists to sustain a thriving economy and to address a wide range of social and environmental challenges. The goals of scientific literacy and a sufficient supply of science and technology graduates from higher education require that primary and secondary schools offer authentic and inquiry oriented science curricula that engage students and inspire them to continue their studies of science (Ainley et al., 2008). Science teachers depend heavily on good facilities and high quality technical support to implement an engaging and inquiry-oriented curriculum and this will be particularly important as Australia implements a national science curriculum. There has been very little research on the status of technical support for secondary school science, and most of this has been conducted in the United Kingdom (The Royal Society & ASE, 2001, 2002). Concerns about the status of technical support for science teaching programs in Australian schools by the Australian Science Teachers Association and Science Education Technicians Australia led to the Australian Government Department of Education, Employment and Workplace Relations (DEEWR) funding a study to investigate the training and support for technicians, their roles and the level of servicing provided by technicians for the teaching and learning of secondary science.

Approach

This research study combined a large-scale questionnaire survey of Australian schools with interviews conducted with 18 key stakeholders with deep experience of the training, employment and support of school science technicians. Questionnaires were mailed to 2011 principals of schools that enrolled secondary students with a request that the teacher-incharge of science and the technician complete the survey or if the school did not have a technician then the teacher-in- charge of science complete the survey and return it to the researchers. An overall return rate of 33% was achieved with questionnaires being returned by 607 schools and 824 technicians. The study sample included mainly schools with technicians, secondary and K-12 schools, and schools from all jurisdictions and sectors. Small remote schools and NSW government schools were not represented in the sample.

Findings

Technicians and their roles

Analysis of the questionnaire and interview data indicates that school science technicians have significant responsibilities and make an important contribution to the quality of teaching and learning of school science. Science technicians have diverse and demanding roles that include preparing resources for and supporting the teaching of science practical work in their schools. They also have significant responsibilities for health and safety, first aid, operating

budgets, training and supervising other technicians, the care of animals, ensuring compliance with relevant codes, and security of the school's science department. Some technicians are also required to supervise students.

The most common patterns of employment of technicians were full-time only, part-time only and a combination of full-time and part-time, and there are indications that contract and parttime employment are becoming more common. Forty per cent of schools reported difficulty in recruiting technicians. The main difficulties related to the poor conditions of service, in particular the poor match between salary levels and responsibility which made it difficult to attract suitable applicants for technician positions.

A large majority of the Australian technicians in the study sample are female, only 22% are less than 40 years of age and 40% are over 50 years of age. It would therefore be expected that significant numbers of our most experienced technicians will retire in the next five years. There is a core of the technician workforce that is both experienced and well qualified, however there are concerns about the training and support provided to technicians.

Training and support

There are three main concerns regarding the training, knowledge and skills of the technician workforce. First, the initial training of technicians provided by the vocational education and training sector is geared towards the requirements of the mining and medical pathology industries and the courses lack relevance for the quite different job requirements of school science technicians. Second, there is a high proportion of technicians who have completed no in-school training (47%) or no out-of-school training (27%) in the past five years. Third, there are staff providing support to science who are employed as generalist school support officers who may have no science or laboratory skills training.

Lack of recent training would impact most particularly on technicians' knowledge of the rapidly changing OH&S environment and of contemporary laboratory and learning technologies. Large numbers of questionnaire respondents and interview participants indicated that technicians require regular updates and retraining in the use of science equipment, in first aid and OH&S, and they need further IT training. Messages posted to science technician internet discussion boards indicate that many staff are struggling with inadequate science and technical knowledge.

More than half of the technicians reported that they had access to the Internet, a technician at another school, online discussion boards, the local science technicians association and WorkSafe as sources of support. The most frequently used sources of support were those that were Internet based and accessible by computer, however, there are concerns about the accuracy and consistency of advice provided by internet based discussion boards. Twenty per cent or more technicians indicated they were in need of further support or training to competently perform a number of tasks related to newer laboratory practices and/or technology and 25% or more technicians indicated they needed further support or training with a number of important safety issues.

Level of servicing

The demand for services from technicians is influenced by the number of science laboratories, the layout of laboratories, preparation and store rooms and the range of science teaching programs to be supported. Over all the schools in the study sample that had technicians, a median of 1.06 FTE technicians per school supported a median of 700 students and four laboratories. In 90% of schools, technicians supported science teaching across Years 8-12 and also to Year 7 students in 63% of schools which would be in the four jurisdictions where Year 7 students are included in secondary schools.

Thirty-six per cent of schools did not have sufficient technical support during school holidays for maintenance, stock-taking and occupational health and safety compliance activities. Many schools indicated that if they had more technical support the amount (46% of schools) and

quality (59%) of practical work in the curriculum would be improved which suggests that the amount of technical support was less than optimal.

There is great variability across jurisdictions, sectors and schools regarding the levels of servicing by technicians of science programs as measured by service factors (technician hours/hours of science class teaching). The median service factor for the sample of Australian schools with technicians was lower than for all school types surveyed in a large UK study (The Royal Society & ASE, 2001) and 96% of schools with technicians in the study sample had levels of servicing lower than the standard recommended by the UK Association for Science Education. The median service factor for the study sample was lower than the minimum standard set by the Laboratory Technicians Association of Victoria (LTAV, 2007). All sectors and jurisdictions had large numbers of schools with levels of servicing (service factor of <0.45) at which "Functions will be markedly reduced and in most cases no more than simple immediate maintenance and control will be possible" (Royal Society & ASE, 2001) and one would expect that the quality of the science curriculum in these schools is compromised.

Schools without technicians

Fifty-three schools without technicians returned completed surveys. The main reasons given for not having a technician were that the school was too small and budgetary constraints. In most cases the science teacher performed the duties of technician. As indicated by the LTAV (2007, p. 5) "the skills required are not normally possessed by most teachers and this is not a task that can be safely and efficiently carried out by an untrained person". Given the pressures on teachers' time, it is likely that teachers in these circumstances can only prepare limited resources for practical work and the quality of the curriculum is compromised. This view is supported by data from these schools indicating that having a technician would improve the quantity and quality of practical work in the implemented curriculum.

Challenges

There is a need to raise standards where they are less than optimal and compromise quality of support, teaching and learning, and safety. The greatest challenges relate to: providing an initial training that is specific to the needs of school science technicians; ensuring that all staff providing technical support to secondary science programs have at least minimum standards of training; the provision of an internet-based and authoritative source of advice and support; the provision of ongoing training and incentives for technicians to attend such training; providing levels of staffing that meet at least the ASE's 0.6 service factor benchmark in all schools; and, improving employment conditions, salaries and career pathways so that sufficient well-qualified staff can be attracted to the profession.

This study also raises broader questions about the roles played and contributions made by other school paraprofessional staff and how they can be trained, supported and used more effectively to support teaching and learning and effective school administration.

Recommendations

The following research-informed recommendations are made to provide direction for actions that can be taken to improve the quality of technical support provided to secondary science programs in our schools.

Recommendation 1: That the vocational education and training sector develop and offer courses for the initial training of technicians, aligned with the requirements of school science technicians and the school science curriculum.
Suggested actions:
• A national forum convened by DEEWR with representatives of DEEWR Skills and Training, ASTA, SETA, TAFE/VET and science policy officers from all sectors establish a framework for the initial training of school science technicians.
• DEEWR recognise schools science technicians as an area of skills shortage so that job seekers become eligible for the services available to those seeking employment in areas of skill shortage.

Recommendation 2: That minimum standards be established for the training required for employment of science technicians in secondary schools and for their induction into the role.
Suggested actions:
• A national forum be convened by DEEWR with representatives of ASTA, SETA and employing authorities to establish a minimum standard of training and induction for new appointments to the role of technician and for identifying mechanisms by which existing technicians can be supported to gain this qualification utilising appropriate skills recognition, distance and workplace learning mechanisms.

Recommendation 3: That nationally consistent job specifications be established for various levels of science technicians to which appropriate salary scales are linked.
Suggested actions:
• A working party be established to review job specifications and salary scales for science technicians that currently exist in Australian jurisdictions and sectors and the position descriptions proposed by LTAV for technical assistants, technicians and senior technicians.
• A set of national levels be established for the appointment of technicians with appropriate job specifications, expected qualifications and salary scales.

Recommendation 4: That mechanisms be established to enhance the availability of ongoing training for school science technicians and increase technicians' participation in ongoing training
Suggested actions:
• At a national forum and with other appropriate consultations identify priorities, providers and mechanisms for delivery of ongoing training for technicians
• Employing authorities be encouraged to fund and provide incentives for ongoing training of technicians.

Recommendation 5: That a minimum standard be established for technician servicing of secondary science programs.
Suggested actions:
• At a DEEWR convened national forum with appropriate stakeholder representation establish an agreed minimal standard for the level of technician servicing for secondary science programs based on a service factor of at least 0.6.
• Mechanisms be developed by which schools report annually against this standard.

Recommendation 6: That a national internet-based advisory service be established to provide consistent and authoritative advice and support to secondary school technicians and teachers
Suggested actions:
• Resources be provided by DEEWR to investigate the UK CLEAPSS advisory service and in consultation with relevant Australian stakeholders develop a framework for the establishment of an Australian online advisory service and a national resource bank of standard procedures and chemical labels.
• Establish an online advisory service for an initial three-year trial period and conduct an evaluation to inform future options.

Recommendation 7: That resources be provided to facilitate ASTA and SETA's involvement with and leadership of the development of national standards for the employment, roles and provision of training and ongoing support of technicians.
Suggested actions:
• Resources be provided to enable ASTA and SETA to be represented and participate in national forums and consultations regarding the establishment of national standards for technicians.

Recommendation 8: That further research and development activity be funded to investigate ways of more effectively deploying paraprofessionals in Australian schools.

Suggested actions:

• Further research and development activity is required to inform the establishment of national standards for the secondary school science technician workforce and to explore the support needs of primary science.

• A review be undertaken in five years time of the impact of initiatives taken in response to this report on the status of technical support for science teaching.

• The roles of the UK High Level Teaching Assistants in supporting the teaching and learning of science be reviewed with a view to trialing them in Australian schools.

• Further research is required to review the range of paraprofessionals that support teaching and learning and administration of schools and identify ways in which the work of paraprofessionals can be enhanced so that learning outcomes and school productivity can be maximised.

It is difficult to specify timelines for the implementation of these recommendations, however, it is recommended that a national forum of key stakeholders be convened by DEEWR, ASTA and SETA by September of 2009 so that initial consultation and discussions can commence on processes of implementation of the recommendations and suggested actions.

Appendix 3: School Science Staff Training- minimum requirements (Ruth Kempton, DET WA).

SCHOOL SCIENCE STAFF TRAINING – MINIMUM REQUIREMENTS

BASIC	EQUIV CERT 1	
COMMUNICATION SKILLS ? verification	Ability to speak, understand, read and write English to a competent level	Prior
ORGANISATIONAL SKILLS	Punctuality	Prior
? verification	Basic time management	Prior
	Show initiative	Prior
COMPUTER SKILLS	Basic Word and Excel	✓
Possible prior learning	E-mail	✓
	Internet	✓
BASIC KNOWLEDGE OF SCIENCE SUBJECTS	Chemistry – chemical symbols, elements and compounds, molar solutions, acids and bases	To do
Possible prior learning	Physics – electricity/electronics, sound, light, mechanics, energy, magnetism, heat	To do
	Biological sciences – classification of plants and animals, microscopy, anatomy	To do
OCCUPATIONAL HEALTH & SAFETY	General laboratory safety	✓
	Chemistry – Hazmat training	✓
	Electrical	✓
	Radiation	✓
	Biological hazards	✓

LABORATORY TECHNIQUES		
CHEMISTRY	Preparation of molar & percentage solutions from solids & liquids.	✓
	Separating techniques – filtration, evaporation, distillation	✓
	Gas preparation - downward displacement of water - Hydrogen, oxygen upward displacement of air - carbon dioxide	✓
PHYSICS	Recognition of equipment	✓
	Magnetism	✓
	Basic electrical circuitry	✓
	Use of lower school equipment for heat, liquids, air, sound and forces	✓
BIOLOGY & HUMAN BIOLOGY	Classification of plants	✓
	Classification of animals	✓
	Dissection techniques	✓
Microscopy	Use of microscopes - binocular & monocular	✓
	Preparation of wet mount slides	✓
	Preparation of permanent mount slides	✓
INTERMEDIATE	**EQUIV CERT 2**	
COMPUTER SKILLS Possible prior learning	Intermediate word and excel	✓
KNOWLEDGE OF SCIENCE SUBJECTS	Chemistry – electrolysis, organic chemistry precipitation reactions, molecular models, ionic & covalent bonds	To do
Possible prior learning	Physics – more advanced knowledge of sound, light, mechanics, energy, magnetism	To do
	Biological sciences – Preservation, aquaria, animal	To do

	ethics, nutrients, anthropology	
		To do
LABORATORY TECHNIQUES		
CHEMISTRY	Separating techniques – refracting distillation, chromatography	✓
	Preparation of indicators, buffer solutions	✓
	Electrolysis – electrodes	✓
	Precipitation reactions	✓
	Conductivity – ionic & covalent	✓
	Extraction of ore	✓
	Carbon reduction	✓
PHYSICS	Recognition of upper school equipment	✓
	Use of CRO, audio oscillator, amplifier, ripple tank, Charles' Law & Boyle's law apparatus,	✓
	Maintenance of equipment	✓
	Electronics - Recognition of components, Techniques – drawing circuits, etching PCB, drilling, soldering. Troubleshooting problems in circuits	✓
BIOLOGICAL SCIENCES	Preservation techniques for plants	✓
	Propagation of plants	✓
	Herbariums	✓
	Preservation techniques for animals	✓
	Aquaria	✓
	Animal ethics	To do
	Food pracs – preparation of solutions – starch, iodine	To do
	Preparation of stains & indicators	✓

Microscopy	Preparation of wet mounts	✓
	Use of videoflex and proscope	To do
	Servicing microscopes	✓
GEOLOGY	Classification of rocks, minerals and ores	✓
	Hardness testing, Mohr's scale	✓
ASTRONOMY	Use of telescope	✓
ADVANCED	**EQUIV CERT 3**	
COMPUTER SKILLS	Data-loggers	To do
ORGANISATIONAL SKILLS	Maintenance and management of laboratory classrooms and prep area	✓
	Stock control – ordering and stock take	✓
OCCUPATIONAL HEALTH & SAFETY	Hazmat ½ day refresher	✓
LABORATORY TECHNIQUES		
CHEMISTRY	Gas preparation – toxic gases, Chlorine, Nitrogen dioxide, Ammonia (fountain expt)	✓
	Hoffman's voltameter	✓
	Titrations	✓
	Halogens	To do
	Flame testing	To do
	Reactive metals	✓
	Redox	To do
	Electrochemical cells	To do

PHYSICS	CRO, audio oscillator, amplifier, speakers, open and closed tubes	✓
	Air track and photo diode gates,	To do
	Laws of gravity expt	To do
	Radiation – Geiger counter, cloud chamber, half-life expt,	To do
	Induction coil, gas discharge tubes,	To do
	Data-loggers	To do
BIOLOGICAL SCIENCES	Genetics - tissue culture, DNA, Out of a Box Biotechnology	✓
	Palentest – water and soil	To do
	Diffusion – osmosis, dialysis, agar cubes	✓
WORKSHOP SKILLS	Creation of new equipment and modification of existing	? To do

Appendix 4: The CLEAPSS Project, UK- some details (Marilyn Miles, SETA WA).

What is CLEAPSS?

CLEAPSS® is:

• a nationwide advisory service for subscribers, • for practical science and technology, • for schools and colleges (including special schools, referral units, etc), • able to help from nursery education through to A-level or equivalent.

CLEAPSS serves:

• teachers (including head teachers), • technicians, • science advisers/inspectors/consultants, • teacher trainers, • health and safety advisers, • architects (working for subscribers), • other local authority officers, • school governors.

CLEAPSS covers:

• health and safety including risk assessment, • chemicals, living organisms, equipment, • sources of resources, • laboratory design, facilities and fittings, • technicians and their jobs, • some D&T facilities and fittings.

CLEAPSS provides support for a consortium of local authorities. It is controlled by its members, ie:

• all LEAs throughout the British Isles (not Scotland), ie, 100% of those eligible.

It has around 2000 associate members, ie:

• foundation and voluntary-aided schools (where not a member via a local authority), • independent schools, • incorporated colleges, • teacher-training establishments and science learning centres, • overseas institutions, • field centres, museums, etc, • curriculum developers.

CLEAPSS provides:

• termly newsletters for primary and secondary schools, • a range of publications, mostly free (see below), • model risk assessments, • special risk assessments, • low-cost training courses for technicians, teachers and local authority officers, • a telephone **Helpline** which takes almost 7000 calls per year, • a monitoring service, eg, for mercury spills, • evaluations of equipment, • discounts from some suppliers, • advice on repairs.

Publications include:

• *Hazcards*®, • *CLEAPSS Laboratory Handbook*, • *Model Risk Assessments for Design and Technology in Secondary Schools*, • CD-ROMs of Science and Design & Technology publications, • *Recipe Cards*, • *Student Safety Sheets*, • Guides on over a hundred specialist topics such as:

Fume Cupboard Datasheets, Small Mammals, Magnets for Primary Schools, Designing and

Planning Laboratories, Glues and Adhesives, Science for Secondary-aged Pupils with Special Educational Needs, Technicians and Their Jobs, Running a Prep Room.

The training courses include:

- • general health and safety, • basic skills for technicians, • microscope maintenance, • chemical handling, • electrical safety testing, basic electricity, basic electronics, • making simple equipment, • microbiology, • safety management (for heads of departments), • radiation protection supervisor training, • safety in primary science.

CLEAPSS also works in a less-visible manner to support practical science and technology. In particular, CLEAPSS is currently or has recently been:

- acting as an expert witness in both criminal and civil court cases;
- working with the Royal Society, the ASE and others to develop a career structure for school science technicians;
- working with the national Science Learning Centre and Regional Centres;
- collaborating with the Royal Society, the ASE, the DfES and others to develop guidance for schools on laboratory design;
- producing reports for the Royal Society of Chemistry on health & safety myths in science and on the mismatch between the equipment and laboratories needed to teach science in a modern way and what happens in practice;
- working with the Health and Safety Executive and the Environment Agency on matters of mutual concern, eg, the diposal of surplus radioactive sources;
- working with QCA to advise on the health and safety implications of Schemes of Work and assessment materials;
- working with manufacturers & suppliers - to keep abreast of latest developments, to find sources of unusual chemicals/equipment, to advise on their healthy and safe use in schools;
- working with publishers and television producers to ensure healthy and safe practices are described and/or shown;
- supporting curriculum developers, including 21st Century Science, Nuffield, the Salters' Institute and the Gatsby Science Enhancement Programme, with proposed practical activities;
- aiding curriculum development in safety by preparing *Student Safety Sheets* to support the teaching of the health & safety aspects included in the Science National Curriculum;
- represented on various British Standards committees (eg, fume cupboards, eye protection, health and safety in school workshops) to ensure standards are appropriate to the needs of school science and technology;
- demonstrating safe but exciting practical techniques on Teachers' TV.

For membership information and details, click here: membership details.