

# Planning an action research project to facilitate implementation of Digital Technologies



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## Aims

This workshop will assist you to:

- identify how to implement Digital Technologies in your school using action research
- shape a project proposal for your school which reflects the curriculum implementation initiatives of your state/territory/jurisdiction
- feel confident about engaging staff in your school with an action research project.



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## Agenda

- Digital Technologies in focus project framework
- Your school context
- Reflecting on the challenges
- Developing a focal question for action research
- Planning next steps

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## Introductions

3 quick facts about you:

- Name
- School
- State or territory

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## PROJECT OVERVIEW

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## Background

- October 2015: ACARA published the F–10 Australian Curriculum: Technologies
  - Design and Technologies; Digital Technologies
- 7 December 2015: Australian Government released the National Innovation and Science Agenda (NISA)
  - \$64.6 million has been committed to STEM education initiatives, with a particular focus on Digital Technologies
- 11 December 2015: National STEM School Education Strategy was endorsed by Education Council
- 30 June 2016: Digital Technologies Hub published (Coding across the Curriculum funding)

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# The project

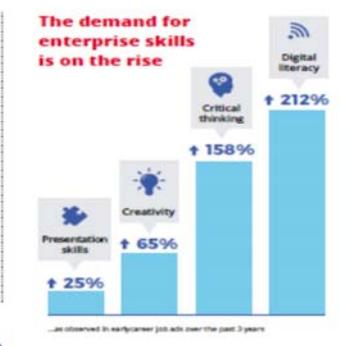


- Digital Technologies in focus: Supporting implementation of Digital Technologies
- 3-year \$7.88 million project
- Eight FTE Curriculum Officers
- 160 disadvantaged schools nationally
- Sustainable implementation

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**Enterprise skills**  
are **transferable skills** required in many jobs. They include:

- Problem solving
- Communications
- Financial literacy
- Critical thinking
- Creativity
- Teamwork
- Digital literacy
- Presentation skills



The New Basics Foundation for Young Australians

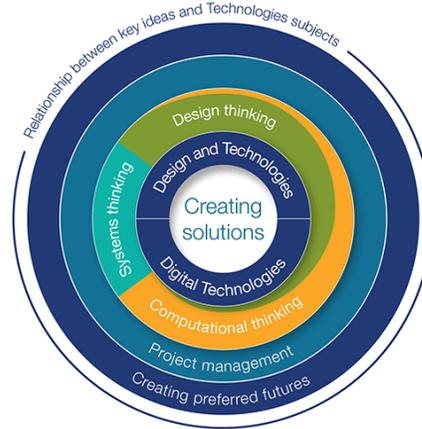


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## Technologies curriculum

Curriculum has been developed:

- from Foundation to Year 8 in two subjects: Design and Technologies and Digital Technologies
- from Years 9 to 10 in two optional subjects: Design and Technologies and Digital Technologies



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## ICT in the Australian Curriculum

ICT is addressed in the Australian Curriculum in two ways:

- ICT capability
- Digital Technologies and Media Arts.

The capability assists students to become effective *users* of ICT.

The Digital Technologies curriculum assists students to become confident *creators* of digital solutions.

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**DIGITAL TECHNOLOGIES HUB**

## What's the difference between ICT Capability and Digital Technologies?

**Information Communication Technology (ICT) Capability**

A general capability taught within all curriculum areas for students in years K-10.

Develops skills and understandings in managing and operating ICT to investigate, create and communicate.

Incorporates digital citizenship when considering the ethical and social impacts of using technologies.

Is explicitly planned and taught in all subject areas.



**Digital Technologies**

A new subject for F-10 (optional in 8-10) students with new and unique skills and content.

Develops knowledge, understandings and skills of the underlying concepts of information systems, data and computer science.

Encourages students to design and create digital solutions that solve problems taking their preferred futures into consideration.

Must be assessed and reported at least once every two years.



**Use ICT**

- Presentation tools
- Locate information
- Digital publishing
- Interpret timelines
- Ownership and use
- Managing files
- Mapping and geospatial tools
- Online communication
- Digital music / multimedia

**Create solutions and learn about Digital Technologies**

- Digital systems (networking)
- Robotics and automation
- Coding and programming
- Computational thinking
- User interface design
- Storing and transmitting data (binary numbers)
- Pattern recognition
- Algorithms
- Programming boards
- Data collection

**Examples of ICT in action**

- Use digital concept mapping tools to plan and select research tasks.
- Use presentation software to present findings of an inquiry that includes text, images and video.
- Use video to analyse a sports performance to provide coaching tips.
- Use a computer simulation or game to test predictive and collected data.
- Use a search engine effectively as a research task.
- Use spreadsheet functions to create tables, records, sort, calculate and present data to identify trends.
- Use an online game that has a grid map system to learn about directions.

**Examples of Digital Technologies in action**

- Create and code an image using bits and byte squares, make a character to describe and recreate the image.
- Compare a transport network and compare routes about cost, time, reliability, priority and security.
- Create an interactive story with code using a familiar programming language.
- Create your own simulation using a visual or text based programming language.
- Explore ways to accurately transmit data through techniques of encryption and decryption.
- Create networks (diagrams to identify relationships between different sources of data) eg. friends on social media and analyse the data.
- Design your own music and use an app to program a message through it.

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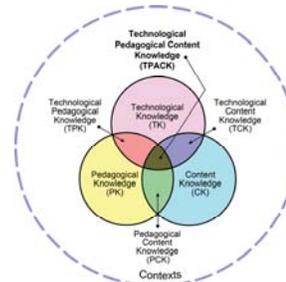
# PROJECT FRAMEWORK

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## Project framework

- Uses the key ideas of the Australian Curriculum: Technologies as a driver for developing technological pedagogical content knowledge (TPACK) and Digital Technologies PCK and as a framework for change.
- Managing change using a design process and the principles of action research



<http://www.matt-koehler.com/tpack/tpack-explained/>

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## Teachers as designers

- Using the key ideas of the curriculum as a driver for developing technological pedagogical content knowledge (TPACK) and Digital Technologies PCK and as a framework for change.
- Managing change through a design process; teachers as designers
  - Defining the challenge for your school
  - Identifying criteria for success
  - Generating ideas
  - Designing the action
  - Collaborating with others
  - Planning the activities, timeline and deliverables
  - Implementing
  - Evaluating effectiveness of strategies

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## Our professional learning ecosystem

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## Our professional learning ecosystem

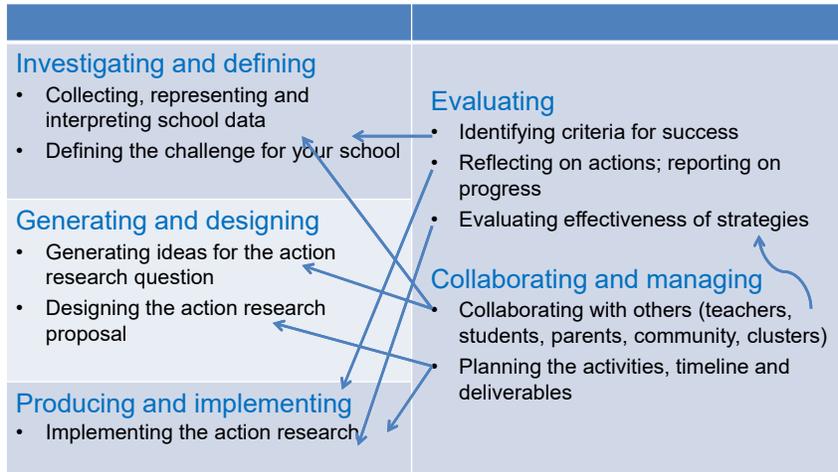
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# Teachers as designers



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# An iterative process



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## Why this approach?

This approach, like action research, has benefits for schools because it:

1. deals with their own situation
2. can start now—or whenever they are ready—providing immediate results
3. provides teachers with opportunities to better understand, and therefore improve, their educational practices
4. promotes the building of stronger relationships among staff
5. provides educators with alternative ways of viewing and approaching educational questions providing a new way of examining their own practices.

Adapted from Mertler, C.A. & Charles, C.M., (2008) *Introduction to education research*, 6th Edition, Allyn & Bacon, Boston, Mass, page 308 and

<https://education.nsw.gov.au/teaching-and-learning/professional-learning/mypl>

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## Getting started

### Developing a question

Example (equity in access to)

- I care about equity and social justice
- The computer club only attracts male students (specific)
- What action could I take to get more female and special ed students involved with computer technology? (issue)
- Computational thinking – an integrated approach across the curriculum (they have free redesign of curriculum)

Adapted from: <https://ccar.wikispaces.com/Developing>

Digital Technologies to enhance numeracy skills

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## Activity – *back at school*

Listen to the  
Illustration of  
practice from the  
AITSL website on  
action research



<https://www.aitsl.edu.au/teach/standards>

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## What's the process?

Templates reflect the processes and production skills strand of the curriculum

- Investigating and defining
  - Identifying and designing
  - Implementing and evaluating
  - Evaluating
  - Collaborating and managing
- Professional learning ecosystem – custom
  - Project proposal template
  - Progress report: webinar presentation template
  - Progress report: reflection podcast
  - Sharing the learning: newsletter; DTiF Community; DTiF Wiki
  - Final report template

*What parts of this process could you use?*

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# YOUR SCHOOL CONTEXT

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## Three divides

- access divide (digital technologies and internet – limited access in home is the issue)
- capability divide (research from Netherlands indicates years using technology in schools made the difference)
- participation divide (levels of education influence the use of internet; disadvantaged users tend to use it for social media) (Starkey, 2016 ACCE conference paper - Digital Divides)

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## Activity 1: Digital divides

**The purpose of this activity is to consider the notion of three digital divides in the context of your school.**

- Discuss the three digital divides in the context of your school with your school team.
- Rate access, capability and participation for your school by circling a number on the Likert scale. 1 is for limited (access, capability or participation) and 4 is for excellent. Record a comment for clarification if needed.
- What is the most significant digital divide for your school?

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## Asking the right questions

- Start with 'why?' (Damian Bebell; Simon Sinek)
- **Why** are we undertaking this project? What is our project aiming to accomplish?
- **How** do we know when we have succeeded? Include indicators of success.
- **What** measurable, definable outcomes are going to be evaluated?

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## Student voice

'It is almost ironic that a chapter has to be devoted to student voice and choice in education, not the least because in other industries, what the customers want and how they want it are the mandate, the beginning place for **designing and delivering products and services.**'

(Yong Zhao in Sharratt and Harild, 2015: 181) (Sharratt, Harild and Coutts, 2015: 21)

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## Guiding questions



| Consider:   | Response:   |
|---|---|
| What knowledge, understanding, skills and capabilities do you want students to develop?   | Skills for a digital world, for personal interest, employment   |
| What are the 'hooks' for your students?   | School garden project. Incorporate technologies into their garden project – a smart garden  |
| What is working in your school? What are your school's strengths?   | Community engagement in the 24 carrot garden already established.<br>Will have enthusiasm to add to the work they are doing by engaging with smart garden technologies! |
| Where are you in terms of integrating ICT? What are the ICT capabilities of teachers? Students? What resources do you have? What do you need? | Our school has committed to embracing and completing the CSER MOOC.<br>A date has been made for full staff PL and registration.   |
| What are the challenges for your school in implementing Digital Technologies?   | Supporting our staff and parents to assist the students to explore their potential and interests as they develop.   |
| How could the community be involved?  | The community are already involved in our 24 carrot garden so expect them to embrace any opportunities to further our work here.  |
| How can implementation be sustained?  | DoE, MONA, CSER, CSIRO  |

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## Activity 2: Identify it

**The purpose of this activity is to identify the focus for your school when developing implementation plans for the Digital Technologies curriculum.**

- Reflect on your school strategic plan and the data from your school.
- Consider the guiding questions in relation to your school context.
- Identify some possible issues, needs or opportunities that will lead to a project focus using a table or by creating a mind map.

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## Activity 3: Explore it

**The purpose of this activity is to generate ideas for a question for your school to focus on that reflects your school plan and supports implementation of the Digital Technologies curriculum.**

- Consider the issues (needs or opportunities) that you have identified in the previous activity.
- Select one issue. Now ask three questions to explore that issue, then branch out from each question with three more questions.
- Record the issue as a focal question for the project.
- Prepare a two-minute pitch to present to other participants for feedback.

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## Activity 4: Pitch it

**The purpose of this activity is to clarify your ideas for a project question for your school that reflects your school plan and supports implementation of the Digital Technologies curriculum.**

- Take turns to pitch the preliminary ideas for a project question (2 minutes).
- Listeners contribute to the SWOT analysis page.
- Repeat once.

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## Activity 5: Review it

**The purpose of this activity is to plan how to develop a project question and proposal for your school that focuses on the school plan and on implementation of the Digital Technologies curriculum.**

- Consider the feedback you received from other workshop participants on your draft project question.
- Review the project proposal template.
- Consider the following questions:
  - Why are we undertaking this project? What is our project aiming to accomplish?
  - How do we know when we have succeeded? Include indicators of success.
  - What measurable, definable outcomes are going to be evaluated?
- Identify three to five actions for when you return to school.

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## PL opportunities

- Teach meets
- Techy brekky
- CSIRO STEM Professionals in Schools
- School observations
- PL for school leaders, teachers, support staff, parents and community
- Video team teaching

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## Activity – *back at school*

**The purpose of this activity is to identify the professional learning needs for the school.**

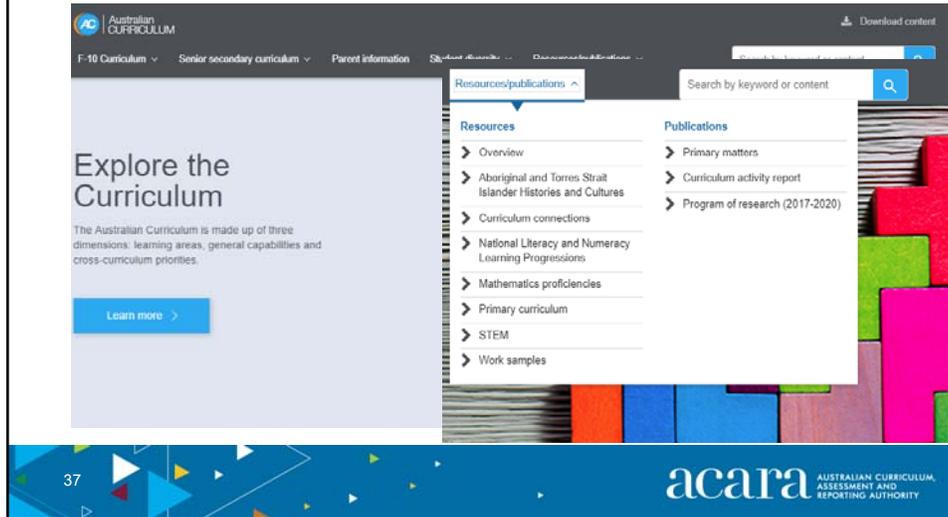
- What professional learning and resources do you need in order to implement your proposal?
- Are there opportunities to connect with others?
- Who would you like to connect with?

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# DTiF website

Located in Resources section of AC website



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# Resources



<https://csermoocs.adelaide.edu.au/>



<https://www.digitaltechnologieshub.edu.au/>



<https://aca.edu.au/>



<http://www.bebbras.edu.au/>



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## Contact

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