INTRODUCING THE DIGITAL TECHNOLOGIES CURRICULUM


acer

MINISTER'S FOREWORD

Our society and economy is increasingly reliant on the availability of quality data and digital solutions for decision-making and communications. It is vital that our learners are equipped with the knowledge and skills to shape and manage their digitally networked environment. To meet the current and future needs of our lifelong learners, an understanding of digital systems, data and processes and the application of specific ways of thinking about problem-solving for creating digital solutions will be essential. These systems will support new ways of collaborating, problem-solving and communicating and provide avenues for active participation in education, employment and recreation.

The Andrews Labor Government is committed to establishing Victoria as the Education State, where the vibrancy of our innovation and the pursuit of new knowledge, skills and jobs will draw others to live, work and invest in Victoria. The Government is investing in supporting teacher professional learning in areas such as digital coding, critical thinking and Science, Technology, Engineering and Mathematics (STEM) education to ensure that every student experiences the chance to succeed in learning and in life.

I hope you find this a valuable resource, that highlights the benefits the Digital Technologies curriculum can offer Victorians and the local economy. I look forward to hearing stories about how your school is implementing this exciting new curriculum.

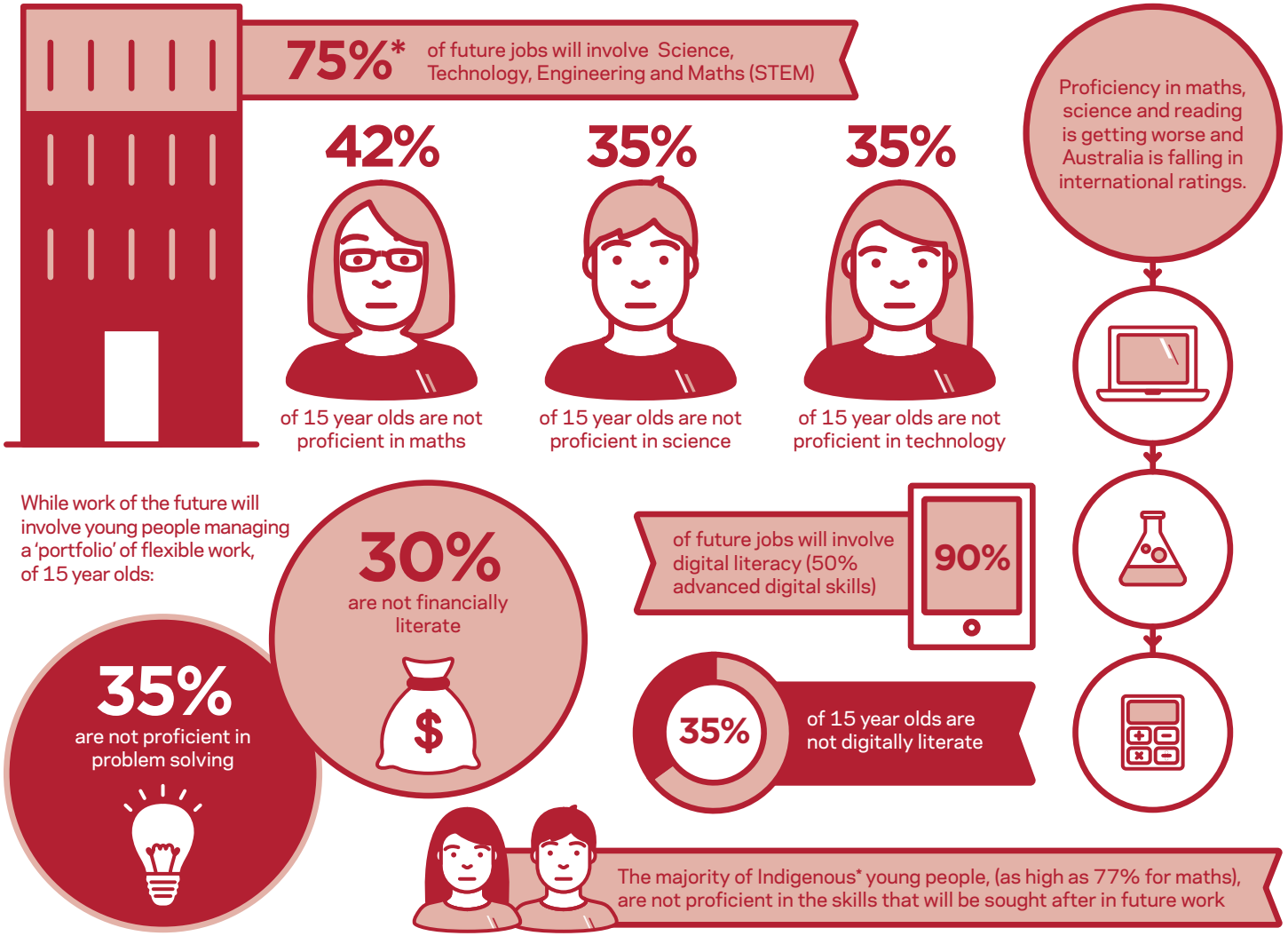
Minister

OUR FUTURE DESIGNED – WHY DIGITAL TECHNOLOGIES?

Young people are staying longer in education which will help prepare them for the high skilled work of the future

- Education participation, attainment and retention are increasing in general.
- The exception is Indigenous young people (15–19), whose participation has decreased since 2008.

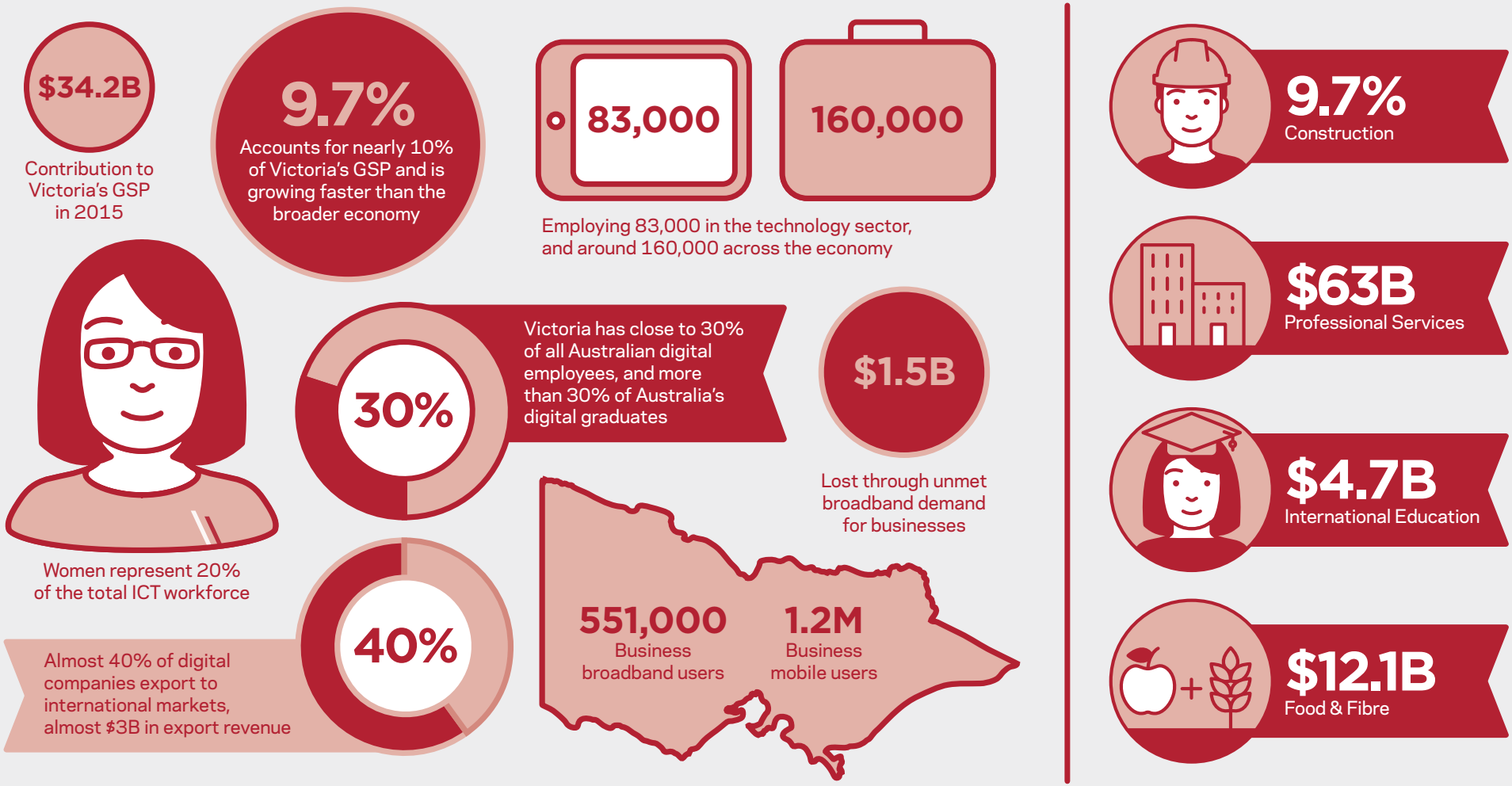
A significant minority are not developing the enterprise skills they will need for future work.



* PwC *A smart move* 2015

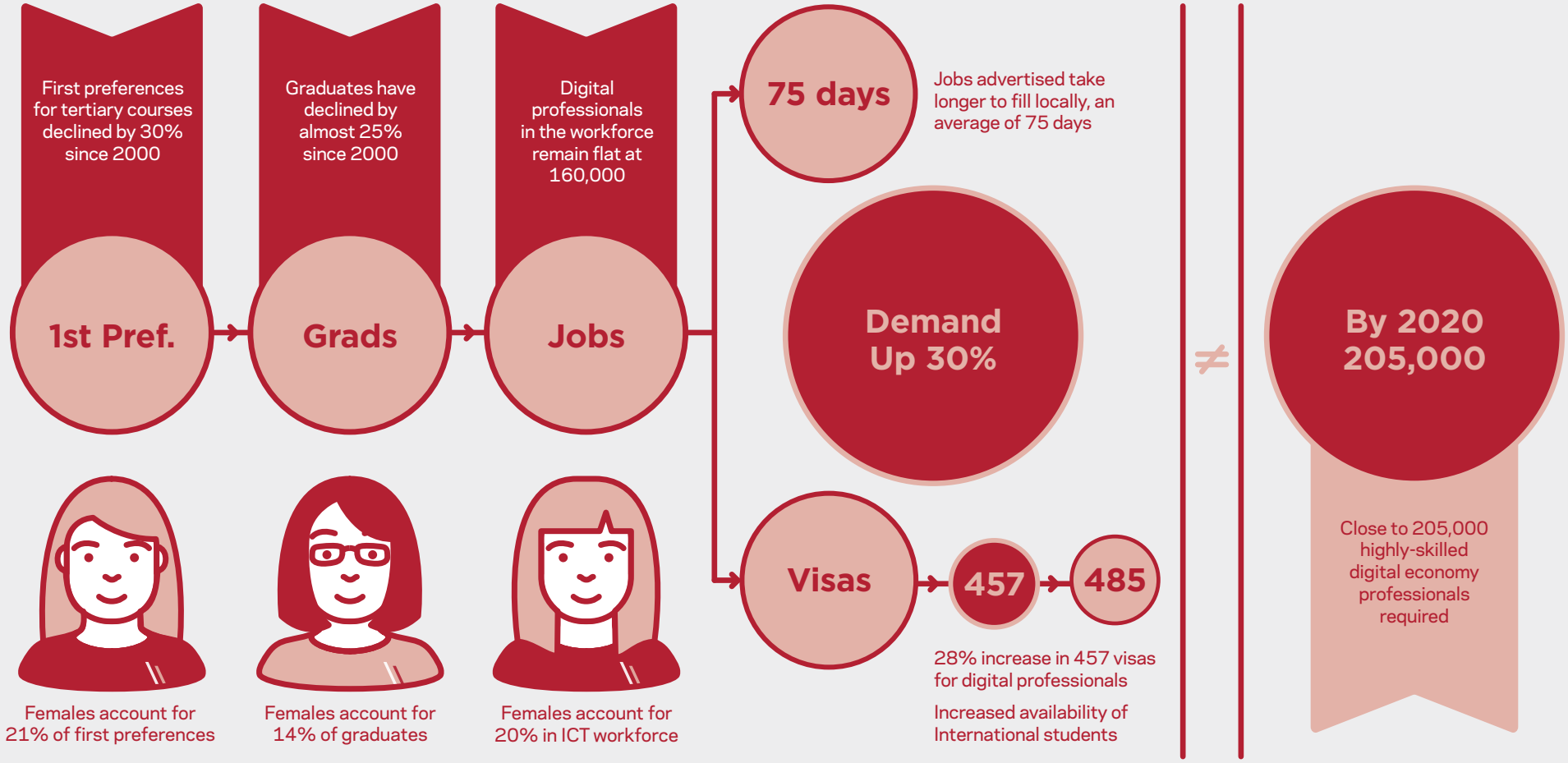
* Throughout this document the term 'Indigenous' is used to refer to both Aboriginal and/or Torres Strait Islander peoples. Unless noted otherwise, the term should be considered inclusive of both Aboriginal and Torres Strait Islander peoples.

VICTORIA'S DIGITAL ECONOMY VS OTHER SECTORS



Information sourced and collated by the Department of Economic Development, Jobs, Transport and Resources from sources including, Victorian Government, ICT Industry Survey, April 2015, Australian Government, ABS, Labour Force-Australia, May 2015, Deloitte Access Economics 2014 Broadband Modelling and Australian Government, DET, Higher Education Statistics Data Cube.

THE SKILLS GAP



Information sourced and collated by the Department of Economic Development, Jobs, Transport and Resources from sources including, Australian Government, ABS, Labour Force-Australia, May 2015, ITCRA, ICT Employment Trend Report, June 2016, Peoplebank, ICT Salary & Employment Index, March 2015, Australian Government, VTAC Annual Reports & Statistics, Aug 2015, and Australian Government DET, Higher Education Statistics Data Cube.

WHAT IS THE DIGITAL TECHNOLOGIES CURRICULUM?

The Victorian Curriculum F–10 is the new curriculum for Victorian schools. It incorporates the Australian Curriculum and reflects Victorian standards and priorities.

It is designed to challenge and engage students in learning how to create digital solutions, including coding.

The curriculum has been designed to provide practical opportunities for students to explore the capacity of information systems to systematically and innovatively transform data into digital solutions, through the application of:

- Systems thinking (the relationship between people, digital devices and society when developing solutions)
- Design thinking (designs that are intuitive to users of all ages and abilities)
- Computational thinking (the precise steps and decisions that need to be made to code a solution)

These ways of thinking can be applied in many endeavors, such as medicine, science, engineering, entertainment and law.

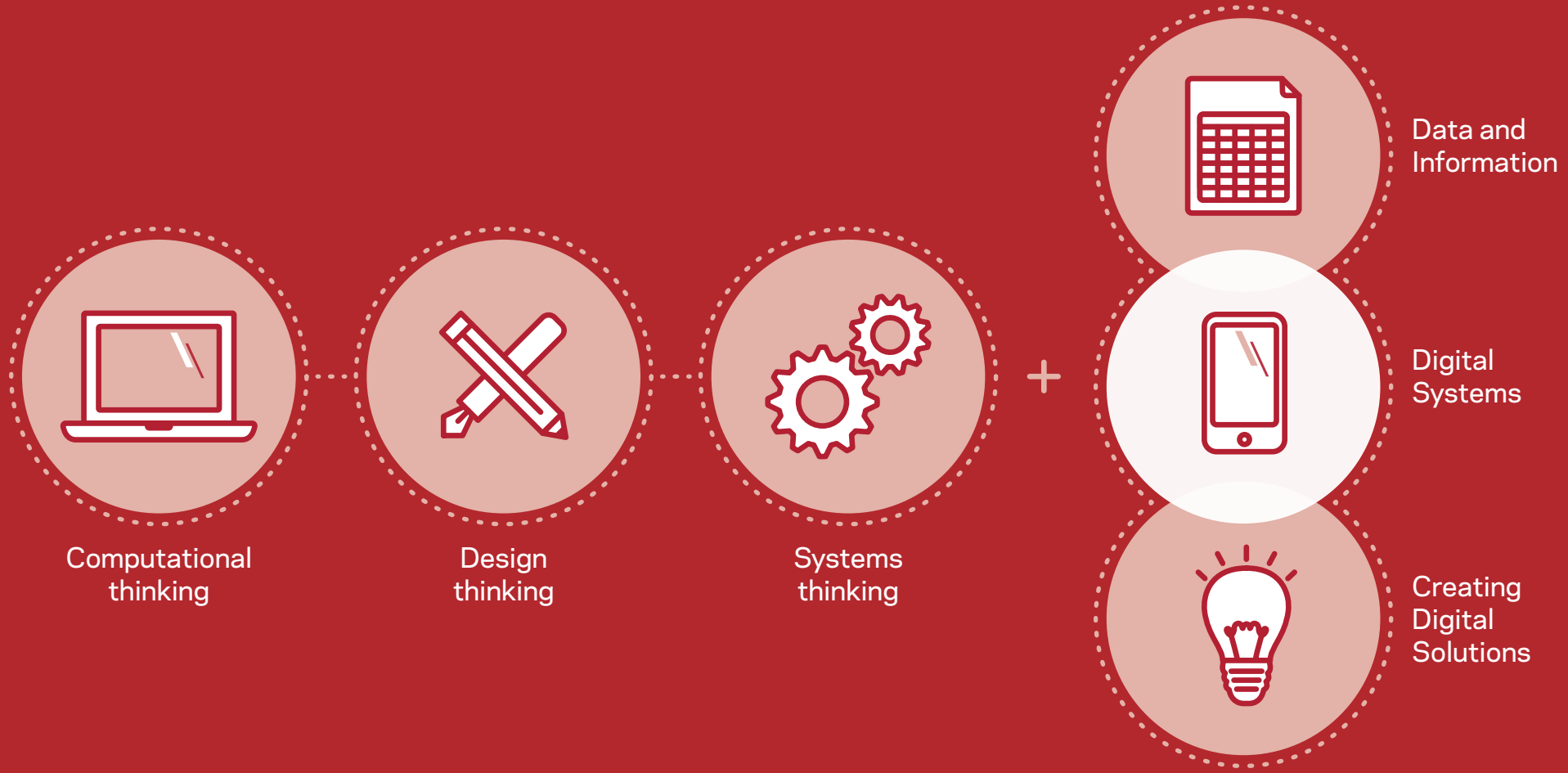
Students will learn to think logically and precisely when writing instructions that can be coded using programming language (coding).

Around 50% of the curriculum can be taught without the use of a computer, also referred to as 'unplugged' learning.

More information about the Digital Technologies curriculum can be found at: http://victoriancurriculum.vcaa.vic.edu.au/technologies/digital-technologies/introduction/rationale-and-aims

WHAT CAN VICTORIAN STUDENTS LEARN IN DIGITAL TECHNOLOGIES: F–10?

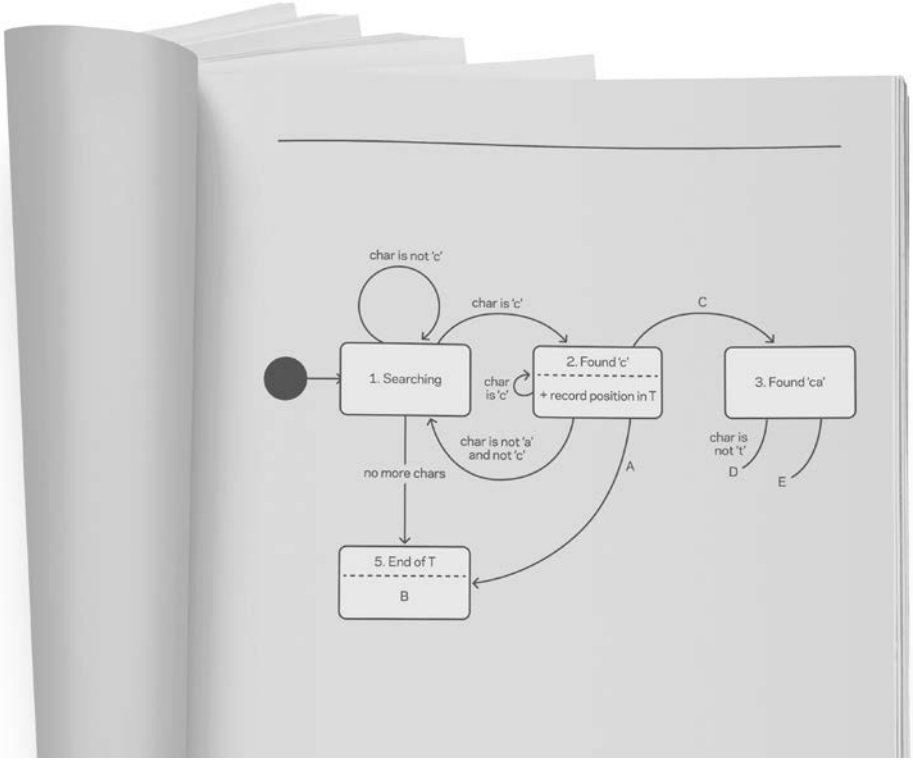
Students learn how to apply different ways of thinking, technical skills and processes to create innovative digital solutions.

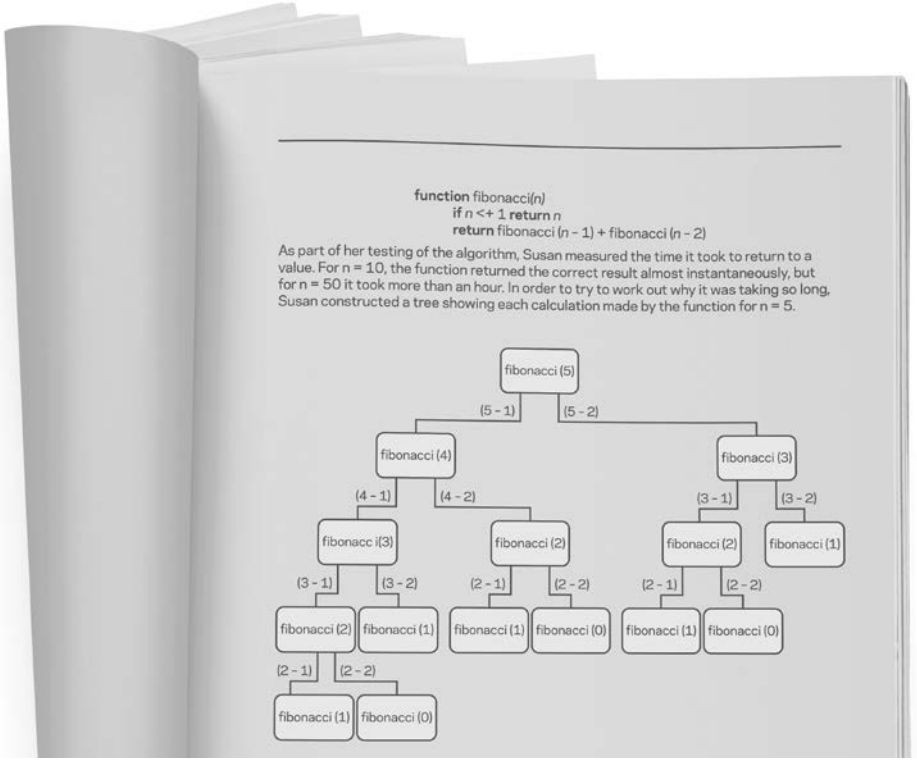


WHAT CAN VICTORIAN STUDENTS LEARN IN VCE ALGORITHMICS, UNITS 3 AND 4?

In 2015, the Victorian Curriculum and Assessment Authority (VCAA) introduced a new Victorian Certificate of Education (VCE) study focusing on a structured framework for solving real-world problems with computational methods. This study provides learning opportunities for students with a particular interest in computer science and mathematics and is pitched at a first-year university standard.

Victorian students now have opportunities from their first year of schooling to Year 12 to develop the algorithmic thinking skills essential to our emerging digital economy and innovation plan.

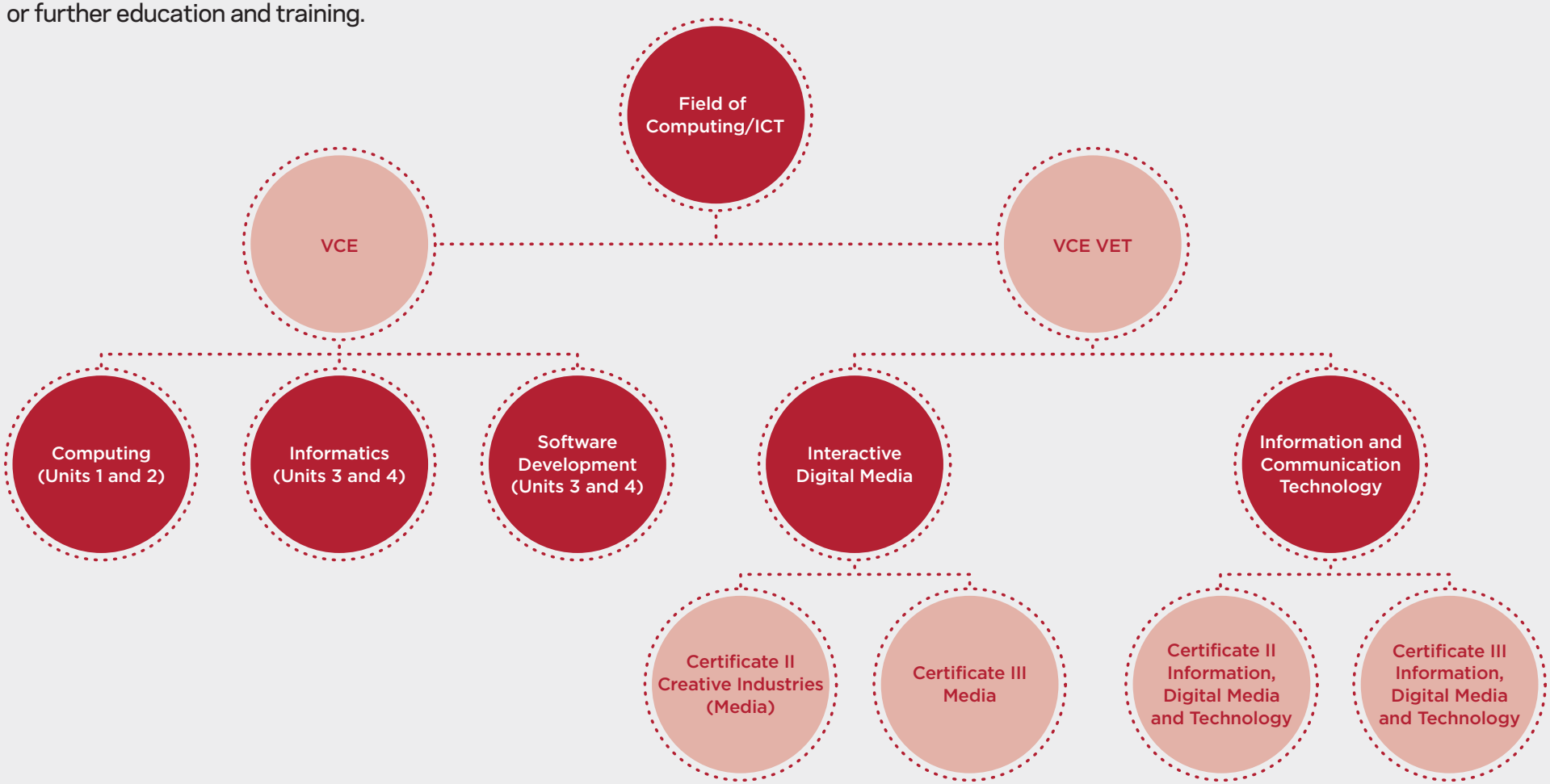




Source: VCAA website – sample examination paper, Algorithmics http://www.vcaa.vic.edu.au/Documents/exams/algorithmics/algorithmics-specs-sample-w.pdf

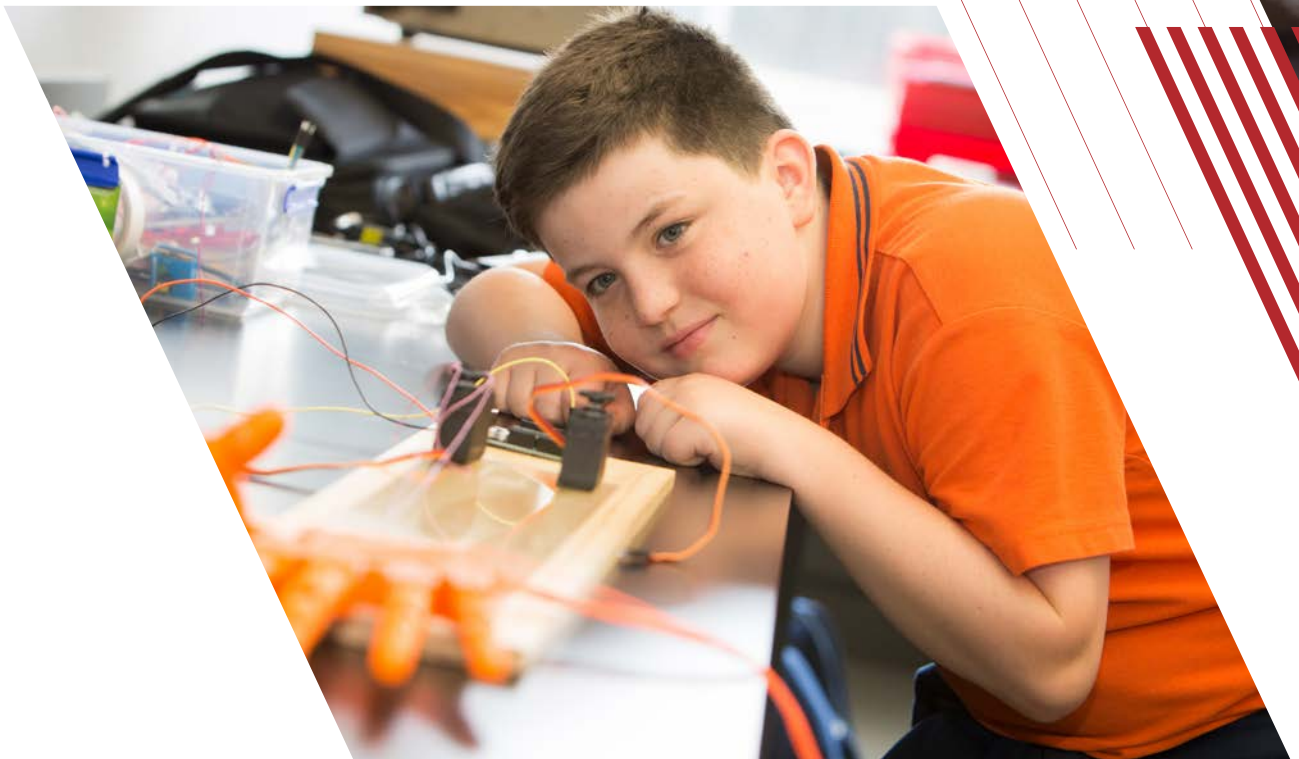
WHAT CAN VICTORIAN STUDENTS LEARN IN VCE COMPUTING AND VCE VET?

Victorian students can select to study specific programs to suit their needs, whether that be pathways to employment or further education and training.



DIGITAL IN ACTION: WHAT EXCITING THINGS ARE HAPPENING IN SCHOOLS?

Many Victorian government schools have already started implementing aspects of the Digital Technologies curriculum. All government and Catholic schools need to implement this curriculum from Foundation (Prep) to Level 10 by 2017.



A MAKER MOVEMENT

Making, Inventing and Tinkering
Dallas Brooks Community Primary School

Dallas Brooks is leading the way in innovation.

Year 5 and 6 students worked on a Maker program with classroom teacher Mark Dixon. Students explored different ways to use *Makey Makey* and *everyday objects to give their computers instructions*. They also built programmable Lego models using We Do.

Students learnt basic programming using software, such as *Scratch* and *Turtle Art*, which include elements of design technology and also provide students with experiences in the field of robotics.

Watch the video where two students talk about their learning experiences when designing, producing and testing their *Makey Makey* guitar.

For more information, visit the Maker DigiPub: digipubs.vic.edu.au/pubs/maker/home

ROBOTS, CODING AND INNOVATION

Aitken Creek Primary School

Aitken Creek Primary School (ACPS) prides itself in being an early adopter of digital learning. When the national draft of the Digital Technologies curriculum was released, ACPS saw this as a fantastic opportunity to engage staff, students and the wider school community in the future of digital learning at the school. As more than half of the student enrolments at ACPS are at Years P–2, the school has focused on introducing the new curriculum in the early years.

Prep students spent weeks investigating robots through inquiry learning; playing with them, collecting and representing data about them, pulling them apart and putting them back together again. Students gained a sense of how digital systems work, rather than only focusing on how to use them.

In addition, students in Years 5 and 6 took part in a *Code the Future* project, working with a software developer for six weeks. Students used *Intel Galileo Boards* to design and create their own projects. A classroom monitoring system that measures temperature and an encryption machine that allows users to send and receive 'secret' messages were some of the innovative ideas that students explored, designed and built.

ACPS has focused on providing professional learning for staff as well as to other schools in the area, developing four sessions around the new Digital Technologies curriculum to enhance teachers' understanding and confidence. To engage parents, ACPS has hosted family events that focused on coding challenges for parents and students to complete together.

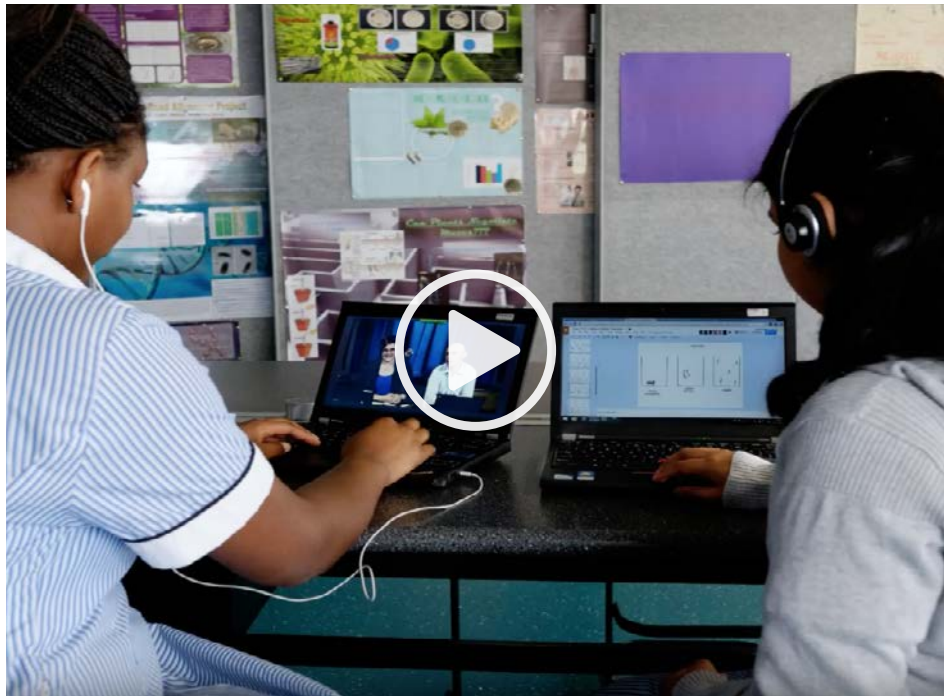
CREATING NEW LEARNING PROGRAMS

Matthew Flinders Girls Secondary College

In this video, Damien Toussaint, Assistant Principal, talks about how his school is creating digital technologies learning programs in collaboration with the Department of Education and Training's New Pedagogies for Deep Learning Global initiative.

The programs support students to become deep thinkers and problem-solvers. He hopes this will encourage and challenge students to have 'hard fun' and learn through tinkering, making and problem-solving.

CUTTING EDGE SCIENCE



John Monash Science School

John Monash Science School runs the virtual science school, Emerging Sciences Victoria (ESV).

This innovative program offers advanced science classes to Victorian students, enabling them to connect virtually and collaborate with peers, teachers and academics nationally and globally. They have developed a curriculum to include courses on astrophysics, quantum physics, bioinformatics and nanotechnology, igniting students' interest in career's in the areas of science, technology, engineering and mathematics.

ALGORITHMICS IN THE CLASSROOM

Choosing to offer Algorithmics – Higher Education Scored Study (HESS) in Year 12 in its first year of accreditation was a natural choice for Box Hill High School. As a school that is determined to cater to a diverse range learners, including a large cohort of gifted learners, the opportunity to offer students an applied problem-solving subject at an advanced level was very exciting. While serving as an introduction to Computer Science at a tertiary standard, many of the students who have enrolled over the first two years are former SEAL students (Select Entry Accelerated Learning) who were enticed by the chance to expand their strong mathematical and scientific skills into a more applied context.

Unlike more established VCE Mathematics or Science subjects where students are often building on years of previous incremental progress, many of the concepts introduced in Algorithmics (HESS) are seen for the very first time, and so initially were quite confronting for some students. However, the students were able to adopt a range of strategies to overcome this initial difficulty. These strategies included implementing algorithms in a programming environment to test how they work, returning to new concepts intermittently in order to be able to encounter them multiple times in a space of a few weeks and working collaboratively to improve their understanding.

Ultimately, having come to terms with some of the early difficulties in the subject, the majority of students came to really enjoy the subject, and particularly the many interesting applications that their newfound skills could be applied to. For instance, one student was amazed that "you can apply this knowledge in some of the most bizarre settings, such as my English Language class, which seemed to, at first glance, have no relation to computer science or mathematics." Other students were able to create a model resembling Netflix for board games. As a result of these positive experiences, well over half of the Year 12 students in the original Algorithmics (HESS) class pursued a Computer Science or Science degree the following year.

Entering an increasingly digital age, the flexible skills learnt by students studying Algorithmics (HESS) will undoubtedly provide them with a competitive advantage in whatever career pathway they decide on.

INTRODUCING OUR TECH SCHOOLS

The Tech Schools initiative is part of the Victorian Government's commitment to creating the Education State by ensuring every Victorian has access to an excellent education. The Government is investing $128 million to create 10 high-tech centres of learning that will use leading-edge technology, discovery and innovation to support the advanced education and training that Victorian school students will need so they can flourish in the rapidly changing global economy. Tech Schools will operate differently from technical schools and traditional secondary colleges. They will be innovative, shared learning environments where students from many schools will attend classes together, while still enrolled in their local secondary school.

For more information visit: http://www.education.vic.gov.au/about/programs/learningdev/techschools/Pages/default.aspx?Redirect=1

GETTING INTO CODING

Mildura West Primary School

Mildura West Primary School has incorporated digital coding into their learning programs for a number of years. Students participated in the World Scratch Day, an international coding event, and the Great Victorian Coding Challenge, where students across Victoria completed three coding challenges, demonstrating mathematical concepts.

The school also facilitated a Robotics and Code Club on a weekly basis for interested students in Years 3–6.

Four students from Year 5 were excited to be involved in a pilot program called Games Net, run by the Australian Center for the Moving Image (ACMI), where they joined as a virtual team with other schools to develop a game to share with the network.

EXTENDING OUR LEARNERS...

Australian Centre for the Moving Image	Supports the development of digital skills through initiatives such as Games Net and ScreenIT.
Creative Victoria	Supports the vital link between education and the digital industry.
Digital Careers	Promotes future pathways for school students and supports the digital industry.
Digital Learning and Teaching Victoria	Provides professional learning opportunities for teachers across Victoria.
Museum Victoria	Provides a range of educational and practical programs which explore real world problem solving using digital technologies.

OUR FUTURE IS NOW...

The Andrews Labor Government recognises the importance of high-quality teaching and learning to ensure that students are well equipped to deal with our changing world. That's why in September in September 2015, the Government announced a $747 million investment to make Victoria the Education State. For schools, this included the Digital Technologies curriculum that will help our students to acquire knowledge and skills that industries want and employers will expect.

It is happening through:

- teachers being engaged in training
- refining education practices
- students being engaged in learning.

The dream is in every school… to give kids the tools to fly!

FOR MORE INFORMATION SEE:

Department of Education and Training: Digital Technologies
http://www.education.vic.gov.au/school/teachers/teachingresources/discipline/digital/Pages/default.aspx

Victorian Curriculum
http://victoriancurriculum.vcaa.vic.edu.au/

Victorian Curriculum and Assessment Authority (VCAA)
http://www.vcaa.vic.edu.au

School Mate app for parents by Department of Education and Training
http://www.education.vic.gov.au/school/parents/learning/schoolmate/Pages/app.aspx