**Inquiry Learning within the Australian Curriculum**

**By Leonie McIlvenny**

As a teacher librarian, one of the first things I do when any new curriculum intiative is mandated is to identify where information literacy / inquiry learning is articulated and in what guise. When examining the Australian Curriculum I was disappointed that inquiry learning / information literacy had not been named specifically as one the General Capabilities. (After all it has been our ‘bread and butter’ for many years and as teacher librarians we know the importance of developing this essential skill set for students.) On closer scrutiny of the General Capabilites and ‘process’ strands of each of the learning areas, however, it became evident that these skills were indeed present. My initial disappointment, therefore, turned to guarded optimism that, what we have been championing for years, had finally found a legitmate voice in the national curriculum (albeit scattered throughout learning areas and cross-curricular contexts).While they may not be ‘packaged’ as inquiry learning skills these competencies are most definitely present.

As I have done in the past with other curriculum frameworks, I set about identifying where the skills we call ‘information literacy skills’ have been placed in the curriculum documents and extracted and aligned these skills with the ***Information Process***. Some would argue that the ***Informaton Process*** is no longer a useful framework to apply to the many new skills and competencies that are required to become information literate in this technology infused educational arena. I would suggest, however, that it still provides an excellent frame of reference to ensure essential information literacy skills are taught.

Below are tables that were developed to link /align the ***Information Process*** with relevant organisational frameworks, learning continuums and content descriptors from the Australian Curriculum. It will be up to you as information specialists to use these (or similar) linking documents when you develop your rationales, policies, integrated programmes and justifications for an information literacy program in your own school.

**Aspect One – General Capabilities – Critical and Creative Thinking**

The organising elements of the ***Critical and Creative Thinking*** *General Capability* appear to be closely aligned with the Information Process. As students undertake an inquiry using the ***Information Process*** there will be many opportunties to address the skills articulated within these four organisng elements.

Figure 1 The Organisational Framework of the Critical and Creative Thinking General Capability **©** Australian Curriculum, Assessment & reporting Authority 2011

Table 1 shows the link between the **Information Process** and the four organising elements of the Critical and Creative Thinking General Capability.

Table 2 shows the elaboration of the Critical and Creative Thinking General Capability Learning Continuum’s four organising elements into a detailed scope and sequence of skills across six levels of achievement. An interrogation of these skills indicate a close alignment with the skills you will find in a similar scope and sequence of the ***Information Process.***

Hyperlinks on the ACARA website provide examples of what each of these elements looks like as a learning activity. <http://www.australiancurriculum.edu.au/GeneralCapabilities/Critical-and-creative-thinking/Continuum>

**Links Between the Information Process and Critical and Creative Thinking General Capability**

|  |  |  |
| --- | --- | --- |
| **The Information Process** | **Organising Elements of the Critical and Creative Thinking General Capability** | **Skills identifed within the organising elements** |
| Defining / Locating / Selecting | Inquiring – identifying, exploring and clarifying information | Pose questionsIdentify and clarify information and ideasOrganise and process information |
| Defining /Organising and synthesing / Presenting | Generating innovative ideas and possibilities | Imagine possibilities and connect ideasConsider alternativesSeek solutions and put ideas into action |
| Selecting / Organising and synthesising / Evaluating | Analysing, synthesising and evaluating information | Apply logic and reasoningDraw conclusions and design a course of actionEvaluate procedures and outcomes |
| Evaluating | Reflecting on thinking, actions and processes | Think about thinkingReflect on processesTransfer knowledge into new contexts |

Table 1 Comparison of Skills from the ***Information Process*** and the Organising Elements from the Critical and Creative Thinking General Capability **©** Australian Curriculum, Assessment & reporting Authority 2011

**Identifying Elements from the Critical and Creative Thinking General Capability – Learning Continuum that relate to the Information Process**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | Level 6 |
| **Inquring – identifying, exploring nd organising information and ideas** |
| Pose questions |
| Pose factual and exploratory questions based on personal interests and experiences | Pose questions to identfy and clarify isues, and compare information in their world | Pose questions to expand their knowledge about the world. | Pose questions to clarify and interpret information and probe for causes and consequences | Pose questions to probe assumptions and investigate complex issues | Pose questions to critically analyse complex issues and abtract ideas |
| Identify and clarify information and ideas |
| Identify and describe familiar information and ideas during a discussion or investigation | Identify and explore information and ideas from source materials | Identify main ideas and select and clarify information from a range of sources. | Identify and clraify relevant information and prioritise ideas. | Clarify information and ideas from texts or images when exploring challenging issues. | Clarify complex information and ideas drawn from a range of sources. |
| Organise and process information |
| Gather similar information or depictions from given sources | Organise information based on similar or relevant ideas from several sources. | Collect, compare and categorise facts and opinions found in a widening range of sources. | Analyse, condense and combine relevant information from multiple sources. | Critically analyse information and evidence according to criteria such as validity and relevance. | Critically analyse independently sourced information to determine bias and reliability. |
| **Generating ideas, possibilities and actions** |
| Imagine possibilities and connect ideas |
| Use imagination to view or create things in new ways and connect to things that seem different. | Build on what they know to create ideas and possibilities in ways that are new to them. | Expand on known ideas to create new and imaginative combinations. | Combine ideas in a variety of ways and from a range of sources to create new possibilities. | Draw parallels between known and new ideas to create new ways of achieving goals. | Create and connect complex ideas using imagery, analogies and symbolism. |
| Consider alternatives |
| Suggest alternative and creative ways to approach a given situation or task. | Identify and compare creatve ideas to think broadly about a given situtaion or problem. | Explore situations using creative thinking strategies to propose a range of alternatives. | Identify situations where current approaches do not work, challenge existing ideas and generate alternative solutions. | Generate alternatives and innovative solutions, and adapt ideas, including when information is limited or conflcting. | Speculate on creative options to modify ideas when circumstances change. |
| Seek solutions and put ideas into action |
| Predict what might happen in a given situation and when putting ideas into action | Investigate options and predict possible outcomes when putting ideas into action. | Experiment with a range of options when seeking solutions and putting ideas into action. | Assess and test options to identify the most effective solution and put ideas into action. | Predict possibilities, and identify and test consequences when seeking solutions and puttng ideas into action. | Assess risks and explain contingencies, taking account of a range of perspectives, when seeking solutions and putting complex issues into action. |
| **Reflecting on thinking processes** |
| Think about thinking |
| Describe what they are thinking and give reasons why | Desctibe the thinking strategies used in given situations and tasks. | Reflect on, explain and check processes used to come to conclusions. | Reflect on assumptions made, consider reasonable criticsm and adjust their thinking if necessary. | Assess assumptions in their thinking and invite alternative opinions. | Give reasons to support their thinking, and address opposing viewpoints and possible weaknesses in their positions. |
| Reflect on processes |
| Identify the main elements of the steps in a thinking process. | Outline the details and sequence in a whole task and separate it into workable parts. | Identify pertinent information in an investigation and separate into smaller parts or ideas. | Identify and adjust the thinking beind choices thay have made. | Evaluate and justify the reasons behind choosing a particular problem-solving strategy | Balance rational and irrational components of a complex or ambiguous problem to evaluate evidence. |
| Transfer knowledge into new contexts |
| Connect information from one setting to another. | Use information from a previous experience to inform a new idea. | Transfer and apply information in one setting to enrich another. | Apply knowledge gained from one context to another unrelated context and identify new meaning | Justify reasons for decisions when transferring information to similar and different contexts. | Identify, plan and justify transference of knowledge to new contexts. |
| **Analysing, synthesising and evaluating reasoning and procedures** |
| Apply logic and reasoning |
| Identify the thinking used to solve problems in a given situtaion. | Identify reasoning used in choices or actions in specific situations. | Identify and apply appropriate reasoning and thinking strategies for particular outcomes. | Assess whether there is adequate reasoning and evidence to justify a claim, conclusion or outcome. | Identify gaps in reasoning and missing elements in information. | Analayse reasoning used in finding and applying solutions, and in choice of resources. |
| Draw conclusions and design a course of action |
| Share their thinking about possible courses of action | Identify alternative courses of action or possible conclusions when presented with new information. | Draw on prior knowledge and use evidence when choosing a course of action or drawing a conclusion. | Scrutinise ideas and concepts, test conclusions and modify actions when designing a course of action. | Differentate the components of a designed course of action and tolerate ambiguities when drawing conclusions. | Use logical and abstract thinking to analyse and synthesise complex information to inform a course of action. |
| Evaluate procedures and outcomes |
| Check whether they are satisfied with the outcome of tasks or actions. | Evaluate whether they have accomplished what they set out to achieve. | Explain and justify ideas and outcomes. | Evaluate the effectiveness of ideas, products, performances, methods and courses of action against given criteria. | Explain intentions and justify ideas, methods and courses of action, and account for expected outcomes agaianst criteria they have identified. | Evaluate the effectiveness of ideas, products and performances and implement courses of action to achieve desired outcomes against criteria they have identified. |

Table 2 Identifying elements from the Critical and Ceative Thinking General Capability Learning Continuum **©** Australian Curriculum, Assessment & reporting Authority 2011 that relate to the Information Process

**Aspect Two – General Capabilities - ICT capability**

**Using Inquiry learning as a vehicle to develop ICT skills**

****Describing ***ICT Capability*** as a *General Capability*, while highlighting its importance across the curriculum, does introduce the idea of *techno centricty* – where the focus is on the technology first and then the learning that is undertaken using the technologies. Many teachers wishing to incorporate educational technologies into curriculum-based learning and teaching begin with selecting the digital tools and resources that will be used. When instruction is planned in this way, it becomes what Papert (1987) calls “technocentric”– focused upon the technologies being used, more than the students who are trying to use them to learn.

So often, in an attempt to demonstrate the use of ICTs in the classroom the technology has become the focus (techno centric) and the learning secondary. Providing a framework that shows which technologies support the development of the various stages of the ***Information Process*** is a model that promotes the notion of ‘curriculum first’ followed by the selection of appropriate technologies to support the teaching learning program.

It has been encouraging to see a number of attempts at mapping learning technologies to the ***Information Process*** and other pedagogical frameworks – where the pedagogy of inquiry learning remains the focus and the learning technologies are seen as a tool only to support the achievement of learning outcomes.

An excellent example of where this has been achieved is on the website **Web 2.0 tools in the Information Skills Process**. (<http://www.studyvibe.com.au/iResearch/The-research-process/Resource-links.aspx>). Here the focus is on the ***Information Process*** and relevant web 2.0 tools that support the development of each stage of the process. As should be the case the process is paramount – the technology a tool. By focusing first and primarily upon the content and nature of students’ curriculum-based learning activities, the learning experiences are developed authentically, rather than technocentrically (Papert 1987), as an integral aspect of instructional planning and implementation.

Table 3 provides a link between the organising elements of the ***ICT Capability*** *General Capability*, the ***Information Process*** and examples of technology tools that can be used at each stage of the ***Information Process***. This is only a sampling. There are many lists online that have detailed examples of the technology tools that you can use to support / enhance / transform the development of information literacy skills across a range of contexts.

|  |  |  |
| --- | --- | --- |
| **Organising Element** | **Information Process** | **Technology Example** |
| Investigating with ICT | DefiningLocatingSelecting | Mindmapping ToolsSearch Engines / DatabasesEvernote / Scoop.it ‘ Diigo |
| Creating with ICT | Processing and SynthesisingPresenting | Digital Storytelling / GlogsterCartoons / Goanimate / VokiiMovie / Animoto / StorybirdPrezi / Slideshare /  |
| Communicating with ICT | LocatingPresenting | Collaborize / Blogs / Skype / Padlet / Google Hangouts /  |

Table 3 Comparison of the ***Information Process*** stages and the Organising Elements from the ICT Capability General Capability **©** Australian Curriculum, Assessment & reporting Authority 2011

**Aspect Three– Learning Area Process Strands**

Each learning area has a ‘skill’ or ‘process’ strand in which the content area knowledge and understandings are to be developed. While each discipline would argue that their process is unique to their learning area there are aspects of inquiry within each process. Table 4 provides a ‘loose’ connection between the learning area process strands and the ***Information Process.***

|  |  |  |
| --- | --- | --- |
|  | **General Capabilities** | **Learning Area Process Strands** |
| **The Information Process** | **Critical and creative thinking** | **ICT Capabilities** | **Historical Skills** | **Science Inquiry Skills** | **Literacy** |
| **Defining**  | Inquiring – identifying, exploring and organising information and ideas. | Investigating with ICT | Historical questions and research | Questioning and predicting | Language – expressing and developing ideas |
| **Locating** | Historical questions and research | Planning and conducting | Literacy – texts in context |
| **Selecting** | Analysing, synthesising and evaluating information | Analysis and use of sources | Planning and conducting | Literacy – texts in context |
| **Organising and processing** | Creating with ICTCommunicating with ICT | Analysis and use of sources / Perspectives and interpretations | Processing and analysing data and information | Literacy – Interpreting, analysing, evaluatingLiteracy – Creating texts Literature – Creating Literature |
| **Presenting** | Generating ideas, possibilities and actions | Explanation and communication | Communicating | Literature\_ Responding to literatureLiteracy – Creating texts Literacy – interacting with others |
| **Evaluating** | Reflecting on thinking, actions and processes. | Applying social and ethical protocols and practices when using ICT |  | Evaluating |  |

Table 4 Comparison of the ***Information Process*** stages and the Organising Elements from the ICT Capability and Crticial and Creative Thinking General Capability, and learning area process strands **©** Australian Curriculum, Assessment & reporting Authority 2011

The following two examples show in more detail how the ***Information Process*** can be linked to the specific learning area descriptors. Note where the stages of the ***Information Process*** have been added to each sub-strand skill.

**LEARNING AREA: History**

**STRAND: Historical Skills**

**SUBSTRANDS:**

**Historical questions and research**

* Identify a range of questions about the past to inform a [historical inquiry](http://www.australiancurriculum.edu.au/Glossary?a=H&t=Historical%20inquiry) (DEFINING)
* Identify and locate relevant sources, using ICT and other methods (LOCATING)

**Analysis and use of sources**

* Identify the origin and purpose of primary and [secondary sources](http://www.australiancurriculum.edu.au/Glossary?a=H&t=Secondary%20sources) (LOCATING)
* Locate, compare, select and use information from a range of sources as [evidence](http://www.australiancurriculum.edu.au/Glossary?a=H&t=Evidence)    (LOCATING, SELECTING)
* Draw conclusions about the usefulness of sources (SELECTING)
	+

**Perspectives and interpretations**

* Identify and describe points of view, attitudes and values in primary and [secondary sources](http://www.australiancurriculum.edu.au/Glossary?a=H&t=Secondary%20sources) (SELECTING)
	+

**Explanation and communication**

* Develop texts, particularly descriptions and explanations that use [evidence](http://www.australiancurriculum.edu.au/Glossary?a=H&t=Evidence) from a range of sources that are acknowledged (PRESENTING)

Use a range of communication forms (oral, graphic, written) and digital technologies

**LEARNING AREA: SCIENCE**

**STRAND: SCIENCE INQUIRY SKILLS**

**SUB-STRANDS (see table**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Description** | **Year 7** | **Year 8** | **Year 9** | **Year 10** |
| Questioning and predicatingDEFINING | Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge  | Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge  | Formulate questions or hypotheses that can be investigated scientifically  | Formulate questions or hypotheses that can be investigated scientifically  |
| Planning and conductingDEFININGLOCATINGSELECTING | Collaboratively and indivdually plan and consuct a range of investigation types, including fieldwork and experiemnts, ensuring safety and ethical guidelines  | Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed  | Plan, select and use appropriate investigation methods, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods Select and use appropriate equipment, including digital technologies, to systematically and accurately collect and record data  | Plan, select and use appropriate investigation methods, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods Select and use appropriate equipment, including digital technologies, to systematically and accurately collect and record data  |
| Processing and analysing data and informationPROCESSING AND ORGANISING | Construct and use a range of representations, including [graphs](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Graph), keys and [models](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Model) to represent and [analyse](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Analyse" \o "Display the glossary entry for 'analyse') [patterns](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Pattern) or [relationships](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Relationship" \o "Display the glossary entry for 'relationships'), including using [digital technologies](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Digital%20technologies" \o "Display the glossary entry for 'digital technologies') as appropriateSummarise [data](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Data" \o "Display the glossary entry for 'data'), from students’ own [investigations](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Investigation" \o "Display the glossary entry for 'investigations') and [secondary sources](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Secondary%20source" \o "Display the glossary entry for 'secondary sources'), and use scientific understanding to identify [relationships](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Relationship" \o "Display the glossary entry for 'relationships') and draw [conclusions](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Conclusion" \o "Display the glossary entry for 'conclusions') | Construct and use a range of representations, including [graphs](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Graph" \o "Display the glossary entry for 'graphs'), keys and [models](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Model" \o "Display the glossary entry for 'models') to represent and [analyse](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Analyse" \o "Display the glossary entry for 'analyse') [patterns](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Pattern) or [relationships](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Relationship" \o "Display the glossary entry for 'relationships'), including using [digital technologies](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Digital%20technologies" \o "Display the glossary entry for 'digital technologies') as appropriate  | Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies Use knowledge of scientific concepts to draw conclusions that are consistent with evidence  | Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies Use knowledge of scientific concepts to draw conclusions that are consistent with evidence  |
| EvaluatingEVALUATING | [Reflect on](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Reflect%20on) the method used to investigate a question or solve a problem, including [evaluating](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Evaluate) the quality of the [data](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Data) collected, and identify improvements to the method Use scientific knowledge and findings from [investigations](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Investigation" \o "Display the glossary entry for 'investigations') to [evaluate](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Evaluate" \o "Display the glossary entry for 'evaluate') claims | Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method  | Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data  | Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data  |
| CommunicatingPRESENTING | Communicate ideas, findings and solutions to problems using [scientific language](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Scientific%20language) and representations using [digital technologies](http://www.australiancurriculum.edu.au/Glossary?a=c7e503ba-0a71-4f81-9f3d-9e4600a2dba8&t=Digital%20technologies) as appropriate  | Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate  | Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations  | Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations  |

Table 5 Comparison of the ***Information Process*** stages and the Science Inquiry Skills sub-strands form the Science Learning Area **©** Australian Curriculum, Assessment & reporting Authority 2011

Conclusion

The new Australian curriculum has, I believe, made significant inroads to ensuring that essential information litercy skills have been adressed, if not explicitly articluated, across the curriculum. It is essential, as information specialists in the school that we are fully cognisant of where these skills are situated and can confidently and competently address them through our information literacy programs. The information provided in the Tables above is only the first step in, not only navigating through the Australian Curriculum to identify where information literacy skills have been situated, but also in providing a context for discussion and negotiation to ensure information literacy / inquiry learning has a legitimate place in the education program in the school.

Developing these frameworks has been a powerful tool when collaborating with teachers, learning areas and curriculum leaders to show that the information literacy and literature programs in our library are supporting the development of a wide range of explicitly stated competencies within the Australian Curriculum. The next step in out integrated information literacy program is to map exactly where the skills will be explicitly taught across all learning areas and year levels.

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