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A framework for teachers**

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Building literacy capabilities for comprehension in the curriculum: A framework for teachers

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ABSTRACT

Primary and secondary classroom teachers are charged with the responsibility of ensuring they cater for literacy in all subject or learning areas. This can be a challenging task as there is little direction about how to do this in the General capabilities of the Australian Curriculum document. This article provides a framework to assist classroom teachers with identifying literacy demands and building literacy capabilities that can support students' learning, regardless of the subject area. In this article, I will discuss the three stages of the framework: identifying the literacy demands for reading comprehension in example texts and activities, highlighting with these examples how to build literacy capabilities, and finally drawing upon the implications of the role of reflection in literacy teaching.

Introduction

As children move into the middle to upper primary years of schooling, reading to learn in a variety of subject or learning areas becomes paramount to success in school and beyond. A focus on this is reflected in the *Australian Curriculum: English* (Australian Curriculum, Assessment and Reporting Authority (ACARA), 2013b) and *General capabilities in the Australian Curriculum* (ACARA, 2013a) documents. Both documents reflect a more general trend in national and global education that considers the types of skills needed for contemporary society. Nationally, this focus started with such policy initiatives as the *Melbourne declaration on educational goals for young Australians* (Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA), 2008, p. 7), which identified essential skills that students needed to be successful learners, confident and creative individuals, and active and informed citizens. MCEETYA stated that 'successful learners have the essential skills in literacy and numeracy and are creative and productive users of technology, especially ICT, as a foundation for success in all learning areas' (p. 8). It observed that not all students have the same access to and participation in education, nor achieve the same learning outcomes. Subsequently, this focus on literacy and numeracy across curriculum documents evolved from the desire to seek equity and excellence for all students.

To support primary and secondary teachers in the process of identifying, building and reflecting on literacy demands in subject or learning areas, I have developed a Building Literacy Capabilities Framework (Kitson, 2013). Curriculum documents such as the *General capabilities* document (ACARA, 2012, 2013a) and the *Australian Curriculum: English* (ACARA, 2013b) may specify *what* to teach; however, they provide no detail about *how* to do so. Given the surmise that 'teachers are expected to teach and assess general capabilities' (ACARA, 2013a, p. 4), the framework offers teachers support in this process.

Building the Literacy Capabilities Framework

The Building Literacy Capabilities Framework (Kitson, 2013) aimed to provide teachers with a

process to engage in as they planned for literacy in subject area texts, teaching and learning activities, and assessment tasks. It also needed to embody essential professional practices that teachers engage in when planning or adapting unit plans or overviews (Australian Institute for Teaching and School Leadership (AITSL), 2014). These professional practices include identifying the curriculum, developing assessment, sequencing teaching and learning, making judgments, and using feedback. With these in mind, three key stages in the framework were identified as particular points where classroom teachers could consider the literacy demands of any subject area:

1. Identifying literacy demands (the *what*);
2. Building literacy capabilities (the *how*);
3. Reflecting on literacy capabilities (*what now*).

This framework can be used with a range of literacy modes (reading and viewing, writing and creating, speaking and listening). However, in this paper, the focus is on supporting teachers to scaffold students' reading development. Each stage will be discussed, providing examples for the subject area of Geography or Science and, where relevant, referring to the organising elements of the Literacy Continuum in the *General capabilities* document (ACARA, 2013a). Whilst examples of literacy demands are found in the Literacy Continuum and in subject or learning area content descriptors, they are somewhat vague. Ideally, the examples of texts and activities provided in the following section will provide a more detailed exploration of literacy demands.

Stage 1: Identifying literacy demands (the *what*)

The Literacy Continuum of the *General capabilities* document (ACARA, 2013a) provides a valuable place to start identifying literacy demands in texts, activities or assessment. First, the key overarching processes (comprehending and composing) can be identified, and then associated areas of knowledge (text, grammar, word, visual) that apply to these processes. The Literacy Continuum allows teachers 'to identify the general level of expected language and literacy skills for each year level that they are teaching' (ACARA, 2013a, p. 10). Further detail can be located by referring to the Language and Literacy strands of the *Australian Curriculum: English* (ACARA, 2013b), as well as other subject area curriculum documents that specify what the literacy capability may typically look like in the subject area. However, these are rather general in nature.

The *General capabilities* document (ACARA, 2013a) and subject area curriculum documents highlight the importance of texts as a means of communication, which can be written, spoken, visual, multimodal, and in print-based, digital or online formats. In the following section, I will discuss the literacy demands of two texts. The first example is a webpage on latitude and longitude, from the National Atlas of the United States (United States Department of the Interior, 2013). The webpage is shown in Figure 1. This content would typically be addressed in Year 6, as an elaboration of Content Descriptor ACHGK031 in the *Australian Curriculum: Geography*, 'the location of places in countries of the Asia region in absolute terms using latitude and longitude' (ACARA, 2013c). Table 1 summarises the literacy demands of this text.

As seen in Figure 1, the National Atlas of the United States webpage, a reader may follow a linear reading of hypertext, by navigating and scrolling from the top of the page to the bottom, or by selecting the hyperlinked titled sections of the article, which are in blue. This hypertext structure provides information in blocks of text, organised by bolded headings, which are sometimes framed as questions (e.g., *What is latitude?*).

Readers need to interpret and analyse the differences between what the text is saying about location, latitude and longitude and what is shown in the 2D and 3D maps and globes, shown from different perspectives. Whilst these maps and globes are provided to further support readers' understanding of the content matter, in all instances the connection between the image and written text is not always

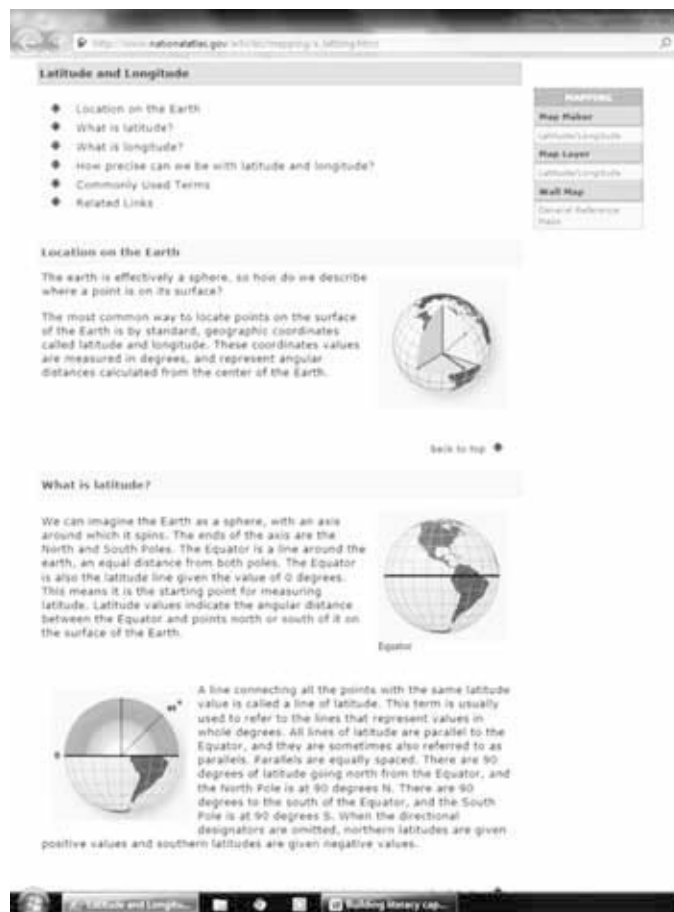


Figure 1. Latitude and longitude from the National Atlas of the United States webpage (from United States Department of the Interior, 2013)

Table 1. Literacy demands in the National Atlas of the United States webpage

<p>Overarching processes – Comprehending:</p> <ul style="list-style-type: none"> • Navigate, read and view interactive webpage consisting of content and 2D and 3D maps and globes. • Interpret and analyse differences between location, latitude and longitude.
<p>Text knowledge:</p> <ul style="list-style-type: none"> • Informational text, structured by bolded headings. • Information chunked into linear hypertext. • Some explanation embedded in information – explaining how degrees of longitude decrease in size towards the poles. • Cohesion – use of headings at text level, at sentence level through pronoun reference (<i>it</i> refers to the <i>Equator</i>; <i>these</i> refers to <i>latitude and longitude</i>) and lexical cohesion of related vocabulary.
<p>Grammar knowledge:</p> <ul style="list-style-type: none"> • Sentence structure – use of simple, compound and complex sentences to elaborate the content. • Mainly formal objective style, used to report information, though personal pronouns are used in some instances (e.g., <i>so how do we describe</i>). • Relating verbs – e.g., <i>is, are</i>. • Precise adjectives or descriptors – e.g., <i>directional</i> to describe noun <i>designators</i>; <i>whole</i> to describe noun <i>degrees</i>.
<p>Word knowledge:</p> <ul style="list-style-type: none"> • <i>Latitude, longitude, coordinates, values, sphere, degrees, angular, Equator, positive, negative, parallels, designators, meridians, decimals.</i>
<p>Visual knowledge:</p> <ul style="list-style-type: none"> • Interpreting 2D and 3D maps and globes.

made explicit. For example, in the third globe presented as a sphere, a reader would need to infer the relevance of the 45% shown in the image because it is not identified in the text. The text also mentions positive and negative values, which are not shown in any of the images.

Due to the nature of the content, readers also need numeracy capabilities in order to understand the significance of the language (*sphere, parallel, coordinates*), and also to understand the concepts of angles, negative and positive degrees, and decimals. The grammar in this text is consistent with an informational type text through its use of a formal objective style, though there is the occasional use of the personal pronoun *we* to connect to the reader (e.g., ‘so how do *we* describe’). There is also the use of relating verbs connecting pieces of information together (e.g., ‘The earth *is* effectively a sphere’), and precise information (*directional* designators). The simple, compound and complex sentences or statements used to deliver the content are made cohesive through the use of pronoun reference (*it* refers to The Equator), and lexical cohesion of vocabulary selected to describe latitude and longitude.

The second example, shown in Figure 2, is a ‘Make your own cloud’ experiment from the ThinkTank website (Birmingham Science Museum, n.d.). In this example, I will explore the literacy demands for developing subject area knowledge. This type of experiment could be included for Year 5 when exploring matter, and in particular states of water as liquid and gas. The literacy demands in this text are detailed in Table 2.

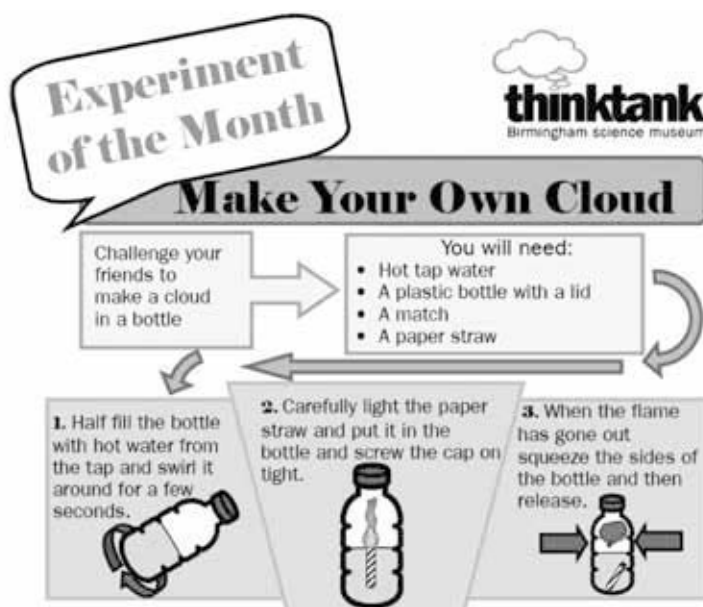


Figure 2. Screenshot of ‘Make your own cloud’ experiment
(from Birmingham Science Museum, n.d.)

For students to complete this activity, the overarching process of comprehension comes into play. This involves following a procedure (text structure) that instructs readers to make a cloud. In procedures, the author’s authority is realised through the use of commands and actions verbs (e.g., ‘*Half fill* the bottle’) and the use of precise adjectives (e.g., ‘*hot tap* water’). As with other procedures, like recipes, if readers digress from the materials and method, they might not achieve the end result (i.e., to make a cloud). Students would also use visual knowledge to follow the flow chart and read the procedure in the correct numerical order.

ACARA (2013a) states that the Literacy Continuum will enable subject or learning area teachers to ‘plan how to teach specific language and literacy knowledge and skills essential to students’ understanding of learning area content’ (p. 9). However, this is not the case. Rather, it only states *what* students are expected to do in general terms, not how to teach it or what strategies to use. I now

Table 2. Literacy demands in 'Make your own cloud' experiment

<p>Overarching processes – Comprehending:</p> <ul style="list-style-type: none"> • Respond to and interpret information. • Read information on how to conduct an experiment.
<p>Text knowledge – Comprehending:</p> <p>Procedure:</p> <ul style="list-style-type: none"> • Goal and aim – Make your own cloud (blue). • Instructions – materials (yellow) and method (green). • Cohesion – knowledge of stages of instructional text and numbers to show order of method.
<p>Grammar knowledge:</p> <ul style="list-style-type: none"> • Nouns to refer to the materials needed – <i>water, bottle, match, straw</i>. • Action verbs – <i>Half-fill, swirl, light, screw, squeeze</i>. • Precise adjectives that describe – <i>hot tap water, plastic bottle, paper straw</i>.
<p>Word knowledge:</p> <ul style="list-style-type: none"> • <i>Experiment, flame, seconds, release</i>.
<p>Visual knowledge:</p> <ul style="list-style-type: none"> • Read visual steps, follow flow chart and arrows to read procedure in the correct order. • Use of colour to denote goal and aim (blue), materials (yellow) and method (green).

explore the second stage of the framework – how to build literacy capabilities – and elaborate on how this might be done using the previously discussed examples.

Stage 2: Building literacy capabilities (the *how*)

The knowledge and understanding and skills of a subject area, whether this is Geography, History, Science, Arts, Technology, or Health and Physical Education, are the key drivers for learning in that subject area. After first identifying the literacy demands of the text or activity, the teacher needs to consider how and when to support students to build literacy capabilities. Such considerations will include the context in which the text or activity will be used or conducted (e.g., whole class, small, group or individual), where the text or activity is situated within a larger body of teaching (e.g., the unit plan) and the prior knowledge of students, as well as the developmental and individual needs and abilities of the students. Other considerations would be subject matter related, including the level of challenge of a particular concept to be learned, or whether students may have existing misconceptions.

To assist students to read to learn, it is important to embed the literacy capabilities at key stages when using texts and conducting activities. Key stages at which a teacher can support students' literacy needs are before, during and after reading, or when engaging in activities. Making decisions about how best to support students requires a toolkit of strategies that range from explicit focused teaching episodes to those that provide knowledge at the point of need.

The latitude and longitude text

To discuss possible pedagogical strategies to build literacy demands for the 'Latitude and longitude' webpage (see Figure 1 and Table 1), its use will be discussed in the context of a lesson (see Table 3). The overarching process would be for students to comprehend the content (i.e., latitude and longitude) of the webpage.

Research indicates that readers make inferences based on their prior knowledge when reading, viewing or listening to a text (Hirsch, 2003). Accessing existing knowledge can be done through strategies such as brainstorming. Sometimes students need to build knowledge prior to reading, and this could be achieved through a frontloading activity (Wilhelm, Baker, & Dube, 2001), such as viewing a short informative video on latitude and longitude. The audio and visual modes of the video clip offer students alternate modes to assist student comprehension.

Table 3. Lesson on latitude and longitude

Stage of lesson	Teaching and learning sequence	Literacy strategy/ Literacy element
Orientation	<p>Pose questions to ascertain prior knowledge: What do you know about maps? Have you heard of the terms <i>latitude</i> or <i>longitude</i>?</p> <p>Play brief introductory video (3 mins 14 secs) on the topic of latitude and longitude. https://www.youtube.com/watch?v=swKBi6hHHMA</p> <p>After watching the brief video, ensure students are exposed to vocabulary relevant to the reading demands.</p> <p>Vocabulary and definition matching game for key terms that students will encounter: <i>co-ordinates, latitude, longitude, parallel, perpendicular, meridian, directional designator</i>.</p>	<p>Brainstorm – Comprehension</p> <p>Frontloading some of the concepts: latitude and longitude</p> <p>Frontloading the vocabulary: word knowledge/ comprehension</p>
Enhancing	<p>Introduce webpage on latitude and longitude (see Figure 1).</p> <p>Before reading: Have students identify the structure of the text and how they can locate information (informative, headings, visuals glossary). Reinforce reading strategies (skimming, scanning).</p> <p>During reading: Have students complete a comparison chart, comparing latitude to longitude for the following things:</p> <ul style="list-style-type: none"> • Direction • Parallel lines • Range • Symbol used to denote • Hemisphere • Denotes distance from • Time zones • Number of lines • Notable lines 	<p>Comprehending – eliciting prior knowledge</p> <p>Graphic organiser – contrast (comprehension)</p>
Synthesis	<p>After reading: Sharing of responses from the comparison chart. Additional questions:</p> <ul style="list-style-type: none"> • Why are latitude and longitude helpful map tools? • How does latitude and longitude help people to identify specific locations? • How might latitude and longitude relate to temperature, and climate? (latitude – further from equator – colder; longitude – no relationship). 	<p>Comprehension: Literal, inferential and applied</p>

As well as building content and conceptual knowledge, frontloading activities (Wilhelm et al., 2001) can build vocabulary knowledge or procedural knowledge of particular reading strategies (e.g., skimming or scanning skills for webpages). Vocabulary knowledge is paramount to successful reading. If readers do not know 90 to 95% of the words or do not have access to their meanings, decoding becomes an effort and meaning can be lost (Hirsch, 2003; Nagy & Scott, 2000). Informative texts contain technical language that can be challenging and may impede comprehension (Sanacore & Palumbo, 2009). Therefore, a frontloading activity where students match terms to definitions would support both comprehension and fluency for reading (Hirsch, 2003).

Teaching instruction or activities should maximise opportunities for students to be involved in comprehension strategies at all stages of reading. As well as ascertaining prior knowledge before reading or discussing a concept, knowledge of text elements (e.g., text structure, text type and purpose) can clue students into reading for meaning (Pardo, 2004). Further, graphic organisers and

the use of questioning can offer opportunities for students to think about texts at literal, inferential and applied levels.

The 'Make your own cloud' experiment

Comprehending the 'Make your own cloud' experiment (see Figure 2 and Table 2) is less demanding than the latitude and longitude text. Upper primary students should access this text easily, as they will be familiar with procedures. In addition, the use of diagrams is supportive and the vocabulary is not challenging. Subject areas like Science, History and Geography use inquiry-based models (e.g., the 5 Es model for Science) as a way to construct content knowledge. Experiments like 'Make your own cloud' would form part of 'engage' or 'explore' phases. Considering when to build in literacy demands would be determined by the complexity of the texts used and the activities to be completed. Activities like this one would be placed in the context of a lesson, and good literacy practice would ensure that prior knowledge of concepts and connection to previous activities and concepts are established before undertaking the experiment.

However, in order for students 'to explain and elaborate', which are later phases of inquiry models, they need conceptual understanding and scientific terminology to be able to make connections and to draw on and report on conclusions reached in the experiment. The key concepts behind this experiment relate to the changing of pressure and temperature (energy) through the heat of the candle and squeezing of the bottle, and the changing of water into water vapour (condensation). Given that subject area teachers encounter new concepts and vocabulary as a regular occurrence, what are the characteristics of good vocabulary instruction that they can employ?

Blachowicz, Fisher, Ogle and Watts-Taffe (2006) identified three key characteristics for good vocabulary instruction that support all students. This includes those who are struggling with literacy or those from an English as an Additional Language (EAL) background (Dong, 2004/2005). First, instruction needs to be supported by a language and word rich environment, which supports students' developing 'word consciousness'. Real-life contexts such as the 'Make your own cloud' experiment provide a rich context from which to systematically explore the meaning of subject-specific vocabulary (Dong, 2004/2005). Second, it must include 'intentional teaching of selected words, providing multiple types of information about each new word as well as opportunities for repeated exposure, use and practice' (Blachowicz et al., 2006, p. 527). Third, it needs to include the teaching of word-learning strategies that allow students to be independent learners. In the following paragraph, I will discuss some of the ways this could be done for the 'Make your own cloud' experiment.

Word consciousness is 'an awareness of words and their meanings, an awareness of the ways in which meanings change and grow, and an interest in and motivation to develop new word knowledge' (Blachowicz et al., 2006, p. 527). This implies a focus on studying and using words, for example:

- Word definitions – contextual meanings;
- Word origin and history (Greek, Latin root words);
- Parts of speech (identify current part of speech, change to other parts of speech);
- Morphemic analysis (base word + any prefixes or suffixes);
- Synonyms/antonyms;
- Word use in sentences;
- Illustration of the word or concept.

Turning to a dictionary and exploring word definitions and word origin is often the first approach to exploring words from a traditional vocabulary teaching focus. Stahl (2003) emphasised that to know a word, however, we need to move beyond just defined meanings, and consider other relationships,

such as synonyms and antonyms. In addition, words may have a variety of contextual meanings. For example, in studying the word *condensation*, it becomes obvious that the word has various meanings – in medicine (psychology), science (general Physics, chemistry) and more generally. Students need to have both definitional and contextual knowledge as meaning making is triggered by the content knowledge we possess (Hirsch, 2003; Stahl, 2003).

Blachowicz et al. (2006) advocate generative vocabulary instruction, which is designed to increase students' vocabulary and has flow-on effects for comprehension. This type of instruction involves students exploring how words work (root words or base words, prefixes, suffixes) and generating more words from these components. Green (2008) found that over 90% of words from Science and Technology consist of a combination of Greek and Latin root words, prefixes and suffixes. For example, the word *thermometer* is formed from the Greek *thermos* (hot) and *metron* (measure). If teachers allow students to explore how to generate words using the root *therm*, students can go on to create other words such as *geothermal*, *thermodynamic* and *electro-thermal*.

Another concept central to generative vocabulary is morphemic analysis. In conducting a morphemic analysis of the word *evaporation*, students would identify the base element *vapour*, noting that the prefix *e* is derived from the prefix *ex* (which means out) and the suffix *ion*. After identifying the meaning of the morpheme *vapour*, students can also add prefixes and suffixes to generate more words such as *evaporate*, *evaporate(d)*, *evaporate(s)*, *vaporise* and *vaporiser*. Morphemic analysis of this word would also allow for exploration of differences between American English (*vapor*, *vaporize*) and British English spelling (*vapour*, *vaporise*) which would be important when writing to learn. At all times, as students develop subject area knowledge, it is important for teachers to actively reflect on whether they have supported students to access and participate by catering to the literacy demands.

Stage 3: Reflecting on literacy capabilities (*what now*)

Reflection and evaluation are important concepts in the teaching and learning cycle as they allow teachers to consider *what now*. The importance of reflective thinking as part of teaching practice has its roots in the work of John Dewey and others, including Donald Schön. As an element of high quality teaching, reflection is emphasised in the Australian Professional Standards for Teachers (AITSL, 2014), particularly in Standard 3.6: 'Evaluate and improve teaching programs'. For this standard, teachers are expected to 'Conduct regular reviews of teaching and learning programs using multiple sources of evidence, including: student assessment data, curriculum documents, teaching practices and feedback from parents/carers, students and colleagues'.

Reflection, according to Schön (1983) was a systematic and purposeful examination of practice. Argyris and Schön (1974) asserted that reflection was paramount to effective teaching with the 'need to become competent in taking action and simultaneously, reflecting on this action to learn from it' (p. 4). Wilkinson (2005) noted that teachers usually have theories in relation to teaching and learning, influencing what they do and why they do it. However, Wilhelm, Baker and Dube (2001) stated that 'these theories are typically under-articulated, unrecognized, underspecified, and quite often inconsistent if not schizophrenic in their application' (p. 1). Argyris and Schön made the distinction between *theories-in-use* (enacted practice) and theories used to describe or justify behaviour under certain circumstances (*espoused theories*). They believed that an individual's theories-of-use (enacted practice) may not always be congruent with their espoused theories and that there may be a lack of awareness of this incongruence. Reflective practice, however, allows for examination of this relationship.

Schön (1983, 1987) differentiated between two types of reflection: reflection *in* action, and reflection *on* action. Reflection *in* action occurs when teachers reflect on their professional actions whilst they are being carried out. When planning, teaching or assessing, teachers 'engage in reflective conversations with practical situations, where they constantly frame and reframe a problem as they

work on it, testing their interpretations and solutions' (Calderhead & Gates, 1989, p. 1). Reflection *on* action, on the other hand, occurs after the event. Teachers use their memory and other forms of data (e.g., observations, student work, videos, photographs) to reframe the events being reflected upon. Reflection *on* action allows for teachers to become more accomplished professionals as they 'remove themselves from the immediacy of the situation and interpret it using new perspectives, refining their beliefs and future courses of actions' (Khourey-Bowers, 2005, p. 85).

As Noffke and Brennan (1988) emphasised, for teachers it is generally not a case of whether to reflect or not, but what is worthy of reflection. In the case of this framework, teachers can ask:

- Did all students have the necessary literacy capabilities to demonstrate their knowledge of the content and processes of the subject area?
- Were the selected resources appropriate to the developmental needs of the students? If not, how can I differentiate the content, or use teaching strategies so that all students can access them?
- What further literacy support do all students need?
- Are there some groups of students who need more support?
- Was my scaffolding at the point of student need or did it need to come earlier?
- Did I make the most of teachable moments to broaden students' learning about literacy?

At a more in-depth level, teachers can consider literacy demands using the Literacy Continuum from the *General capabilities* (ACARA, 2013a), applying the overarching processes (comprehending and composing) and areas of knowledge (text, grammar, word, visual). This can be done through a focussed analysis of classroom observations and other assessment collected during classroom activities, such as work samples, student conferences, and peer and self-assessment. In exploring subject area texts and activities, more specific questions to reflect on may be:

- Do students have sufficient word knowledge and world knowledge (Hirsch, 2003) to engage with the concept?
- Do students understand subject area vocabulary so that they can apply it when reading to learn?
- Do students have sufficient comprehension strategies to deal with subject area texts and do they have appropriate skills, such as summarising, taking notes, comparing/contrasting, that need to be taught and modelled, rather than just tested?
- Do students have sufficient strategies for reading and viewing multimodal and digital texts (i.e., understanding how visual, audio, spatial and gestural modes make meaning in their own right)?
- Do students know how to access information from websites, including how to skim and scan for information, how to evaluate information or to do searches?
- Do students have knowledge of the text structure, language and grammatical features of the subject area texts they are expected to comprehend?

It is only through reflection and evaluation of teaching practice and student learning that teachers can identify *what now* for students as a whole and individually. Once they have this information at hand, they can act upon these findings to develop more effective teaching practices which build students' literacy capabilities for reading comprehension in the subject areas.

Conclusion

Certain demands have been placed on students to be considered literate in contemporary society, particularly when reading to learn in subject areas. Documents like the *General capabilities in the Australian Curriculum* (ACARA, 2013a) have started this journey with detailing the *what* of literacy

demands, but there is little in the way of *how* or after teaching *so what*, to support classroom teachers during this process of building literacy capabilities. In this paper, I have discussed one framework that supports such a process with a close focus on reading. To support students as literacy learners when reading to learn, it is paramount that we clue students in to how knowledge is constructed differently in different subject areas, and to build their literacy capabilities for success inside and outside school.

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