

Journal

iiate

Institute of Industrial Arts
Technology Education

President's report

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Inside this Volume of iiatej

Enhancing Primary Technology Education

What is STEM?

This journal is produced bi-annually for
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Technology Education

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John Barlow

Andrew Burgess

Monique Dalli

Geoff Hogan

John Perdriau

Jason Smith

iiatej Contributions

This journal welcomes contributions from authors regarding all aspects of Technology Education. The journal aims to educate its readership by providing a balanced view of contemporary issues relating to Technology Education.

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Editorial



Welcome to the new format of the Institute of Industrial Arts Technology Education Journal (iiatej). It has initially been a hard slog, but I am anticipating that as a contributing community of educators, the good work that is occurring in every school can be shared over time. In saying this, I am putting out a call to the group to send me details regarding the fantastic projects and other exemplars that would benefit the association. It would be great to have a bank of great topics to choose from when considering the next journal issue.

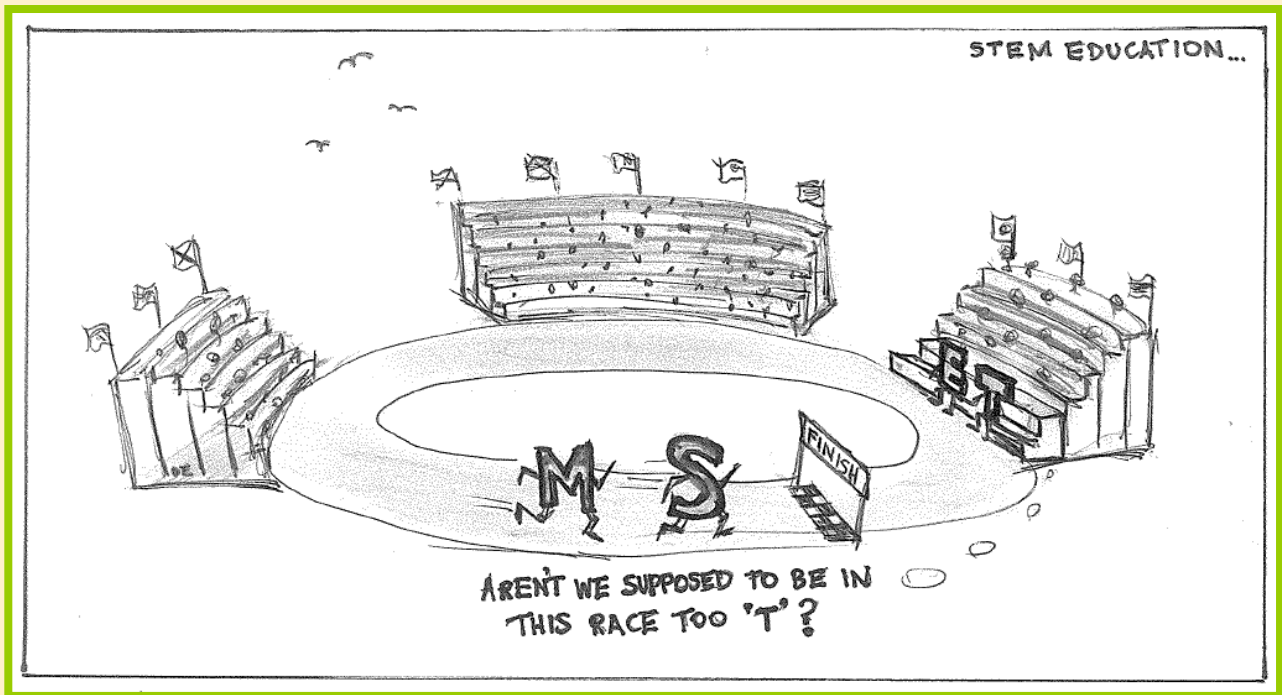
This edition we are celebrating a man who has made a fantastic contribution to Technology Education in NSW, Geoff Hogan. As a young Industrial Arts teacher, I had heard his name mentioned many times amongst the movers and shakers in NSW. Today we get to learn a little more about him and what he has done in his career. At the other end of the career spectrum, I would like to introduce to the association an enthusiastic pre-service teacher at ACU- Jason Smith. Pre-service and early-career teachers will also get a regular gig in the journal to give us a snapshot of who will be steering the ship in the years to come.

In both the current NSW curriculum documentation and in the Australian Curriculum is the notion of a 'continuum' of learning. We will be looking at an initiative developed by the Diocese of Lismore Catholic Schools Office. This initiative provides an opportunity for primary school teachers to get a taste of working with 'real world' materials and understand the nuances of the design process.

Have you heard of STEM? Well you should have by now. As you know, it is not unusual for politics to influence education, but the political eye is now looking at our discipline area through a new lens combining Science, Technology, Engineering, and Mathematics education. A lot of this influence is imitating what is occurring in the USA, and Economics is a primary driver where Education is seen as the conduit. In this new 'Asian century' our country cannot just rely on our comparative advantage in resources, we need to skill our future workforce in a way that develops capacity for our nation to innovate and engage in emerging technologies and their related industries. See this ABC Lateline interview with our Federal Chief Scientist Professor Ian Chubb:

- LATELINE Interview: <http://www.abc.net.au/lateline/content/2014/54017442.htm>.
- July 2013 Position paper: <http://www.chiefscientist.gov.au/wp-content/uploads/STEMstrategy290713FINALweb.pdf>

Professor Chubb's comments and the position paper presented in July of last year are beginning to resonate in the ears at Canberra. It will be a case of watch this space to see what funding will be attributed to STEM initiatives in the future.



To provide you with some more insight into STEM, we have included a couple of articles from International Technology Education journals for your reading pleasure. The key take-home message for us is to be aware of what STEM is, however after reading the following articles, the two questions I wish to pose to you is *what is Technology's place in STEM education?* And, *how can we protect avoid being overrun by the larger core disciplines of Science and Mathematics?* Take the time to read the Article by John Williams (2011) *STEM Education: Proceed with caution* over a cuppa. We mustn't forget that Education is a political toy that we need to ensure it is played with appropriately.

Last, but not least is a section called the Storeroom. The Journal will not be the place for an exhaustive repository, however this space is dedicated a limited amount of teaching resources, suppliers, linked associations and events. Hope to have you involved at some stage. Happy reading!

Dave Ellis

"If you can't explain it simply, you don't understand it well enough."
Albert Einstein

The President's Report

As my wife, Astrid, and I approach retirement at the end of the year, it is time for me to step down as President of the Institute of Industrial Arts Technology Education – for the second time. As I said at last year's conference, I would only take this caretaker role on for one year and over that year I hoped that someone would come forward to take over. When I first became President many years ago, the ITE, as it was known then had an core of active and committed teachers involved, most of whom have gone on to bigger and better things, though still involved in technology education. Numerous have retired and still keep in touch by attending meetings etc.

The main focus at the time was the replacement of Industrial Technology with Design and Technology. Institute members believed in great numbers that Industrial Technology was worth saving and a major campaign ensued. Many, many meetings, letters and hours later, Industrial Technology was reinstated, albeit with Category B status, for the HSC. Many attempts were made to change the categorisation, but unfortunately the great efforts made amounted to nothing.

As the new President, this was a major challenge and one that I looked forward to. After a couple of not so successful attempts, major reworking of the syllabus was seen as the way forward. Having been involved with the writing of the previous syllabus, I realised that we had a syllabus with many gaps; with little in the way of specifics and one that was difficult to examine.

The rewriting of the syllabus took just over a year to complete, with the input of many people, many of who were Senior Markers and the not so public assistance of people at the Board of Studies. Finally after presenting the new syllabus to BOS for approval, the wait was now for the UAC people to grant Category A at their categorisation meeting. Finally we achieved what we endeavored. **Category A, at last!**

Position Vacant

President of teaching association

The President's position has become available with a professional teaching association in the technology teaching area. The IIATE is the professional teaching association for Industrial Arts teachers across NSW. Originally centered on IA teaching, the IIATE now encompasses teaching in a broad number of technology areas in TAS.

Qualifications: a suitable relevant degree at pass level or greater. Experience in teaching a wide range of technology subjects. Care about the welfare of other teachers and their students. An awareness of the factors that affect the future of the subject area and a capacity to help shape it's future. Applicants must have benefits of subject areas foremost. Need to be actively involved in teaching technology education, willing to be involved in liaison with BOSTES and DEC.

Interested parties should contact **Grant Byrne** at Macquarie Fields H.S. (grant.byrne1979@gmail.com)



So where to from here? Well for Astrid and I, a future with our granddaughter (so far), overlooking black swans frolicking across the road on Lake Macquarie (now that we live here in Swansea). Ah the great 'sea change'. We will still be involved in some way, but feel there is a need for far younger heads than ours, especially with technology progressing unabated and at such a rapid pace.

For whoever the new President is, I can see several challenges: but perhaps those detailed below are a good starting point.

Firstly, the ongoing treatment of Technology subjects when calculating a student's ATAR. Look at the UAC report, published every year, in relation to scaling in the HSC. I just can't hope to understand why the 99th percentile Industrial Technology student has their mark devalued from 94 to 76, when the same percentile student in Dance basically keeps the same mark. Why?

The reason, according to Prof. Cooney, when heading the scaling committee, was that it far easier to get a good mark in Industrial Technology because of the weak candidature. Nothing here about standards referencing assessment i.e. reach the standard get the rewards. Those of you who remember Bob Carr, the then Premier of NSW, when introducing 'standards referencing assessment', said that if all candidates achieved a Band 6, then we had all done our job. It is not the fault of our (Industrial Technology) high achievers, those that do reach the standard, that there are a wider range of students of lesser ability, also in their course.

I have no intention of belittling other subjects, particularly Dance. They get treated the way they do for ATAR calculations, because they do not have the aforementioned tail. Think for a moment, how many students at your schools take Dance that can't dance? How long have they been dancing – since 5-7 years old?

Secondly, the constant battle that you all must put up with in your schools with trying to get recognition for your subject area. For so long tarred with the 'Manual Arts' brush, or even 'Craft'. We are not just retrained tradespeople who teach students things to do with their hands. We are consummate professionals trained in an ever-widening area of the school curriculum. We are trying to keep pace with a rapidly changing area under the cloud of being treated as 'second-class'. We have little value placed on our abilities and specific training and are looked at as just Technology teachers. Here's a Technology class, teach it!

No we are not part of the 'core' of English, Math and Science and, after Bob Carr, History. We are a very valuable part of a student's learning – just think about the number of your ex-students who have gone into a technology-related field, or eventually find their way to it. One of mine, who topped our Industrial Technology-Timber class many years ago, comes to mind. He trained as a solicitor, but now designs and refurbishes homes in the \$5 -6 million dollar and above range. Nice gig!

To a large extent, government and the might of the dollar hamstring us. Not just the present government, with its ridiculous efforts to return to surplus (after the excesses of the previous government) in as short a time as possible. I mean all government in NSW. Technology Education COSTS. Code for our rooms has shown little progress, if any, in the last 30 odd years. I say that with confidence because when I took over our new rooms at Mosman, very nearly 30 years ago, we missed out on the Emco CNC lathe, which had just been taken OFF Code for Technology rooms. That lathe was the last piece of CNC equipment actually included in Code. If Technology Education in NSW is to flourish, then the Code must change. Too often we see schools slipping into the past with the current spending on technology. If you're not lucky enough to be in the private system, or have a supportive Principal or parent body, you get left behind! Why are 3-D printers, vinyl cutters, CNC routers and laser cutters not part of Code? No, not just part of the list of contract items, that we can buy if we can, but part of the Code for all schools to use.

Just some thoughts for the future.

I have enjoyed the involvement I have had with the Institute immensely. I have been able to have experiences in far more activities than I hoped to imagine when first starting out. Sometimes, it was tremendously hard work, but it was always enjoyable and worthwhile. I wish you all well for the future.

John Perdriau



IIATE blog QR Code

Feature Article

SWIMMING AGAINST THE CURRENT: ENGAGING IN THE CONTINUUM OF LEARNING FROM HIGH SCHOOL BACK INTO PRIMARY SCHOOL

Introduction:

Writing for a readership such as the IIATE, I am assuming that the process of designing is not an unfamiliar topic. Many of us engage in designing, making and appraising on a daily basis, whilst others wouldn't bat an eyelid at the thought of testing their skills on a new 'foreign order'. Is our confidence or willingness a result of our training; our past experiences; an opportunity to specialise, or just that we are intrinsically motivated that enables us to display confidence in undertaking new projects?

What may seem second nature to many of us can often be a daunting exercise to those who haven't had appropriate training, or the opportunities in their teaching career. Whilst many of us are University, TAFE and trade trained, and/ or tinkerers, those of us who happen to teach in primary settings are required to be the true jack-of-all-trades. The problem with this label is that many of these teachers may not feel 'equipped' to teach Technology confidently. This lack of confidence and resources may lead to Stage 3 students being underprepared for their transition to the Stage 4 curriculum.

This article will look at one educational sector who is being proactive in developing both teachers and their resources so that they are better equipped to confidently teach the Working Technology skills content embedded in the NSW Science and Technology K-6 syllabus.

NSW Syllabus for the Australian Curriculum: Science K10 (incorporating Science and Technology K-6).

To briefly explain the organisation of the content, the K-6 Science and Technology Syllabus has been incorporated into the Science K-10 syllabus. The K-6 syllabus states that, "Science and Technology are linked through problem solving by the skills and processes of scientific inquiry and technological design." (NSWBOS, 2012) It isn't until students progress into high school that they experience a decoupling of the Science and the Technology Learning Areas even though both areas are difficult to segregate at times.

To explain this relationship, as Technology educators we often discuss scientific concepts to better explain how materials react to certain stimulus, and we often demonstrate this nexus in our lessons. As technologists, we can use this knowledge of the science to our advantage in developing a better understanding of the material, and anticipate how it may behave under certain conditions.

An explanation of this is the application of our knowledge of thermoplastic polymers and the behaviour of van der Waal's forces between linear molecular chains when the material is heated. Considering this, we can demonstrate to our students the weakening of these forces, and that heat will enable us to apply a force which will allow the material to change shape without failure. The link between the two disciplines is explicitly explained in both figure 1 and 2. Figure 1 maps out the pathway of continued learning (continuum), whilst the link between the two disciplines is explicitly explained in figure 2. NB> As Technology educators who teach with secondary syllabus documents

in mind, we may be familiar with the 'substrands' of the K-6 Science and Technology syllabus such as, *the Built environment* and *Products* (Fig. 2).

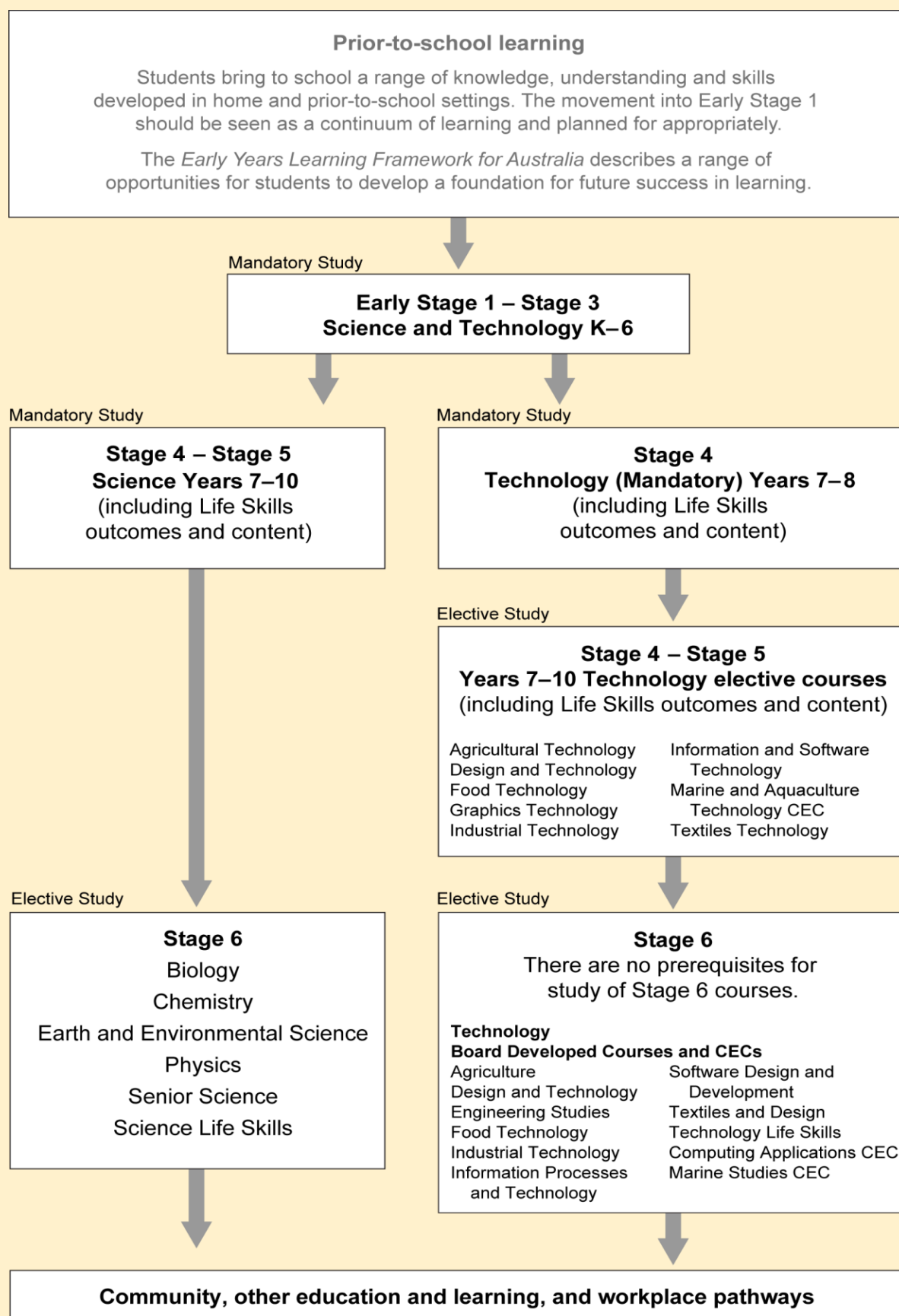


Fig.1 (NSWBOS, 2013)

In the new K-6 Science and Technology syllabus (to be implemented in all NSW schools in 2015), the document explicitly links the relationship between Science and Technology. This is reinforced by the differentiation of skills that are packaged as outcomes under the strands of Working Scientifically (WS) and Working Technologically (WT).

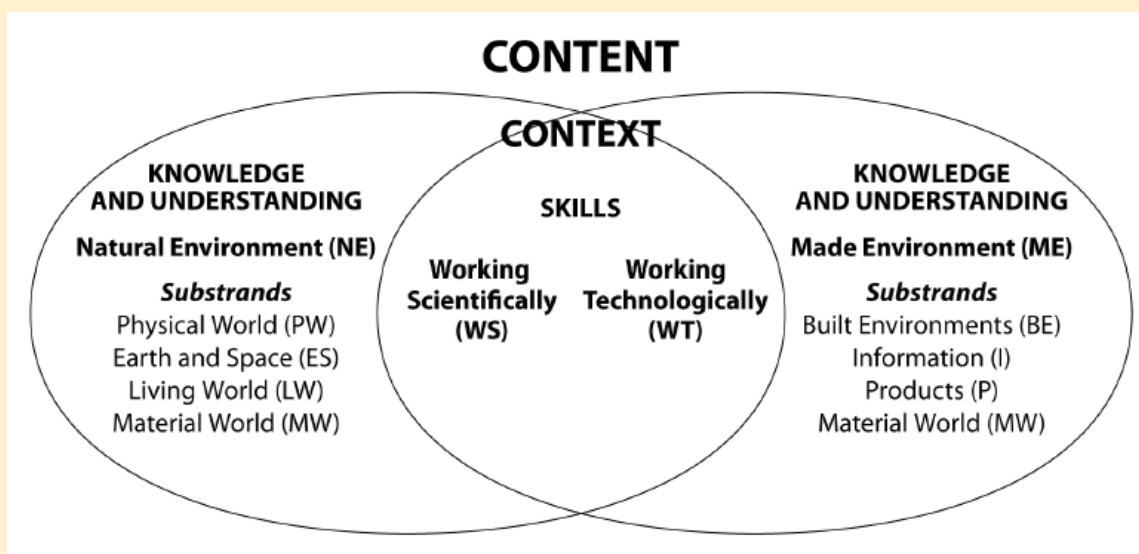


Fig. 2 (NSWBOS, 2013)

The focus on this article is to highlight to our readers the outcomes embedded in the strand of Working Technologically (Table 1), and specifically to acknowledge the relationships that exists between Stages 3 and 4. In the acknowledgement of shared concepts between the outcomes taught in Stage 3 to 4, it is important for both primary and secondary teachers to collaborate to see 'what' and 'how' Technology outcomes are being taught. This collaboration may result in a shared understanding that may lead to improved student learning outcomes.

Embedded within the Rationale of the K-6 syllabus is the concept of Working Technologically. It's the opportunity for students to engage in 'real world situations' to actively develop design solutions. Far from the previously used (and less significant to the real world) materials and components of paper mache and paddle pop sticks, the syllabus requires primary school teachers to 'step-up to the plate' mentioning that students may engage in a range of technological contexts, such as "agriculture, engineering, food, graphics, industrial and digital technologies as well as product design that uses metals, textiles and timber" (NSWBOS, 2012).

Though the intent and outcomes of the syllabus can be considered as 'world-class' and contemporary in providing the infrastructure or conduit that will enable our future workforce to engage in the 21st society, a common obstacle is the preparation of teachers in the development and delivery of quality teaching programs. Teacher education programs are limited by time; the constraints of accreditation authorities and educator expertise (in higher education settings), consequently, they would therefore have little opportunity to develop primary school graduates with the deeper understanding of the numerous Technology contexts, adding to the genuine lack of confidence in teaching students how to work Technologically. This is where the secondary Technology teacher may be able to assist. Where the continuum of learning normally moves from the simpler concepts in the earlier Stages to the more complex concepts of later Stages, teacher professional development can reverse this trend as trained, competent teachers who are well versed in the complex concepts may advise and assist those who teach in Stage 3 to Early Stage 1.

The Continuum of Learning in Technology K-8

Skills Outcomes through Working Technologically

Found embedded within current NSW documentation is the concept of a continuum of learning. This concept acknowledges the fact that as students progress through the various state (in our case NSW) education systems, student understanding of learning outcomes continues to develop. An example of this continuation of ideas and outcomes is evident in the example of learning related to Technology below:

Early Stage 1	Stage 1	Stage 2	Stage 3	Stage 4
STe-5WT uses a simple design process to produce solutions with identified purposes	ST1-5WT uses a structured design process, everyday tools, materials, equipment and techniques to produce solutions that respond to identified needs and wants	ST2-5WT applies a design process and uses a range of tools, equipment, materials and techniques to produce solutions that address specific design criteria	ST3-5WT plans and implements a design process, selecting a range of tools, equipment, materials and techniques to produce solutions that address the design criteria and identified constraints	4.1.1 – 4.6.1 applies design processes that respond to needs and other related outcomes specific to stages of the design process, such as: generating ideas; experimentation; developing design solutions; working safely; and evaluating, etc.

Table. 1(BOS, 2003 p. 51)

As students progress through their education, the intention is that their learning experiences build upon previous knowledge, their understanding and skills that they have gained from prior learning experiences that have been packaged into Stages. This expectation and acknowledgement of prior learning is evident in the increase in concept complexity and higher-order tasks that embedded within the staged outcomes around using, applying and planning a design process (from Early Stage 1 – Stage 4 in this example).

To ease student transition from primary to high school, incorporating common language and concepts and processes will assist students to build upon their prior knowledge as they progress from Stages 3 to 4. In order to make that happen, teachers from both primary and secondary schools need time to collaborate.

Analysing the continuum (Table. 1) above, we can see the requirements on Stage 3 teachers to enable students to develop design solutions using a range of tools, materials and techniques. What we know is that primary school teachers may not have the knowledge, skills, experiences and resources to teach this confidently. What we also know is that primary school classrooms are more generalised in terms of plant and equipment, and don't have access to many of the resources that the specialist secondary Technology facilities possess.

So given the constraints surrounding time; cost; primary teacher expertise and attitudes; and primary school facilities, how can we address the issues surrounding the K-10 syllabus continuum, teacher expertise, professional development and resources?

Case study:

Diocese of Lismore, Primary Technology Professional Development Workshops 2014

The Diocese of Lismore Catholic Schools Office (CSO) has always been proactive in developing the capacity of their teachers so that they are better equipped to deal with curriculum renewal through collegial networking and writing events. As a result of the primary teachers having to implement the new Science & Technology K-6 curriculum next year, the CSO has pre-empted the capabilities that their primary teaching staff will require to teach their students how to work 'Technologically'.



Fig. 3 Primary school teachers learning about the design process and how to document it.

Primary school teachers from the Lismore Diocese engaged in a 3 hour hands-on workshop to learn how a specialised secondary technology teacher may approach a design project (Fig. 3). The workshop designer and facilitator (Mr Andrew Burgess an experienced Technology educator in this case) gave the teachers a design brief, pre-cut materials and a partially completed design portfolio as a resource. A design process methodology developed by the Diocese was used by all participants. The portfolio not only assisted teachers with their understanding of this design process and the individual steps involved, but also allowed participants to document their own solutions incorporating real world materials and processes (Working Technologically) to solve this problem.



Fig. 4. Example of a wine bottle holder in action.

A well-chosen brief required the teachers to design a wine bottle holder that incorporated the use of two materials; braided rope and aluminium rod. The design project efficiently enabled primary teachers to experience the development of a design solution from initial sketches through to the realised design project in just 3 hours. Teachers were provided with a 1m length of Ø6mm aluminium rod, a 1m length of x 16 Gauge wire (to

make a model) and 1.2 m of braided water ski rope as a means of decorating the aluminium rod. The folio had blank sections for initial ideas, development and evaluation. The brief, limitations, research of existing solutions, construction steps and tools and equipment were provided.

Andrew had mentioned that the idea for the wine bottle holder arose from the following constraints:

- First and foremost it had to be applicable and meaningful to the teachers. In other words it had to be a problem that the teachers could solve on the day but could also be used the next day (using a different type of bottle) with students in a primary classroom equally well.
- It had to use 'real world materials' but not many tools and techniques. The tools and techniques used had to be able to be useable in a primary school classroom – not a workshop. Even though the activity took place in a high school workshop setting where teachers used a vice and a number of bending jigs. This equipment was later packaged as a kit that schools could borrow.
- It had to be low cost approx. \$3 per finished project.
- Lastly it had to be able to be designed, made and evaluated in a 3 hour teacher workshop/professional development activity timeframe.

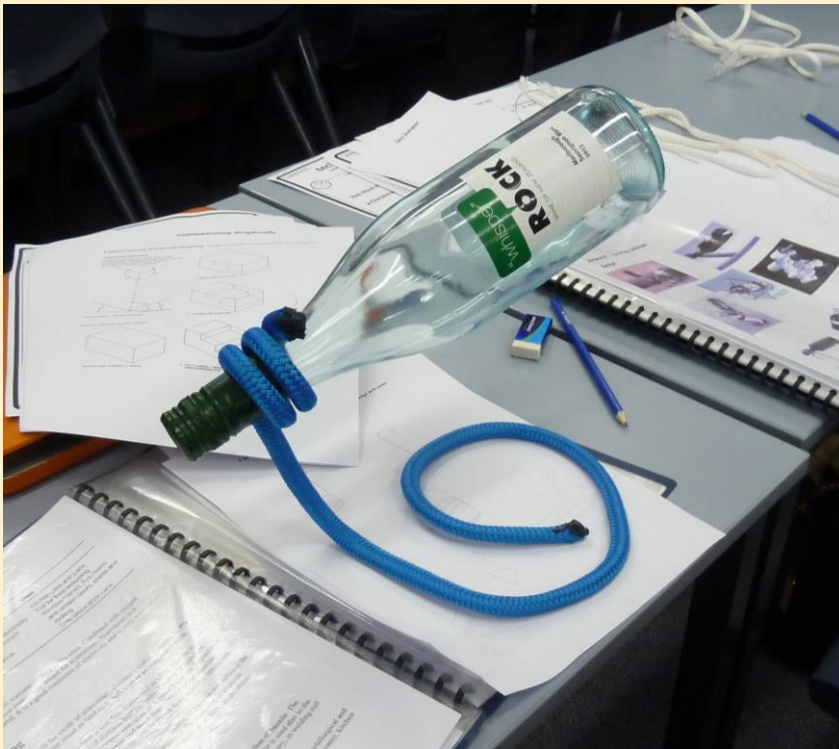


Fig. 5 Project functioning as intended.

All teachers managed to complete a functional and aesthetically pleasing wine bottle holder (Fig.5). The success was an indication of the preparation and choice of project as much as the quality of the instruction. Andrew had mentioned that following the workshop the teachers had a "greater understanding and appreciation of the design process and the use of constraints and limitations to make the project more manageable." He also added that there was a change in the primary teacher attitudes as they realised that "design projects can be completed in a

primary school context and that they did not need to simultaneously address the Working Scientifically context"

In terms of skills development, Andrew found that primary were not familiar with the documentation of a design process and that many struggled to represent their ideas in both 2D and 3D. He also mentioned that some teachers didn't fully understand the role that models play in experimenting and testing design solutions, and that they didn't refer back to their models when constructing their final design solution.

Inside the partially completed design portfolio, the teachers were given an exemplar rubric of how a design project (including the portfolio) such as the wine bottle holder could be assessed. Andrew articulated to the teachers a very important point regarding the assessment of design projects, explicitly stating that, "design failures do not necessarily result in a poor grade, it is the process and the higher-order thinking behind the analysis of the failure (the learning) that is most important."

Discussion

The Diocese of Lismore, Primary Technology professional development workshops reinforced what we as experienced Technology professional may take for granted, and that is confidence and a 'lack of inhibition' in developing design solutions through the framework of the design process.

Generally speaking, our hardworking primary school teachers do their best with their level of training, their collegial support and the professional development opportunities available to them.

This article is asking secondary technology teachers to become familiar with the design and technological processes that the students are being taught in their local primary schools. The article will also suggest that primary teachers possessing very limited expertise in this area would



Fig. 6 Andrew Burgess demonstrating the use of a jig to successfully bend the aluminium rod

be appreciative of assistance from high school colleagues. Not only in terms of knowledge and skills in using the design process but also materials, tools and equipment and a mentor for practical tasks. (Fig.6)

It is known that Technology Education is a Learning Area that suffers from an identity issue in the community. Andrew Burgess has warned that many primary schools have in the past, seen Technology Education as being distilled into 'using computers'. As a community of Technology professionals who want to see improved educational outcomes and enthusiasm for Technology Education, we need primary teachers to be more aware that Working Technologically in the new syllabus is a process of designing, making and evaluating.

**"I have not failed. I've
just found 10,000 ways
that won't work."
Thomas Edison**

Government Publications

From the Australian Government, July 2013

Science, Technology, Engineering and Mathematics in the National Interest: A Strategic Approach

<http://www.chiefscientist.gov.au/wp-content/uploads/STEMstrategy290713FINALweb.pdf>

From the United States Department of Education, (n.d.)

SCIENCE, TECHNOLOGY, ENGINEERING AND MATH: EDUCATION FOR GLOBAL LEADERSHIP

<http://www.ed.gov/sites/default/files/stem-overview.pdf>

International Technology Journal Articles

Learn more about STEM here:

- **From *Creative Education* 2014, 5, 1106-1117**

Procedural Skills, SketchUp and Vodcasting: Distance Teaching of Design Drawing Skills and Student Learning Autonomy by David Ellis and Bill Boyd.

<http://dx.doi.org/10.4236/ce.2014.512125>

- **From *Design and Technology Education: an International Journal* 2011, 16/ 1 p26-35.**

STEM Education: Proceed with caution. By Associate Professor P John Williams

<https://jil.lboro.ac.uk/ojs/index.php/DATE/article/view/1590/1514>

- **From *Technology and Engineering Teacher*, Mar 2011, v70 n6 p5-9**

Understanding STEM: Current Perceptions. By Ryan Brown, Joshua Brown, Kristin Reardon, and Chris Merrill. <http://www.iteea.org/Publications/TTT/mar11.pdf>

- **From *Technology and Engineering Teacher*, Mar 2013, v72 n8 p14-20**

An Engineering Design STEM Project: T-Shirt Launcher. By Todd D. Fantz and Melva R. Grant.

<http://www.iteea.org/Publications/TTT/mayjun13.pdf>

"ITEEA is the professional development organization for technology and engineering educators. For more information, go to www.iteea.org."

- **From *Journal of Technology Education*, Fall 2013, Vol. 25/1**

The Evolving Classroom: A Study of Traditional and Technology-Based Instruction in a STEM Classroom. By Timothy J. Devlin, Charles R. Feldhaus, & Kristin M. Bentrem.

<http://scholar.lib.vt.edu/ejournals/JTE/v25n1/devlin.html>

Teacher In Focus

RETIRED LEGEND – GEOFF HOGAN OAM

Geoff Hogan: Apprentice; Artisan; Teacher; Leader; Life-long learner and recipient of the Order of Australia Medal (OAM) in 2006 has dedicated his life to Technology Education. This profile on the man celebrates his achievements as his career has evolved from educating school students to being instrumental in shaping what Technology Education is today.

Geoff, what was your background prior to your teacher training? Where did you train?



Geoff in the mid-1970s

I had wanted to become a Marine Engineer from my time in primary school, hence did Industrial Arts (IA) (Manual Arts as they were then called) in high school, then to a fitting and machining apprenticeship in the NSW Railways. This was a prerequisite for Marine Engineering. I was one of the more successful apprentices and won the Commissioners Prize and James Fraser Memorial Medal in my final year for being the top F&M apprentice).

At about mid-way through the apprenticeship I was encouraged to consider doing Mechanical Engineering. I went to Meadowbank TAFE and did the Leaving Certificate part time in the evenings, and then a Mechanical Engineering Certificate course at Sydney Technical College. After one year as a tradesman, I was transferred into the position of an Assistant Engineer. This role required me to visit various work places around the state assessing, advising and trialing maintenance procedures on vehicles.

In the final year of the Certificate course I applied to start a part-time engineering degree, but saw an advertisement for IA teachers Artisan scholarships. I also broke my leg skiing and while in hospital I decided to change careers.

In addition to the incentive of an Artisan Scholarship, who inspired you to become a Technology Teacher?

In that final year of the Certificate Course and at about the time I saw the advertisement for IA Artisan scholarships, I remembered what my Yr 8 Metalwork teacher had said to me, "Hoges you should think about becoming a teacher". I had no interest of acting on that advice back in Yr8, but while I was in hospital I recalled that advice and it then seemed appealing. I also recalled some of the excellent teachers I had at school and during the trades and Mechanical Engineering courses. It was a hard decision to leave the Railways as I had an assured career as an engineer, for which I was suited and encouraged to pursue, but I am pleased that I decided to change from a career in engineering to teaching.

Geoff, this is not a time to be modest. You are a recipient of the Order of Australia Medal (OAM). This is a fantastic and appropriate recognition of your achievements. Can you please provide us a brief timeline of your teaching career and some of your achievements in that time?



Geoff in Yr 8 Woodwork 1958. Different WHS expectations then.

Newcastle Teachers College February 1970 to December 1970: One year artisan teacher training course. 2 years trained status.

Camden HS February 1971 to December 1974:

I taught mainly Metalwork, some Woodwork and some Technical Drawing. This school provided an excellent introduction into the teaching profession. The students came from diverse backgrounds. The teachers, most aged under 30, were mutually supportive. Most of the executive were excellent and the first principal was a gentleman and very positive. Many of the teachers and head teachers went on to become principals and some inspectors and later Education Directors. A very competent team!

Macquarie Boys High School January 1975 to May 1980:

I originally taught Woodwork and Engineering Science, but as Technics was introduced I was moved through many of the Technics lobes and also Technical Drawing. I wrote programs and lesson registers for what I was actually teaching and these became programs and registers for the IA Department in the school. As a result, I became familiar with a wide range of the IA curriculum, from theoretical, to practical, and then from the broader educational and administrative perspectives.

I was appointed as the Yr. 10 Year Adviser in 1978 to May 1980. This gave me a better insight into the needs of students and the problems they faced with some teachers in other subject areas. In 1979 I was appointed as the assistant to the head teacher who did the timetable. This opportunity was a good learning experience and introduction to the arithmetic of staffing and time allocations for different subjects. These experiences expanded my and understanding of issues to beyond the IA Department.

Whilst I was at Macquarie BHS, I became actively involved in the Institute of Industrial Arts Education (later IIATE), this led me to participate in the various regional IA activities and committees.

I found that teachers at Macquarie were generally older than those at Camden, particularly the IA teachers. They were excellent teachers, but a bit set in their ways and resistant to change. I did not accept this rigidity, but they were tolerant of my endeavours and valued the up-to-date teaching programs and registers I produced -particularly when the school was being inspected. While I was



at Macquarie I completed the Diploma in Industrial Arts Education at Sydney Technical College and then started a BA at Macquarie University with majors in Psychology and Education and a minor in Statistics. I was inspected and gained List 2 in 1978.

Properties Directorate at Head Office May 1980 to January 1981

For only a short period of time, I was seconded to the Properties Directorate as a Senior Education Officer. I was not keen on the idea, but was encouraged by a consultant whose opinions I valued, on the basis that it would give me some insights into, and experience of administration and planning within Department of Education. The job certainly did this and more. What I learned was to serve me well later on, particularly when arguing the case for IA issues in a diverse range of contexts beyond the school.

Crestwood HS January 1981 to May 1981

This was a new school based in demountable classrooms with only a Year 7 cohort. When I arrived the demountable classrooms were not fully equipped. I was the only IA teacher and there were no programs policies or teaching resources such as text books, charts, etc. That required some ingenuity and quick thinking on my part and on and the use of the Metropolitan West IA network to borrow some tools, materials, etc. I also taught a Maths class and a PDHPE class.

Penrith HS Head Teacher IA (May 1981 to December 1987)

In the IA Dept. there was a core team of very good teachers, all younger than me. This was a very productive period as we enthusiastically adopted the changes in the IA curriculum including the revised Technics and Technical Drawing Syllabus and the introduction of Industrial Technology. We also acquired and trialed many new items of equipment and materials that became available. I think that I promoted the professional development of the IA teachers. Many were inspected and obtained list 2. There were some at the other end of the competence and effectiveness spectrum, which presented some challenges.

Again I started to look at areas outside of the IA Dept. I became involved in whole school initiatives including Literacy across the Curriculum, the introduction of computers and was the assistant timetabler.

I was involved in curriculum development activities at a regional level which supported State based initiatives including the introduction of Industrial Technology, the revision of the Technics and Technical Drawing syllabuses and trialing new equipment including a CNC lathe. I was active on the Met West IA Subject and Resources Committee and the so-called IA Head Teachers conferences held twice a year at Muirfield HS.

There were two short term secondments in this time. One was as the acting regional IA Consultant (about two months). Another was to look at industrial applications of CAD with a view to informing the IA Equipment Committee on introduction of CAD to schools in NSW (two weeks) working with John Deeble and Bruce Lucas.

While I was at Penrith I completed the BA at Macquarie University and also started and finished a MEd(Admin) at UNSW. I was inspected and gained List 3 in 1986.

Hunters Hill HS Head Teacher IA (January 1987 to December 1988)

This was a much smaller IA department (three other teachers and me). All were competent and conscientious teachers, like the core team at Penrith, and all became head teachers. The department had adapted to the recent changes in the Industrial Arts curriculum. I was able to continue with my involvement with IA activities outside of the school and became involved in a number of whole school initiatives including doing the school timetable and was a member of the school's Welfare Panel. I frequently attended P&C meetings.

St Clair HS Deputy Principal (January 1989 to May 1992) and Deputy Principal Crestwood HS (May 1992 to December 1993)

St Clair was a new and large school in western Sydney. The workload was heavy and intense. The IA department had a competent Head Teacher and I mainly taught Years 7 to 10 wood-based Technics classes. Similarly at Crestwood HS, there was an extremely competent IA staff and well-resourced IA faculty where I taught junior wood-based classes. Crestwood had a students with disabilities unit and these students were integrated in IA classes. This caused me to learn a few new skills.

I was fortunate to work with excellent principals in these two schools. They were very supportive and patient with me and contributed considerably in my transition from managing an IA department to managing whole school issues and working with the community. I learnt many things as a DP, but this is not the place to expand on that topic, but the experiences included exhilaration, humour and some emotionally draining encounters.

This was the "Metherell era" (Terry Metherell- Minister for Education and Youth Affairs 1988-1990) and Industrial Arts faced many challenges. The Government had its own agenda and much of this did not align with what we had been developing. Teacher involvement in decision making, strong within IA during the previous 10 years, was given token recognition and effectively sidelined (in my opinion). I continued to be active in IA activities and lobbying. I also began to take leadership roles, becoming President of the Institute at about this time. I appeared before and made submissions to various committees which produced reports such as the "School Centered Education" (Scott Report), the Carrick 'Excellence and Equity' Reports. When the Board of Studies was established I was appointed to the Technology and Applied Studies Key Learning Area Advisory Committee (TASKLAAC).

I also travelled to country area to advise IA teachers of what was happening. I remember trips to Orange, Batemans Bay and Newcastle.

Principal Macquarie Boys Technology HS (January 1994 to February 2005, but was on LSL from December 2003 to February 2005)

As principal I was not allocated classes so my involvement in the IA Department and direct teaching was minimal. The school had a very competent executive staff and most of the teachers were committed to the welfare and educational needs of the students, many of whom had special needs and came from disadvantaged and migrant families. I was fortunate to have excellent Deputy Principals and Leading Teacher. Many of the staff went on to become, head teachers and principals. At least three rose to senior positions at Head Office.



I served on and lead a number of reference groups for the Secondary Principals Council. I was also an active member of a Rotary Club in Parramatta and involved students from many high schools in Rotary programs for secondary school students. Many students benefited from this involvement and the people they met.

Towards the end of my time as a principal I was seconded (August 2002 to May 2003) as a Chief Education Officer School Accountability and Student Assessment. Discussing the principal's and CEO's roles would be excessively long and possibly irrelevant for this exercise, but there are many stories I could tell.

While I was a principal I continued to be active in IA matters. While stepping aside from formal leadership roles in IA, I used the skills and knowledge I had acquired to promote and lobby for those matters that were of importance to IA teachers and students. I was still a member of the TASKLAAC for a number of years.

There were indicators of an unstated policy to incorporate all courses within the TASKLA, except agriculture related courses, into Design and Technology from Years 7 to 12. One was the decision to abolish Industrial Technology for the HSC. There were others including a move to abolish Textiles and Design and incorporate it into D&T. I was active in lobbying to have Industrial Technology and other separate courses in the TASKLA retained to maintain subject integrity. I opposed many of aspects of the Design and Technology Syllabus developed at that time.

Those involved in pursuing IA teachers' agendas were making no progress with the Liberal National Party Government and officials in the Education Department and Board of Studies. We came into contact with the member for Blacktown, John Aquilina who was shadow Minister for Education. As a local member he frequently attended the annual IA Craft exhibition and award presentations. This connection, originally informal and discrete, became very useful when he became Education Minister in the mid-1990s and we were able to pursue some IA objectives without opposition from the Minister's office, on the contrary, we had support. Our strategy changed and we became more focused and deliberate in taking on opponents of IA teachers' agendas at the Board of Studies and within the Department, with some success. Two specific achievements were to reinstate Industrial Technology and eliminate the agenda of absorbing other Technology based courses into Design and Technology.

When I was seconded as a CEO I stepped aside from IA activities, just in case a conflict of interest could emerge or be seen to emerge.

Additional Comment:

The period from about 1988 to 2000 was difficult and challenging for IA, but important. It would take some time to reflect on and write about this in detail. Maybe something could be done jointly by John Gibson, Mick Eccleston, Arch Park, Rupert Jones and me. Arch and Rupert were not members of the TASKLAAC, but were active on the IA Equipment Committee and were closely involved in the activities of this and other periods, Arch in particular was a significant player and leader. However such an exercise would need to be done with some caution for a range of reasons.

Part time, casual and sessional teaching positions Early 1990's – 2013

Sydney University teaching Technology and Society in IA teacher Education program Early 1990's.

Australian Catholic University teaching Design Issues in Metal. Technology Teacher Education program. Most years from 2006 to 2014. I supervised students in school practicums for a few years.

I also undertook various casual teaching positions, casual jobs for DET and BOS from 2005 to 2013.

Who has shaped and has been inspirational to you as a Technology Educator?

My teachers at high school

I had some excellent teachers at high school, particularly my Metalwork and Woodwork teachers. They were supportive, patient and kind people. As I have said, becoming a teacher occurred 10 years after leaving school, but I am sure these teachers influenced me and I drew upon this later when I made the decision to change from a career in engineering to one in teaching.

Newcastle Teachers' College

At Teachers College I think Harry Pickard had a huge influence and taught me the skills to be a woodwork teacher. Allan Taylor, Barry Abelson and Eric Fitness also had an impact on me. Geoff Bennett in Education introduced me to Psychology and developed in me an interest in the subject and how it could inform me as a teacher.



Newcastle Teachers College 1970, Group 212. Geoff, back row, third from left

Keith Wilson

Within schools I valued the head teachers I worked for, particularly the first, Keith Wilson at Camden HS. There were also a number of IA teachers I worked with in schools that I valued and learned from: too many to mention.

There were also a number of fellow head teachers, principals and deputy principals I valued and was influenced by. Again too many to mention!

Arch Park

Perhaps the most inspirational person for me during my teaching career was Arch Park. I met him when I was a young teacher at Macquarie Boys High School (MBHS) and he was the Regional IA Consultant. I found him to be an intelligent person who could think outside the square and was keen to improve IA Education. I admired in particular Arch's work in curriculum reform; the implementation of equipment that came closer to that what was available in industry; and the overall in Industrial Arts education through: in-service training and IA teacher networks whereby IA teachers could meet, discuss matters and become involved in decision making processes relating to various proposals, issues and research.

Mike Eccelston

I had considerable respect for Mike Eccelston who led the NSW Teachers Federation Industrial Arts Special Interest Group and the successful class size campaign of the early 1980's when the class size for Technics was reduced to 20 students. He was latter a member of and ally on the Technology and Applied Studies Key Learning Area Advisory Committee (TASKLAC) and a member of many teams negotiating with NSW BOS officers, NSW Departmental officials and politicians regarding IA matters. He had great negotiating skills!

John Gibson

John Gibson was also important in the leadership he provided in teacher education and the Institute. He was also an ally on the TASKLAC. He, like Mick and Arch, was a valued ally in the negotiations; meeting etc. we had with the NSWBOS, and with the Minister and his staff. He had an excellent grasp of detail.

There were others who I valued in out of school IA campaigns including Rupert Jones.

Barrie Mayo & Geoff George

The two Industrial Arts Inspectors I regarded highly, for different reasons, were Barrie Mayo and Geoff George. I did not know Tom Darby well, but if I had, based on what others said of him, I suspect that I may have regarded him highly as well.

What is something that interests you, but your colleagues/friends might not know about you?

I have been and continue to be an active member in a number of groups in the wider community and do some voluntary work associated with them. I could list these, but I see little point and never made mention of these in my IA activities.

I have an interest in classical music, opera, ballet and live theatre. I once regularly attended ballets, operas, classical concerts and live theatre performances. I still attend, but not as regularly as I once did. I taught myself to play the guitar, but to a very low level of achievement and have not done so for many years. I am currently learning to play the piano. Progress is slow and I should do more practice.

I continue to attend various public lectures on a range of topics including the areas of public policy, technology, education, behavioural sciences and history. I am associated with a range of activities as an alumni helper at Macquarie University.

In your opinion, what characteristics make up a 'great' technology teacher?

There is an extensive range of literature on the characteristics / qualities of a good teacher. My opinions reflect some of that, but I suspect they may be a bit dated and these could vary with the context. The following points may be worthwhile points to initiate a discussion on this topic.

- a) *Has a wide and sound knowledge and set of skills related to technology. Not only as it relates to school-based curriculum, but also related industrial practice.*
- b) *A sound knowledge of education theory and practice related to secondary education, the needs of student likely to be encountered, the learning outcomes required of students and associated assessment procedures, and a willingness to adjust teaching approaches and personal attitudes in learning to meet the needs of particular groups of students and individuals.*
- c) *A commitment to be involved in improving the curriculum and teaching practice.*
- d) *Good planning, management and interpersonal skills, particularly in relation to people, time and resources.*
- e) *Some personal qualities could include: an appropriate sense of humour, a degree of self-discipline and a recognition that a teacher's behaviour needs to reflect what he expects of students. (If you want students to be disciplined, work safely, be eager to learn, show respect and be courteous, etc.; model those qualities). An ability to step back and look at an issue from outside the square and from a perspective other than your own, or that of those you usually associate with, is also important. (I could mention Plato's Cave)*

What does a retired Technology Education teacher like yourself do to keep busy?

See my answer to the question: ***What is something that your colleagues/friends might not know about you, but something that interests you?***

A few further points:

- *I have travelled extensively, continue to read, learn and research issues.*
- *I engage in child minding, including supervising the completion of homework, and transport of younger members of the family.*
- *I do various voluntary activities including being a SRE teacher at a local primary school and various duties for the Australian Catholic Historical Society including being Vice President and Newsletter Editor.*
- *I am coordinating a project called **Recollections of Industrial Arts**, which is recording the recollections of those who were involved with or closely observed developments in Industrial Arts Education.*
- *I organise four get-togethers each year for IA teachers who were active in the 70s, 80s, and 90s and also some get-togethers with a group that I taught with at Macquarie BHS. I also regularly meet with former principal colleagues and students from the high school I attended*
- *I completed an MA in History. I needed to first complete a graduate certificate as History was not a major in my BA.*

Geoff, do you have any final comments? Words of wisdom or Quotable quotes to offer our readers?

I will answer with this with a few thoughts from other wise people.

In the Prologue of Canterbury Tales, Geoffrey Chaucer mentions the qualities of the Clericus (teacher from Oxford). I quote from the end of that:

"He took utmost care and heed for his study.

Not one word spoke he more than was necessary;

And that was said with due formality and dignity

And short and lively, and full of high morality.

Filled with moral virtue was his speech;

And gladly would he learn and gladly teach".

I think I am OK with the first and last qualities, but I am still working on the others.

Another medieval writer Dante made a point that should be kept in mind by teachers and those in leadership roles in education when communicating with other teachers, students and the community. I frequently promoted this value, but with less elegant language:

"You were not born to live like brutes, but to pursue virtue and knowledge".

Victor Frankly wrote a number of books, the best-selling book being [Man's Search for Meaning](#). His own life story is interesting. I offer two quote from him.

"There is nothing in the world, I venture to say, that would so effectively help one to survive even the worst conditions as the knowledge that there is a meaning in one's life. There is much wisdom in the words of Nietzsche: "He who has a why to live for can bear almost any how." And "Each man is questioned by life; and he can only answer to life by answering for his own life; to life he can only respond by being responsible".



Geoff on the right, with his Metalwork teacher John Mahon

circa 2010

Finally a quote from the Old Testament prophet Micah:

"Act justly, love tenderly and walk humbly with God". (Micah 6:8).

Thank you Geoff for your time and recount of your educational journey. There are many members of our association who both know, respect you, and applaud your efforts and contribution to Technology Education. In a later edition, it would be good to 'unpack' some of the stories you mention here to provide our readers with an insight into the challenges of the past, for us to move forward in the future.

At this point in time I would also like to plug the project that Geoff is working on with other legends. The project is called, *'Recollections of Industrial Arts'* and will be a fantastic collection of interesting Industrial Arts-related interviews. Watch this space for more on this!

Student Teacher

JASON SMITH – AUSTRALIAN CATHOLIC UNIVERSITY



Thank you for your willingness to answer a few questions Jason. Talking to pre-service teachers provides us with a little insight into who will be teaching technology education in the future.

What is your background, and why did you chose to be a technology education teacher?

After graduating high school in 2008 I entered into an electrical apprenticeship where I completed 3 years of my training, gaining valuable hands on and 'real world' experience. In these three years I learnt a great deal not only about the various industries as a whole but also what project development and management looked like in a working scenario.

I chose to enter into education, in particular Technology Education because of my continued passion with the field.

I find enjoyment in learning new and innovative ways of improving practices and methods within Technology-related industries to better achieve the desired result. The thought of passing my knowledge learnt through experimentation and mistakes onto the younger generations instills in me a great deal of pride and satisfaction.

What interests you the most about technology education (tech.ed)?

Technology-related industries are forever changing, evolving and adapting to meet the developing needs of current and future societies. It is this that makes technology education so interesting. We as future teachers of Technology are able to explore these new and emerging technologies with our students who will one day hopefully are the next generation innovators and pioneers responsible for technological advances.

Have you had any tech.ed mentors? People who you have connected with and learnt from?

My interest in technology began in high school so naturally my teachers were great mentors in fostering and developing my understanding and skills in the field. In terms of Technology curriculum Dr. Arna Welsey (a lecturer at ACU) provided an excellent insight into how the various Technology syllabuses are shaped and she has provided guidance along with encouragement and support to us as future teachers. John Barlow and Sheldon Vaughan, both widely respected individuals in their chosen specialties were integral in providing me the opportunity to develop and express my skills in the various technology areas. They urged me to stress the limits of what I thought was achievable and in doing so, pushed me to produce higher standards of work.

What has been the biggest challenge to you thus far, and what do you think you can bring to the profession?

“It is imperative that a Technology Education teacher strives to be exactly that, and not a woodwork or textiles teacher”

Thus far I would say the greatest challenge would be trying to develop skills and knowledge evenly across the many subjects that fall under the NSW TAS (Technological and Applied Studies) Key Learning Area (KLA) umbrella. It is hard not to show favouritism to the fields which one feels most passionate about, or most comfortable doing. It is imperative that a Technology Education

teacher strives to be exactly that, and not a woodwork or textiles teacher. Our students are greatly benefit from our continual efforts to expand and consolidate our knowledge across all disciplines related to the TAS KLA. I feel that I will bring a level of enthusiasm, (which is present in all newly graduated teachers) but I also want to bring a willingness to explore possibilities and ask the questions such as: How can we improve this? Or, what worked well? Building on these answers will not only benefit the students, but also our professional knowledge and understanding in improving the quality of education for our students. That is what I want to bring to the profession, a commitment to always provide the highest standard and best quality of education I possibly can.

What have you learned most from your university study?

Throughout my degree at ACU I’ve learnt that teachers are also diagnosticians. If you want to be a good teacher and provide a quality learning experience you need to first evaluate the students and find the ways they best learn, both individually and as a class. There is no one rule that fits every class or year group. It is this customising and adapting of learning environments that can make each class successful. I have also learnt through my degree not to be afraid to try something new in an attempt to find improvements. If the experiment fails then you’re closer to finding the right solution.

Where do I see yourself in 10 years?

I entered into the teaching profession with a desire to improve education in any way I could. With this in mind, in 10 years time I hope to be in a position where I can evoke change to benefit the quality of education that teachers and schools provide to their students. Unlike the majority of occupations, teachers have a direct link with the future generations of this country. We are responsible for providing our students every opportunity to realise their potential for the benefit of society in the future.

It was inspirational to see your focus on educational outcomes Jason. Thank you.

Acknowledgements:

Many thanks to John Barlow (ACU) for his assistance.

The Storeroom

In the Storeroom you will find a brief number of resources available to IATE members

- **Suppliers and Text Resources**

[Bottle Rocket Flyer](#)

[Down Force Racer & Solid Edge](#)

[Intellecta](#)

[KJS Publications P/L](#)

[Metcalf Resources](#)

[OnGuard Safety Training](#)

[Paul Copeland texts](#) Engineering Studies Volume 1 \$31.90 incl. GST, and Volume 11 \$41.80 incl. GST.

Email Richard Paine: ad2000book@bigpond.com

- **Web Resources**

Project – [Gumball Machine](#)

Project – [LED torch](#)

Project – [Upcycling fans into generators](#)

Video - [Influence of the Cap iron on a hand plane](#)

Video – The men who make us spend [Ep. 1](#); [Ep. 2](#); [Ep. 3](#).

NSW BOS Website- [Sydney Harbour Bridge](#)

[UoW Engineering High School Competitions](#)

- **Technology Education Associations - Australia**

[IIATE NSW](#) [IIATE Blog page](#)

[DATTA – Australia](#) (includes links to all State Technology Education Associations)

- **International Technology Education Associations**

[DATA – UK](#)

[ITEEA – USA](#)

[TENZ- NZ](#)

- **Related Associations**

[The Warren Centre](#)

[Re-Engineering Australia Foundation](#)

- **Events**

[Technology Education Conference Australia \(incorporating TERC8\)](#)

Technology Education: Learning for Life - 27-29th of November, Sydney Masonic Centre