Digital Technology at St Patrick's College

Technology HOD background and department background

Having graduated from Wellington Polytechnic/Victoria University School of Design in 1995 with a Design Degree majoring in Visual Communication Design, I worked as a freelance technical illustrator, portrait and landscape painter for six and a half years. I did my teacher training in Wellington and began teaching in mid 2002 at St Patricks College, Wellington, initially teaching Technology, Graphics and Art. After eighteen months I became a Graphics and Technology teacher only. After two years, with staff leaving the department, I became Assistant HOD of Technology and Graphics, then HOD in 2007 until the present.

During this time, I have witnessed and been involved in great change in the way Technology is, or should be, taught in New Zealand schools. The previous curriculum document was introduced in 1994 and was subsequently replaced by the 2007 curriculum document. An enormous amount of research and development has gone into the current Technology curriculum, with comprehensive supporting material. There is a strong technology education community; perhaps most significantly the government supported IPENZ initiative, the Futureintech programme which was created to provide authentic information and change perceptions about careers in technology, engineering and science. More recently the New Zealand government established THE ENGINEERING EDUCATION-TO-EMPLOYMENT PROGRAMME in 2014.

http://engineeringe2e.org.nz/About/

"The field of engineering and technology is critical to New Zealand's future success. It offers some of the most rewarding, challenging and exciting careers, yet we are facing a shortage of students enrolling in engineering qualifications – particularly in Levels 6 and 7 courses.

The Engineering e2e Programme is about working together to address this shortfall and to give engineering the support and profile it deserves."

Digital Technology in the New Zealand Curriculum

http://dtg.tki.org.nz/The-DTG-project

What is the DTG?

The Digital Technologies Guidelines (DTG) provide a flexible structure and a coherent approach to the teaching and learning of digital technologies in the senior secondary school sector in New Zealand. It is expected that these guidelines will:

- support improved pedagogical practices in the area of digital technologies
- develop clear links to the New Zealand Curriculum
- provide a common framework for teachers working in this area
- provide a platform for closer alignment with industry and tertiary
- focus on the future by encouraging confident, connected, actively involved, life-long learners.

The project has the potential to strengthen the appeal to students of digital technologies as a specialist subject and to connect students with a range of enterprising and innovative employment opportunities and tertiary pathways. Focused on years 11–13, the DTG provides a flexible planning environment for teachers to design appropriate and coherent courses in the area of Digital Technologies.

The DTG project

Developing the guidelines

As a direct outcome of the New Zealand Fluency in IT (FIT) project, a set of Digital Technologies guidelines was conceptualised by the Ministry of Education and HiGrowth NZ initiative. In August 2007, Cognition Consulting was contracted to instigate the foundation phase of the project, developing a framework for digital technologies being developed and trialed with a small group of pilot schools. The development phase which followed increased the number of schools involved until in the current consolidation phase, 120 schools are actively working on DTG implementation.

Using the guidelines

The DTG has been developed as a flexible planning environment that enables teachers to design and deliver programmes of work for years 11–13 that give context, coherence, and relevance to its related areas of knowledge. Aligning with the New Zealand Curriculum, the DTG addresses: programming and software development; digital media; electronics; business technology; plus an examination of today's digital environment and society. Recognising that both teachers and students come to these areas with vastly different backgrounds and knowledge, the DTG provides a range of tools and learning experiences which enable any teacher or student, novice or expert, to successfully engage with this rapidly changing area.

http://www.education.govt.nz/news/digital-technology-to-become-part-of-the-new-zealand-curriculum-and-te-marautanga-o-aotearoa/

Digital technology to become part of the New Zealand Curriculum and Te Marautanga o Aotearoa

04 July 2016

Digital technology is to become part of the New Zealand Curriculum and Te Marautanga o Aotearoa. From now until the end of 2017, the Government will consult with stakeholders, design new curriculum content, and develop achievement objectives across the whole learner pathway.

Digital technology will be fully integrated into the New Zealand Curriculum and Te Marautanga o Aotearoa in 2018.

Education Minister Hekia Parata has today announced the change to the New Zealand Curriculum at the NZTech Advance Education Technology Summit in Auckland.

Formally integrating digital technology into the curriculum is intended to support young people to develop skills, confidence and interest in digital technologies and lead them to opportunities across the IT sector.

It will be included as a strand of the Technology learning area in the New Zealand Curriculum, and as a whenu within the Hangarau Wāhanga Ako of Te Marautanga o Aotearoa.

The decision is an outcome of the Government's Science and Society Strategic Plan 'A Nation of Curious Minds: Te Whenua Hihiri i te Mahara which reviewed the positioning and content of digital technology within the New Zealand Curriculum and Te Marautanga o Aotearoa.

From now until the end of 2017, the Government will consult with stakeholders, design new curriculum content, and develop achievement objectives across the whole learner pathway.

It will be fully integrated into the New Zealand Curriculum and Te Marautanga o Aotearoa in 2018.

http://www.stuff.co.nz/national/education/81763452/Digital-technology-coming-to-the-NZ-Curriculum

Digital technology coming to the NZ Curriculum

Last updated 10:05, July 7 2016

The changes in the NZ Curriculum won't come into effect until 2018.

Algorithms and programming are officially moving into the classroom, but not until 2018.

Digital technology will be written into the New Zealand Curriculum and come under the technology umbrella, Education Minister Hekia Parata announced on Tuesday.

The change got a lukewarm reception from the IT industry, which said the move was "like telling a subject as essential as maths that they have to be a part of PE".

New Zealand needs skilled graduates for its growing information technology sector, Parata said.

Digital technology is being formally moved into learning as a strand of technology, Parata announced at the NZTech Advance Education Technology Summit in Auckland.

"This is the first change to the New Zealand Curriculum since its introduction in 2007 and reflects our Government's commitment to championing 21st century practice in teaching and learning," she said.

Digital technology will cover six themes, ministry spokesman Karl Le Quesne told the summit.

They will be: algorithms, programming, data representation, digital devices and infrastructure, digital applications and humans and computers.

But the Government still has to work with experts to lay out exactly what it will look like, meaning it won't come into effect until 2018.

The changes announced mean kids will learn about digital technologies from Year 1 - instead of the subject sitting with senior secondary students, the Institute of IT Professionals NZ (IITP) said.

Digital Technology at St Pat's

We have a long history of digital technology teaching and learning at St Patrick's College.

The Technology courses we have developed at St Patrick's College have been designed to create a pathway for students and a way to ignite interest in engineering in a broad sense. This includes digital technology (or 'I.T.') in all its facets. The success of our programmes is evident in the progression of our students into relevant study and employment. This is confirmed by feedback from ex-students who are now working or studying in a wide variety of engineering and design fields.

Teacher expertise:

Professional development: Key to the implementation of the curriculum is the professional development of teachers. I have been fortunate to have been involved in a number of funded initiatives over the last twelve years.

I personally have actively undertaken new learning throughout my teaching career, particularly in electronics, programming and robotics. I quickly realised that modern Technology education was all about integration of technologies, as that is what happens in the 'real' world. I have attended several PD courses with Les Black and Ross Petersen of Electroflash to learn about electronics, starting in the early 2000's. I applied what I was learning by building things. This began with simple robotics projects using light sensors and other simple control circuitry. Next, along with my good friend and colleague John Davidson, I began to learn programming using the PICAXE system.

Why did we choose PICAXE for teaching? To quote from *(Introducing the PICAXE System July 27, 2015 by Charles R. Hampton):*

"The PICAXE system takes the user-friendliness you have come to associate with board-level products like the Arduino, and moves it down to the chip level, allowing hobbyists and professionals to construct projects that are smart, compact, and economical.

The first PICAXE was the brainchild of Clive Seager and was based on the PIC16F872 microcontroller introduced by Microchip in 1999. Seager realized that the 5V in-circuit serial programming capability of the 16F872 could eliminate the need for a separate hardware programmer if the PIC could be made to respond to incoming serial commands. He developed a bootstrap code that would do just that and programmed it into the PIC µC. With the subsequent development of a customized version of the BASIC programming language, the first PICAXE system was born.

"…the PICAXE system was designed as a method of allowing schoolchildren to use all the power of Microchip PICs…without any of the technical difficulties of complicated hardware or complex programming languages. [Since then, it] *has been adopted by hundreds of thousands of other users—industrial, hobbyist, and educational…"*

Seager felt so strongly about the educational value of the PICAXE system that he named the company, "Revolution Education," or "Rev-Ed" for short."

The chips are low-cost. We build circuits from the ground up, as this is excellent for extending students' electronics learning. The software is free. There is a lot of information

out there on forums and supporting websites, and the local educational electronics company Electroflash provide good support in terms of components and equipment to many schools, as well as professional development and advice. So we developed units of work around PICAXE programming and circuit building.

Expertise with design software: At Design school in the early 1990's I learned Photoshop, Freehand and Pagemaker software. After completing my design degree and working as an illustrator and designer for six and a half years, I became a teacher. I did a Natcoll (now Yoobee) teacher training short course to update my skills in Photoshop, Freehand and Pagemaker software, specifically to teach the Print Design course that I developed in 2005. This course would now be considered a 'Digital Design' course with print media outcomes. We ceased offering this course as the Art Design course became a 'Digital Design' content course with changes in staffing of the Art Department, with whom we work closely for the benefit of our students. The software used is Photoshop, Illustrator (has replaced Freehand as the industry standard vector-based drawing program) and InDesign (has replaced Pagemaker as the industry standard layout/publishing program).

Digital video: I had learned video editing during my Degree, though this used physical video tape controlled by Matrox computer software. By the time I was teaching, digital editing was the norm, so I taught myself both i-movie and MovieMaker. We have taught students digital video skills in various ways in Technology courses since 2005.

Connecting with the school community: With the school-wide introduction of Department Google Sites, we have used these to present course material to students, families and the community. We have been increasingly making and using video tutorials along with comprehensive course material on our course sites. We are increasingly using the 'flipped classroom' concept, where students preview learning content using our video tutorials, with access from a computer anywhere, any time; then applying the learning in class.

Our progress has been inhibited by a number of factors in recent years:

- Skilled staff leaving
- the problem of moving on from a stand-alone (i.e. not overseen by the Technology department) and dysfunctional Computer Studies department, which had a negative impact on delivery of quality learning for students as well as perceptions in the school community
- earthquake strengthening in 2013, closing our specialist teaching spaces for most of the senior year and impacting 2014 as we re-established equipment, etc.
- asbestos roof replacement disrupting learning spaces for Term One of 2017
- delays in appointing permanent staff in 2017 until early in Term Two
- difficulties in communicating the strength and depth of our programmes and expertise to Senior Leadership, the Board of Trustees and wider staff

We have had good success and have developed a strong platform, with comprehensive curriculum coverage. Of course, there is much still to be done:

- train current department teachers in PICAXE programming for robotics, which I have started with one full-day department PD session in June 2017. This will be followed up later in the year
- train teachers in Technology department ethos
- train teachers in electronics theory and circuit making
- train new teachers in design theory, and DVC skills including technical drawing
- Work with Futureintech and Engineering e2e to have ambassadors visit our students, etc.
- Have Alysha Dougherty upskill the rest of the department in how best to use the Art Department Laser Cutter for aspects of Technology projects
- Consult with the MindLab, other secondary schools and various providers to determine the best options for 3D printing, as investigation into this indicates there are pitfalls to be avoided. This would primarily be used at senior level
- Look at introducing Sketchup into our programmes – note there is a cost after the first year, which may mean it is best to do this at Year 13 – but in DVC and/or Technology? Note that in the past we have directed individual students to learn Sketchup (formerly Google Sketchup, now owned by Trimble) as extension learning; which they did and were able to teach themselves to use
- Have teachers involved in external PD – Martina Byrne is attending the Mind Lab currently

Personal upskilling planned for 2017/2018:

- Learn HTML and CSS so that I can teach the website unit of work if needed
- Learn Python programming via Code Avengers, so that I can teach the Gaming Programming unit of work if need be
- Learn InDesign and Illustrator, as these have replaced Pagemaker and Illustrator as the most common industry standard software, and are used in the Art Design course – at Yoobee? Or from Alysha?

Recommendations for St Patrick's College Digital Technology/I.T:

- All students should have a common programme of learning until the end of Year 10, which could be taught either within or with the support of the Technology department
- Key skills students should have by the end of Year 10:
  - Touch typing (crucial with digital assessment coming)
  - Digital citizenship
  - Digital Information: good use of Word, Excel, Powerpoint (or equivalents)
  - Digital Information: use of networks, file & folder management
  - Digital Infrastructure: basic understanding of networks and internet
  - Internet research skills
  - Digital media: introductory digital video and Photoshop skills
  - Programming using simple coding e.g. using Alice or Scratch
  - Programming within robotics contexts e.g. using PICAXE robots

Note that all but the first two items have previously been taught in our Year 10 Technology course, when it was a compulsory course taught within the Technology department.

St Patrick's College Technology

What is it all about?

The NZ Technology Curriculum

What is technology about?

Technology is intervention by design—the use of practical and intellectual resources in an informed and creative, critically reflective manner to develop technological outcomes. Outcomes are products and systems that expand human possibilities by addressing needs and realising opportunities. Adaptation and innovation are at the heart of technological practice.

Technology makes enterprising use of its own particular body of knowledge and skills as well as knowledge and skills from other disciplines.

Why study technology?

The aim is for students to develop a broad technological literacy that will equip them to participate in society as informed citizens and give them access to technology-related careers. This involves them undertaking **technological practice** ('what we do'), developing an understanding of the **nature of technology**, and developing **knowledge** of technological concepts. Students will experience and/or explore a range of historical and contemporary examples of technology in a variety of contexts.

How is the learning area structured?

The learning area is structured in ***three strands***: **technological practice**, **nature of technology**, and **technological knowledge**. Teaching and learning programmes will integrate all three, though a particular unit of work may focus on just one or two of the strands as long as it is clearly part of a complete programme and contributing to the overall development of students' technological literacy.

Knowledge and skills are learned in specific contexts. By providing their students with a variety of contexts, teachers will support them to recognise links and develop generic understandings. It is also important that students are encouraged to access relevant knowledge and skills from other learning areas *(e.g. sciences, the arts).* By doing this, their learning is enhanced and their technological literacy broadened and deepened.

The **Technological Practice** strand provides students with opportunity to examine the practice of others and undertake their own. The result is the development of a range of outcomes, including concepts, plans, briefs, and technological models, as well as fully realised products or systems. In the context of this strand, *development* refers to an iterative process within which design is integral. Students learn to identify and investigate issues and existing outcomes to ensure that technological practice is informed by the past and by different cultural and ideological perspectives. The strand is organised around three substrands: planning for practice, brief development, outcome development and evaluation.

The **Nature of Technology** strand provides opportunity for students to develop a philosophical understanding of technology, including how it is different from other disciplines. Students develop a critical understanding of technology that allows for informed debate of historical and contemporary issues and exploration of future scenarios. They explore how developments and outcomes are valued and driven within different societies and across different eras and, as a result, come to appreciate the socially embedded nature of technology. This strand is organised around two substrands: characteristics of technology and characteristics of technological outcomes.

The **Technological Knowledge** strand provides opportunity for students to develop knowledge specific to technological endeavours and environments, and understandings of how and why things work. Students learn how the potential of design ideas is evaluated through functional modelling and how prototyping is used to evaluate the fitness for purpose of technological outcomes as they are realised. Understanding of material properties, uses and development underpins knowledge of how and why *products* work the way they do.

Similarly, understanding of the constituent parts of technological systems and how these work together underpins knowledge of how and why *systems* operate the way they do. The strand is organised around three substrands: technological modeling, technological products and technological systems.

The St Patrick's College Technology Department

*Our **ethos** – we aim to equip our students with the understandings, practical skills and design competency they need to become confident innovators and problem solvers in varied contexts.*

*Our **Technology** courses build these skills through classroom and workshop project based learning. Students develop an increasing capability in the understanding and manipulation of a variety of digital and physical technologies, including materials, mechanical devices, and control systems. As they progress through the year levels, there is an increasing emphasis on individual design and innovation.*

*Our **Design and Visual Communication** courses are focused on drawing and modelling for design, with a strong emphasis on aesthetic as well as functional qualities.*

We try to create a motivation for learning through captivating project work and attempt to foster intrinsic motivation. The aim is that students will get hooked into their personal projects and rich learning will occur as a consequence. Academic achievement is seen as the by-product rather than an end in itself. We enjoy a high level of academic success in national terms.

In addition, we have an emphasis on collaborative learning. This takes many forms, including discussions, peer teaching of skills, cooperation in workshops, working together to test ideas, create mock ups etc. during prototype development.

The Maker Movement and our response to it.

How does it relate to us? Some aspects of Technology education at St Patrick's College relate closely to the 'Maker Movement'. The Maker Movement is being hailed as the next big thing for STEM - Science, Technology, Engineering and Maths (or STEAM – Science, Technology, Engineering, Art and Maths) - education in schools.

BUT…

*the Technology curriculum that underlies our programme design is bigger than that, and sometimes that can seem like an obstruction. The modern Technology curriculum has a heavy emphasis on written work, especially at the senior levels. Layers of thinking and documenting have a tendency to overburden students at times. Some schools have moved away from a focus on making, focusing instead on the theoretical. Some combine diminished aspects of Technology learning with other learning areas, thereby not addressing the curriculum in the depth intended by the NZ Curriculum. The application of 'Maker Movement' principles in schools is seen by some as a way to redress this. Other schools have focused on the traditional 'vocational skills' approach, with limited theoretical content or assessment. We are in a different position to both of these. We **have** continued to foster the development of making skills, combined with student design and innovation, and proper teaching of Technology curriculum content.*

We would NOT like to see other departments within our college try to introduce a major 'making' component into their programmes of learning. It is important that, with our crowded school curriculum, we don't have departments treading on each other's toes. We should complement each other rather than compete with each other. Learning areas such as Science and Maths need to understand and support what we do, and vice-versa, recognising that we each have our areas of expertise and that together we are preparing our students for the future.

Excerpts from internet article:**http://www.weareteachers.com/blogs/post/2015/04/03/how-the-maker-movement-is-transforming-education**

How the Maker Movement is Transforming Education

By Sylvia Libow Martinez and Gary S. Stager

Makers learn to make stuff by *making* stuff. Schools often forget this as they continuously prepare students for something that is going to happen next week, next year, or in some future career.

"We" are smarter than "me" is the lesson for educators. Collaboration on projects of intense personal interest drive the need to share ideas and lessons learned more than external incentives like grades.

Perhaps "grit" or determination can be taught, but there is no substitute for experience. The best way for students to become deeply invested in their work is for their projects to be personally meaningful, afforded sufficient development time, given access to constructive materials, and the students themselves encouraged to overcome challenges.

Many educators are still clinging to old design models where students are provided recipes and prescriptive rubrics that hamper student imagination and preclude serendipitous learning. This practice deprives students of the opportunity to take risks and learn how to navigate their way to the end of a sophisticated project.

Learning happens inside the individual. It can't be designed or delivered. Learning is personal—always. No one can do it for you. Giving kids the opportunity to master what they love means they will love what they learn.

Some educators like to say that technology is "just a tool" that should fit seamlessly into classrooms. In contrast, the Maker Movement sees tools and technology as essential elements for solving unsolvable problems. To makers, a 3D printer is not for learning to make 3D objects. Instead it is the raw material for solving problems.

Making is a position on learning that puts the learner in charge. Giving students time to brainstorm, invent, design, and build—and then time to fix mistakes, improve, test, and improve again is crucial.

This doesn't mean that the teacher does nothing! Far from it. Being a guide, studio manager, and motivator is the important work of the teacher. Resist the urge to lecture students about invention and just get busy.

St Patrick's College Technology programmes

Year 9 Engineering Technology

Every student does this half year course. The project is an electronic toy car. The design is mostly prescribed, built to a set of specifications. This allows students to develop basic skills and material understandings that provide the platform for subsequent learning. However, the aesthetic (paint job) aspect is individually designed by each student, and capacitor and resistor values in the circuit are able to be trialled and selected by the student to personalise the timing in the light circuit. This allows students to learn a variety of making skills while also personalising their project. The programme unfolds as follows:

We use diagnostic assessment of student's current understandings of the nature of technology, brief development and practical skills, through individual written answers, whole class discussion and group discussion. Students record this in their books.

The course includes explanation and illustration of NZ Curriculum understandings of Technology. We use video programmes, worksheets and discussion to understand the historical development of such technologies as vehicles, communication systems, media products and electronics. This includes a look at innovative New Zealand companies.

Project based learning:

Brief writing – conceptual statement and bullet-pointed attributes; students write this from the teacher explaining the project using an exemplar.

Electronics - Common electronic components and their functions – batteries, wire, switches, LED's, resistors, capacitors, transistors, buzzers. Flow of electrical energy in a circuit. Schematic component and circuit drawing. Circuit and system function diagrams. Soldering simple electronic circuit, including resistor-capacitor timing system for lights.

Car chassis – measuring, marking up, cutting, filing, sanding, drilling, gluing wooden components. MDF manufactured wood, pine axle blocks, pine dowel wheels. Emphasis on accuracy and correct use of tools – steel rules, squares, centre punches, bench vices, saws, battery drills, files. Using metal lathe to create recesses in wooden wheels.

Car body - Vacuum forming thermoplastic over resin plug to create model car body.

Workshop safety and care of resources – working together to tidy up, etc.

Research and use of digital devices and resources - Use of internet to research paint jobs, following a 'skim and scan' process to select useful material, with source references and annotation.

Design process - two paint jobs on paper, inspired/informed by research. Design constraints. Selection of best design.

Paint on plastic – use of specialist acrylic enamel paints on inside of transparent body shell. Marking up on outside with pen, layering or separate application of paint. Accuracy.

Understanding of functional modelling (previewing/visualising an outcome prior to or during development) in the form of schematic circuit drawings, temporary circuit building using kits, chassis drawings, paint job designs.

Project planning - Whole class planning using Gantt chart, drawn in books, updated individually later in project.

Use of digital resources – Course website video tutorials to preview workshop activities prior to carrying out tasks. Website video tutorials for electronic theory learning. Also able to be accessed at home, to catch up on missed instruction, reinforce learning and show parents course content. We make our own tutorials for this purpose.

Homework assignment – research by interviewing and internet research – history of toys, history of electronic toys.

Evaluation of and reflection on own learning at end of unit.

Year 10 Technology **from 2012 to 2016**

This programme was taught by non-specialist teachers (from other curriculum areas) from 2012 to 2016: Students learned about Technology in a number of contexts through case studies; including film making, product design and vehicle modification. They worked in small groups to present their learning to the class. As these teachers were not able to teach in workshops, there were limited opportunities for 'hands on' project work. Some teachers had the confidence to use our Meccano kits with the students, or to have them make simple wind-powered models or construct 'Rube-Goldberg' temporary mechanisms from found materials. However, some teachers did none of this, which was a major problem for us. Students' perception of Technology education was negatively affected, with an inevitable consequence that less of them continued with Technology courses at senior level. A promotional push has resulted in two Year 11 classes for 2017.

Year 10 Engineering, Robotics, Programming, Digital and Workshop Technology

From 2017, the course is once again taught by Technology teachers (though now as an option): The Year 10 Technology course provides a foundation for senior study in Technology courses. Students learn about Robotics and work in small groups to program robots. Students also learn about Technology in a number of contexts, including programming, film making, product design and vehicle modification. Students make an electronic circuit to take home. They learn about structures and mechanisms by constructing models using Meccano construction kits. They work collaboratively in the workshop while learning about tool use and construction processes in the design and making of projects, using such materials as wood, metal, plastics. They continue to learn about brief development, project management, technological modeling, prototype development, stakeholder consultation and consideration of the social and physical environment.

Year 11 Engineering Technology

The project based learning has an engineering focus. It begins with the making and assessment of a slot car, built to specifications from guide sheets and teacher direction. Following this, and having learned the skills and material understanding they need for success, students design and fabricate their own chassis to suit a longer body. They reuse some components from the first project.

Project One:

Aluminium chassis – use of templates, measuring, marking up, cutting, filing, centre punching, drilling. Emphasis on accuracy and correct use of tools – steel rules, squares, centre punches, bench vices, tinsnips, hacksaws, bandsaws, battery drills, files, pliers.

Wheels – use of metal lathe to make aluminium wheels to specifications within fine tolerances, creating recesses with milling bit, cutting flange and diameter for tyre.

Car body - Vacuum forming thermoplastic over resin plug to create model car body.

Making axles from bright steel rod – using dies to cut threads.

Guide flag – cutting nylon block to accurate dimensions.

Electrics – Wiring and soldering braids and wires to motors.

Assembly, adjustment and testing on track.

Workshop safety and care of resources – storing project work, working together to tidy up, etc.

Project Two:

Research of slot car design and function.

Materials investigation – learning about the properties of aluminium versus brass for the construction of chassis components; testing, drawing conclusions. A report is written for external assessment.

Prototype development – design and fabrication of slot car chassis. Innovation and precise engineering encouraged. Use of functional modelling in the form of plan drawings and cardboard mock-ups. Ongoing testing and evaluation to completion.

Use of digital resources – Course website assessment information, exemplars (and video tutorials to be added). Able to be accessed at home, to catch up on missed instruction, reinforce learning and show parents course content.

Year 11 Digital Technology

This is a new course from 2017. It replaces the former Computer Studies department course and is aimed at the ‘average’ student. The course is assessed using Achievement Standards. In 2017 it is called CS101 Computer Studies (Digital Technology) and will be renamed as ‘DT102 Digital Technology’ for 2018.

This new course is structured around project-based learning to engage students. The focus project is a short digital 'movie', a digital media outcome. During the preparatory work, students are developing both digital media and digital information knowledge and skills. The course unfolds as follows:

Research: students demonstrate understanding of basic concepts of digital media in edited movies (short digital films) that demonstrate an integration of digital media types.

- Research information into word docs. Learn formatting, text manipulation, etc.
- Learn spreadsheet use e.g. to record how many instances of different shot types - close ups, mid-shots, long shots, moving camera, etc.
- File management – drives, back-up, security, named folders, sub-folders

Students shoot footage at school on smart phones or Dept. cameras; learn about filming techniques; test device use, uploading, file storage and backup, etc. Footage may be shot in groups and used to make individual movies later.

Class review of existing PowerPoint presentations; discuss and take notes on what makes a good presentation, and errors to avoid

Practice presentation – guided exercise to practice skills required

Assessment: Select & manipulate content and data using word document & spreadsheet excerpts from research assessment, to create a PowerPoint presentation:

Students work independently to make their Presentation (must be independent for Merit or Excellence)

Students use planning tools to guide the technological development of the outcome (their digital movie) to address the given brief:

- establish key stages and resources required
- plan actions to be undertaken within each key stage
- identify key planning decisions
- identify critical review points for key stages
- review key planning decisions
- prioritise resources required to ensure completion of the movie

Planning tools used are at least two of: plans of action, Gantt charts, spreadsheets
Resources: time, equipment, research information, specialist knowledge & skills

Each student performs a set of techniques as instructed to make their movie to teacher-given specifications, from footage shot earlier, or possibly additional footage.

External written report: *Demonstrate understanding of basic concepts of information management* involves:

- identifying and describing key features of operating systems and common application software as they relate to the management of information
- identifying and describing file management procedures
- describing ethical issues related to management of information (eg copyright, privacy, file security, appropriateness of the material in its context).

Year 11 Programming Technology

The Year 11 Programming Technology course was introduced in 2016. It focuses on a range of programming contexts. The Technology Department teacher who taught and developed most of the content for this course has moved to another school, so we are in the process of refining the course content in 2017. Students work on projects that involve programming for websites, game software and electronics, as follows:

Project One - Website development project: Students work through a series of tutorials to understand and learn to use HTML & CSS, while also learning legal & design factors. They use Aptana Studio 3 to create a multi-page website. They keep a Word journal to record planning and the results of their testing.

Specifications:

- a home page plus at least 2 sub-pages.
- style applied through an external CSS file
- images are to be edited versions of material created by the student
- images and content must comply with legal and ethical considerations
- HTML & CSS files make logical use of indenting, commenting and label names

Functional Specifications:

- main navigation menu with hyperlinks to sub-pages
- images optimised where necessary for increased performance
- an ability to be displayed in at least 2 different browsers

Aesthetic Specifications:

- a consistent theme used across all pages
- design elements such as contrast, alignment, consistency, size & proportion must be used to enable readability and usability

Project Two – PICAXE programming of an electronic circuit: Students learn to program simple PICAXE circuits, which have a pair of LEDs and three input sensors. They follow a series of tutorials and teacher guidance to build their understanding and skills. They are assessed on creating & using simple command sequences in a computer language (PICAXE).

Project Three – Plan and construct a simple game: Students learn Python using the Code Avengers online tutorials. They also learn about the importance of good planning, and use skills including flow charting to plan their game. They then create a game following a brief; for example a 'Paper, scissors, rock, lizard, Spock' game. They are assessed on constructing a plan for a basic computer program and constructing a basic computer program.

External written report: *Demonstrate understanding of basic concepts from computer science*:

- describing the key characteristics and roles of algorithms, programs and informal instructions
- describing an algorithm for a task, showing understanding of the kinds of steps that can be in an algorithm, and determining the cost of an algorithm for a problem of a particular size
- describing the role and characteristics of programming languages, including the different roles and characteristics of high level languages and low level (or machine) languages, and the function of a compiler
- describing the role of a user interface and factors that contribute to its usability.

Year 12 Programming Technology

The Year 12 Programming Technology course was introduced in 2017, for students who took the Year 11 course to further develop their understandings and skills. The assessment and project work is as follows:

Implement advanced procedures to produce a specified digital media outcome (website project)

Construct a plan for an advanced computer program for a specified task (plan for a project to use Python programming)
Construct an advanced computer program for a specified task (Python programming project)

Implement advanced interfacing procedures in a specified electronics environment (PICAXE circuit interfacing)

Demonstrate understanding of advanced concepts from computer science (external assessment)

Year 12 Engineering Technology

The Year 12 project also has an engineering focus, and an even greater design element, while introducing additional materials. The project is the design and development of a remote control model boat.

Conceptual design – working to a provided brief that outlines the issues to be addressed, constraints and broad attributes, students research hull design, propeller and rudder design, construction techniques and materials, etc. They develop conceptual designs and refine these taking into account stakeholder feedback.

Students investigate and use planning tools to manage their project.

Prototype development – design and fabrication of the model boat, to race at the end of the year. Design aspects include hull design for aspects such as stability versus maneuverability, and the design of a rudder mechanism. Hulls are shaped from foam and covered in epoxy resin, possibly using builders fill to smooth the hull further. Students then have to integrate motor, propeller shaft, rudder mechanism, battery packs and a purpose-built remote control system, which also requires simple programming.

Once again a report is written for external assessment demonstrating understanding of material properties, their selection and application to the project.

Year 13 Robotics Engineering and Programming Technology

The Year 13 students work on a robotics project, which involves both engineering and programming.

Conceptual design – working to a provided brief that outlines the issues to be addressed, constraints and broad attributes, the class examines global developments in robotics, look at a variety of exemplars that provide options for the basis of their own robotics projects. They research similar robotics projects to inform their own design work. Alongside construction of a generic PICAXE control circuit, they learn the basic programming skills they will need to later develop the prototype. They develop detailed conceptual designs, which involve modifications to the electronic circuit, structural and mechanical construction from a variety of materials and software planning. They refine these conceptual designs, taking into account stakeholder feedback, using ongoing research and modelling.

Students create a project schedule to manage planning tools to complete the project.

Prototype development – students develop their small ‘intelligent machine’ robot, integrating electronic circuitry, sensors, mechanisms and programming.

Students are encouraged to submit a report for external assessment demonstrating understanding of technological modeling.

Year 9 Design and Visual Communication

This is a half year option course. Students learn a broad range of design, drawing and model-making skills in the context of a model aeroplane project. Digital technology is used for research and accessing video tutorials and other on-line resources via the Google Site **(Digital Information Management content).**

Year 10 Design and Visual Communication

This is a full year option course.

The Year 10 DVC course provides a foundation for senior study in design and visual communication. Students continue to develop skills in ideas generation, design process, freehand and technical drawing, tonal and colour rendering. They work on a number of design projects that apply the skills learned. Digital technology is used for research and accessing video tutorials and other on-line resources via the Google Site **(Digital Information Management content).**

Year 11 Design and Visual Communication

This is a full year option course.

Students further develop a broad range of drawing skills. These skills are learned and developed within the context of extended, inter-related design projects. The ancient war machine (siege engine) project is constructed as a working model in workshops, and has a significant Engineering focus. The work is assessed internally, and a portfolio of the year's work is submitted for external assessment as well. Digital technology is used for research and accessing video tutorials and other on-line resources via the Google Site. In addition students have the opportunity to use Adobe design software (Photoshop and/or Illustrator) in a Presentation project **(Digital Media and Digital Information Management content).**

Year 12 Design and Visual Communication

This is a full year option course.

Building on their work in Year 11, students further develop their skills in drawing, model making, presentation and design process. Students develop these skills within the context of two or three related projects, focusing on product design and spatial design. This includes students making models and using digital technology (Photoshop or Digital Video) to create presentations of their designs, as well as for research and accessing video tutorials and other on-line resources via the Google Site **(Digital Media and Digital Information Management content).** These projects are assessed internally. A portfolio of the year's work is also submitted for external assessment at the end of the year.

Year 13 Design and Visual Communication

This is a full year option course.

This course extends the techniques and skills of previous years while providing a link to tertiary courses or careers in design, engineering or architecture Students work on two or three related projects that focus on the design and presentation of a product and environment. This includes model making and using digital technology software - Photoshop and/or Digital Video - to produce presentations of their work, as well as for research and accessing video tutorials and other on-line resources via the Google Site **(Digital Media and Digital Information Management content)**. At this level, the student works with the teacher as the 'client' in each of the projects, which are assessed internally. A portfolio made up of a selection of the year's work is submitted for external assessment at the end of the year.

Where to from here?

Promotion

Improve display of project work and understanding of the learning area in the school community – especially for students and other teachers. How can this be done? Display cabinets with project work – both more DVC and Technology. Outside rooms; in other areas of the school (library, outside staff room, etc.)

The use of Promotional videos – including showing a student's journey through Technology at St Pat's, and another through DVC. Could include student interviews and workshop work. Could be used on the website, running on computers in display areas, screened to staff – maybe in installments for staff reflections.

Courses

Continue to revive the Year 10 programme and upskill teachers. This needs to be taught by specialists and needs to provide the basis for Year 11 Technology and Year 11 Programming, and the successive Year 12 and 13 courses.

There should be compulsory Digital Technology learning for all students to the end of Year 10. This could be covered in a course that focuses on introductory programming, simple website development, a simple digital video project, a short Photoshop unit, and integration of Word, Excel and Powerpoint or their equivalent.

Continue to develop Year 11 Programming and Year 12 Programming.

Improve equipment and learning spaces

ECB – Evidence Capture Booth to be completed (requires the addition of a dedicated camera), and possibly a second.

Continue to replenish tools and improve storage spaces.

Purchase 3D printer? This would be used to produce some of the small components used in our projects, and to introduce students to this equipment at senior level.

Curriculum integration

Establish links with learning in other curriculum areas. This will require planning with other departments – especially HODs, or other staff with key planning roles. They need to want to. For example, Science students learn and write about material properties, while Year 11 and 12 Technology students learn about, test, select and use materials and submit an external report. Science students learn about energy, which can include electricity, and also learn about levers within Physics, both of which are useful and important in our Engineering focused Technology courses.

Maths students learn skills and approaches applicable to programming, which is relevant for our Year 10 programming unit, Year 11 Programming, Year 12 programmed remote control within the boat project, and Year 13 Technology robotics.

Aspects of the Nature of Technology could be linked into Social Sciences and Religious Education (ethics, guardianship of the earth/responsible technology)? In English class, students could write about project work from Technology courses. In the past, this has been done successfully with the lower level English students who were taking the Automotive or Building courses, giving them a familiar context to write about.

BOARD OF TRUSTEES OF ST PATRICK'S COLLEGE, WELLINGTON

NOTICE OF MEETING TO BE HELD AT
ST PATRICK'S COLLEGE IN THE COLIN BOARDROOM
ON WEDNESDAY 26 JULY 2017 AT 6 P.M.

Chris Smyth, HOD Technology will join the Board for dinner and then speak about the NZ Technology Curriculum.

PRAYER roster – Tracey Arthurs

1. **APOLOGIES –** Elliot Bell, Kate Southall

2. **MINUTES OF MEETING** (28 June 2017)

3. **MATTERS ARISING**

4. **ACTION POINTS**

5. **GENERAL BUSINESS**

- Update on Admin/Support Review - Neal & Audrey
- Report to Board of Trustees on Progress on the 2017 Annual Plan
  (Please note that Neal's *Report to Board of Trustees on Progress on the 2017 Annual Plan - July 2017* will be emailed out on Monday.)

6. **SUBCOMMITTEE REPORTS**

(a) Special Character

(b) Appointments

(c) Charter & Policy

Policies to be discussed and reviewed:

- Complaints Policy (update)
- NAG 5 – Safe Environment General Complaints Policy (update)
- Sexual harassment and Social Media (update)
- DRAFT Attendance Procedure

(d) Pastoral

(e) Finance, Property & Maintenance/Development:

(f) Health and Safety

7. **RECTOR'S REPORT -** July 2017 (report attached)

8. **STUDENT REPRESENTATIVE**

9. **STAFF REPRESENTATIVE** (report attached)

10. **PARENTS' ASSOCIATION**

11. **WOMEN'S GROUP**

12. **POLYNESIAN PARENTS' ASSOCIATION**

13. **WHANAU GROUP**

14. **CORRESPONDENCE**

Correspondence – Requiring Attention

Correspondence – Inward

NZEI Te Riu Roa, Notification of paid union meeting - 4 July 2017

Correspondence – Reports & Circulars

STA News, Issue: 274 - July 2017
Tukutuku Kōrero - NZ Education Gazette – 10 July 2017

Correspondence – Outward

BoT Chair, re staff perspective on BoT in Kate Southall's absence - Lynley Reid - 3 July 2017
BoT Chair, re approval of leave of absence - Kate Southall - 29 June 2017
BoT Chair, re approval of leave without pay in 2018 – Rob des Tombe - 29 June 2017

Correspondence – Late

DATE OF NEXT MEETING

Wednesday 23 August 2017

RECTOR'S REPORT TO THE BOARD OF TRUSTEES

21 JULY 2017

ROLL

The roll on 21 July was:

	2017	2016	2015	2014	2013	2012
Year 9	136	165	186	174	160	157
Year 10	171	190	167	159	164	179
Year 11	182	155	158	159	183	150
Year 12	153	155	148	173	147	140
Year 13	148	134	156	136	129	142
Total	**790**	**799**	**815**	**801**	**783**	**768**

There are also currently 26 International students.
Enrolments for 2018 are coming in slowly. They close on Friday 28 July.

SPECIAL CHARACTER

- A number of staff and members of our community attended the Requiem Mass for Mike Savali's father Papali'itele Petelo Savali during the holidays. He had been a significant figure in the Samoan Catholic Community in Newtown for many years.
- The Choir sang at the funeral of one of our Grandparents during the last week of term.

STAFFING

We have held an induction session for our 4 new staff who are starting in Term 3.

TEACHING, LEARNING AND STUDENT ACHIEVEMENT

All staff were expected to have commented on at least one assessment on the Parent Portal by the end of Term 2.

EXTRA CURRICULAR

- Our combined Kapa Haka Group performed very well at the Regional Kapa Haka Festival in Otaki in the last week of Term Two. While they did not qualify for nationals this group made a real impression on everyone who saw them perform and the whole process has been very uplifting for the students involved. Special thanks to Jarrad Porima and Ngahuia Madden for the many hours they put in to support this group.
- Our Poly Group perform at Tu Tangata on Tuesday 26 July. They have been practicing over the holidays to prepare for this special performance.
- We are hosting two rugby teams from Sherborne School in the UK this week.

- We have our big sports exchange with St Patrick's College Silverstream on the first Wednesday of the Term out at Silverstream. We will be taking our Year 13 students out as spectators.

PROMOTION AND COMMUNITY LINKS

- I hosted the first meeting of the Wellington Catholic Community of Learning Interim Stewardship Group in the first week of the holidays in our Boardroom. The key outcomes were that this group will meet again on 31 July to review our draft Memorandum of Understanding and to set up a process to appoint a Lead Principal. I have enclosed a copy of the COL's Term 3 Action Plan.

ENVIRONMENT AND RESOURCE ISSUES

- The re-roofing contract is almost complete. We are reoccupying Level Two of Watters from the start of Term 3. An additional section of the contract is the need to enclose the breeze block ceiling of the area outside the Tuckshop in the Redwood Block. LT McGuiness are starting on this work today. This work was identified as being needed in our Asbestos Management Plan.
- The Todd Theatre has been cleaned and cleared and is now able to used again.

HEALTH and SAFETY

- We have now met with three of our four main contractors to introduce them to a training module they need to complete to ensure they are fully aware of our Asbestos Management Plan.

Other Issues

1. Progress on the Annual Plan is outlined in a separate paper.
2. I attended the National Association of Principals of Catholic Secondary Schools Conference in Queenstown from Saturday 8 July till Tuesday 11 July which we held with our colleagues from Australia. I will have a short report on that conference emailed to Board members in the next day or two
3. A reminder that we are planning a BoT meeting with the Senior Leadership Team on Thursday 3 August at 5.15pm. How do you want me to structure that meeting?

Neal Swindells
RECTOR

Chris Smyth Curriculum Vitae

Personal Statement

I am a Curriculum Leader of Digital Technology, Engineering and Materials Technology, and Design and Visual Communication; I have held the Technology Head of Department position for ten years. Under my leadership we have achieved high levels of academic success and provided pathways for many students into digital technology, design, engineering and technical careers. I have an excellent record of external moderation and departmental administration.

I have developed and taught or overseen courses for Years 9 to 13 in Digital Technology, Engineering and Materials Technology, and Design and Visual Communication. Our Engineering Technology courses integrate a wide range of content, including digital technologies. Our Digital Technology courses involve coding/programming, digital information, digital media and digital infrastructure content. In addition I have developed, taught and overseen a Digital Design course for Print Media.

I have had deep professional development in the Technology curriculum over the course of the last twelve years. This includes involvement in Ministry of Education funded initiatives, curriculum development programmes and trials over several years, as the modern Technology curriculum has been developed. This has included involvement with the IPENZ Futureintech programme. In 2007 I was a presenter of new Technology curriculum material at the TENZ conference. I worked as an assessor of external Technology standards for three years, providing insight into the courses of other schools across the country. My personal professional development has included courses in electronics, programming and design software.

As a curriculum team leader I have a major focus on continually upskilling my colleagues to develop their broad technological literacy, which in turn enables them to provide suitable guidance for our students. I have developed a department ethos that embodies the idea of collaborative teaching practice and collegial support.

I have personal expertise in teaching electronics and programming in a robotics context at multiple year levels over the last twelve years. In addition I have expertise in digital video, resistant materials, workshop and engineering practice, mechanics and model making in a wide variety of media. I am also a highly experienced teacher of Design and Visual Communication at both junior and senior level. I am a designer, technical illustrator and artist by background, with a broad practical base in a wide variety of contexts.

I embrace modern learning practices and have embedded these into the structure and delivery of Technology education. This is ideally suited to modern learning environments, though can be applied in more traditional school environments. I place a strong emphasis on the guiding principles inherent in the New Zealand curriculum, in particular the development of the key competencies and assisting students to make overt learning connections across traditional subject contexts.

My educational philosophy has several key aspects. I emphasise curriculum first, assessment second. I use inquiry based learning to stimulate curiosity in the minds of students, as I believe that people are more likely to learn when they have a sense of wonder. I actively seek to differentiate the learning to address the needs of individual students. I teach my students to use materials, tools, and processes. I teach them to use their minds; to invent, create, adapt, collaborate and integrate. Problem-solving is a major focus of the courses I teach. The success of this approach is confirmed by many of our students finding study and employment pathways in a wide variety of engineering and design fields.

Staff Report for St Patrick's College Board of Trustees Meeting on 26 July.

1. The end of Term 2 saw Watters House winning the Taylor Festival House performance. Derek Wood worked hard to coordinate student leaders so that it would be a successful occasion. Taylor Festival has undergone some review in the past two years and it is generally felt amongst the staff that there is still scope for it to be celebrating genuine 'creativity' and the arts. What was disappointing is the large number of students who were absent from Taylor Festival.

2. A significant number of staff members suffered ill health in the second half of last term and this has put pressure on keeping students up to date and focused. This included members of the administrative staff as well. This sometimes meant that staff who should have been at home because of their health continued coming to school and therefore took longer to fully recover. This also put pressure on organising suitable relief teachers on occasions.

3. The continued re-roofing put further pressure on staff from Level 200 in being relocated, finding suitable work spaces and on some occasions having the technology to teach their courses. They are thrilled to be able to return to Level 200 for the start of Term 3.

4. The Kapa Haka group were well supported by a large number of staff who attended their open dress rehearsal before their competition in Otaki. Jarrad Porima and Ngahuia Madden have worked extremely hard in coordinating and supporting this group including students from St Catherine's and St Mary's.

5. Similarly, a large group of staff attended the final Home School Partnership coordinated by Ainslie Sauvao where Matt Bayliss outlined NCEA requirements and promoted excellence and the Sciences generally.

Lynley Reid.

Wellington Catholic Community of Learning

Term 3 Action Plan

Objective	By	How?	Progress to date
Confirm comfort with MOA/lead principal appointment process/draft local criteria and ask Boards to endorse	Interim Stewardship Group at their meeting of the 31 July	1. Interim Stewardship Group to review draft MOA prior to meeting of the 31 July, and confirm comfort to/comments to the 31 July meeting (if not able to attend, to confirm comments/comfort by email to Frank) 2. Confirm approval with lead principal appointment process to the 31 July meeting (if not able to attend, to confirm comments/comfort by email to Frank) 3. Confirm comfort with/comments on the draft local criteria (as at 31 July may simply be the Christchurch base) 4. Interim Stewardship Group to review key message for seeking Board approval to the MOA/lead principal appointment process/general direction of the local criteria 5. Interim Stewardship Group to identify any other assistance required to help them seek approval from their Boards	1. Draft MOA of 12/7/17 sent to the interim stewardship group on 13/7 to review and provide feedback to the meeting of the 31 July; 2. Action Plan and Report of 12/7 meeting sets out key elements of the lead principal appointment process and sent to the interim stewardship group on 13/7 3. Christchurch Catholic COL local criteria as base draft for the Wellington Catholic COL sent to the interim stewardship group on 13/7 4. MOE notes to assist interim stewardship group to inform their Boards of approvals being sought, sent to the interim stewardship group on 13/7 for review 5. Principals to ensure that there is an Interim Stewardship group member for the school and that person receives all relevant information. 6. Frank now has one email address per school
Finalise Achievement Objectives, and submit to MOE	Principals Meeting on (9 August?)	1. Principals revisit draft achievement challenges, and make suggested edits, comments on the doc prior to meeting on (9 August?) 2. Finalise the wording at the meeting on (9 August?)	MA shared doc Di investigating endorsement of the Achievement Challenge during the election period

		3. Principals recommended it draft achievement challenges,to be circulated by email to Interim Stewardship group members for comment/comfort 4. Send to MOE for approval	
Establish support needed in relation to Admin, Communication , HR	Ongoing to be reviewed at Interim stewardship group meetings and principal management meetings	1. Principal group and Stewardship Group to establish how best supported by MOE (secretary, etc) 2. Send request of hours needed to Di	
Finalise MOA	Approved/signe d by each Board by end of Week 4	1. Any changes agreed at the Stewardship Group meeting of the 31 July to be processed with final form of the MOA to be sent to Interim Stewardship Group members later in the week of 31 July 2. Frank will provide ome speaking points for Stewardship group members to share with own Boards) 3. MOA presented to individual school Boards, by Board Stewardship group member, for BOT approval	4. MA sent draft MOU to Frank 12.07.17 5. Di is investigating liability insurance in the Community of Learning space
Set Local Criteria for Lead Principal	Meeting on (9 August?) - this is a different deadline than discussed at 12.07 meeting, but more practical	1. Virginia shared ChCh version of Job Description (p4 has their **local criteria**) https://drive.google.com/file/d/0B4_qxYaB9bKrQXI1OTF3aDJLYWFKRDJxMkJJakNjX1BtUFVN/view?usp=sharing 2. Principals consider our own Local Criteria Prepare and suggestions / edits to present at meeting 3. Finalise the wording at the meeting on (9 August?) 4. Send suggested final form to Interim Stewardship Group members for comment/confirmation to be done by emails 5. Send to Appointments Panel for inclusion in application pack, along with MOE criteria, etc (panel to be a appointed on 31 August)	1. Criteria based on Christchurch circulated to Interim Stewardship group 13/7 for comment at meeting on 31 July 2.

Appoint Lead Principal	End of Term 3	1. Individual Boards approve MOA, lead principal appointment process and appointments panel by end Week 4 2. Advertise Position Weeks 5 & 6 3. Applications close end of Week 6 4. Shortlist candidates Week 7 5. Interviewing Week 8 6. Decision by week 9, if possible 7. End of Term 3 = Lead Principal Appointed	