IoT for teachers and students

A one or two-day program providing participants the opportunity to learn how to take students on a coding journey that enhances explorations in multiple subject disciplines.

"Programming like problem–solving, is a skill that should be infused into all our school subjects from math and science to social studies and English." (Marc Prensky, in *From Digital Natives to Digital Wisdom* p192).

This workshop will show teachers how they can take students on a six to twelve-month journey whereby they learn the basics of coding, but progress quickly to the use of more complex devices without the need to master complex coding. Participants will undertake several coding activities so that they themselves might teach them to their students, but most importantly, will take away an understanding of the Internet of Things (IoT) and how they might take students on a coding journey that promotes the transfer of learning across and between subjects.

Day One of the program is designed to empower teachers to incorporate coding into their teaching without feeling challenged or inadequate. **Day Two** of the program is intended to provide support to the teacher as he/she begins the coding journey and engages with IoT technologies in the classroom for the first time. (see overleaf for detailed program outline.)

All participants will receive a Thinxtra Xkit as part of Thinxtra's Smart School Program and a teacher's handbook outlining the complete coding journey from an introduction to coding an Arduino UNO through to multiple examples and exercises using several simple sensors and finally, the IoT, using the Xkit connected to the Sigfox LPWAN to collect and analyse real-world data to drive decision-making.

Who should attend? *Any teacher or school leader interested in developing relationships between digital technologies and the traditional core curriculum .*

Learning Goals for the teacher:

- Confidence to engage with coding without high-level programming capabilities
- Appreciation of the 'language' of coding and computational thinking
- Enhanced appreciation of scientific techniques such as data collection, analysis and presentation
- Understanding the basics of coding using both mBlock and the Arduino IDE
- The ability to use digital technologies to drive decision-making
- links between coding and key subject areas like Mathematics and Science
- An understanding of how simple sensors can enhance learning in different subjects.
- Understanding of the Internet of Things technologies and their significance for the future

See overleaf for the detailed program outline.

For more information and pricing, contact Rob Sieben at the Hartley Institute via email - admin@hartley.edu.au

Rob Sieben has held a number of administrative positions in a career spanning over thirty years in education. He has also worked as a consultant in matters of curriculum delivery, school administration and school network infrastructure. He has contributed both nationally and internationally to the understanding of digital learning technologies and the current research that is shaping paradigm reform.
He is currently the Director, The Hartley Institute at Prince Alfred College in Adelaide.
More information and articles he has written can be found at www.hartley.edu.au/articles-and-links/

Programme Outline *

Day 1 - Delivered to teachers on-site or at The Hartley Institute **

- Introduction to the Arduino UNO and accessories
- mBlock and the Arduino IDE programming interfaces
- Basic commands and syntax
- Using the Arduino to control LEDs
- Using sensors with the Arduino
- Using an analog sensor to create a night light ***
- Other sensors - temperature, humidity, soil moisture, barometric pressure ***
- The Internet of Things
- Thinxtra's Xkit
- Coding the Xkit to collect data from its on-board sensors and transmit it across the IoT network
- Accessing /Retrieving the Xkit data
- Converting the Xkit data into classroom useable data
- Analysing the Xkit data
- Presenting the Xkit data in a meaningful form

Day 2 - On-site at the school, working with the teacher *in the classroom with the students* **

As the teacher takes the students through the above program, the students will develop:

- knowledge of basic coding commands and syntax
- the ability to work with analog and digital sensors ***
- the ability to use computational thinking
- an understanding of the processes involved in data collection, representation and interpretation
- the ability to transform their data into meaningful information
- critical thinking skills required to use data to drive decision-making
- the capacity to design digital solutions to tackle real-world problems
- the ability to use IoT solutions to monitor and analyse a variety of situations that might impact individuals and their environments

*   Schools may opt to register for Day 1 only or for Day 1 and Day 2 as a package.
**   Thinxtra Xkit provided by the Thinxtra Smart School Program
***   Sensors used in Day 1 program will be provided by the Hartley Institute,
        Sensors used by schools for teaching the program will need to be purchased by the school.
        These sensors are inexpensive and can be readily purchased from many retail outlets or
        through the Hartley Institute.

For teachers registered in Australia, AiTSL standards addressed in this program are 4.5.3, 6.2.3, 3.2.3 and 2.6.3 .