

“Why Do You Think That?” Exploring Disciplinary Literacy in Elementary Science, History and Visual Arts

Patrick Burke, Eithne Kennedy

How can elementary teachers embed meaningful disciplinary literacy instruction in *more than one discipline*? Learn from research that integrated literacy with science, history, and visual arts.

Introduction

Disciplines like visual arts, science, and history can provide a powerful springboard for literacy development. Yet, too often, our prioritization of literacy puts a squeeze on the amount of time available for the meaningful interrogation of critical questions in the content areas. Though this prioritization has ostensibly noble aims (every teacher wants their students to read and write to their fullest potential), diminishing the time available for other subjects may be counterproductive in the long run.

Converging lines of research evidence confirm the importance of making strong connections between literacy and the broader school curriculum. Firstly, the research evidence strongly attests to the benefits for both literacy achievement (e.g., vocabulary, comprehension) and content-area learning when thoughtfully integrated (Hwang et al., 2021). Secondly, the importance of building background knowledge to support understanding of text has received growing attention as a crucial component of comprehension instruction (Smith et al., 2021). Thirdly, we know from the significant research on approaches like concept-oriented reading instruction (Guthrie et al., 2007) that using literacy to pursue new knowledge about a puzzling phenomenon is highly motivating. If carefully planned, uniting the literacy time block with the time for other subjects has strong research support.

Disciplinary literacy provides a helpful way of thinking about how we can integrate our literacy instruction in a manner that serves our *literacy* aims while remaining true to the ways of thinking and inquiring that a scientist or artist might adopt (Moje, 2008; Shanahan

& Shanahan, 2008). Disciplinary literacy refers to the “specialised ways reading, writing, and oral language are used in academic disciplines such as science, history, or literature” (Shanahan, 2019, p. 1). Some of the disciplinary distinctions between science, history, and art (the focus of this article) are illustrated in Table 1. A burgeoning body of research supports the move to integrating literacy and content instruction through, for example, focusing on disciplinary language and thinking in inquiry-based teaching (Wright & Gotwals, 2017), teaching literacy through content-area projects (Duke et al., 2021), or jointly developing literacy and content-area knowledge through thematic units involving conceptually related texts (Kim et al., 2021). This paper draws on empirical work conducted in six elementary classrooms (10–12-year olds) to illustrate what disciplinary literacy looks like when taught across *multiple* disciplines by generalist teachers. We conceptualize literacy as the interpretation and production of texts in ways that may vary from discipline to discipline (Draper & Siebert, 2010).

Theoretical Perspectives on Disciplinary Literacy

Three theoretical perspectives—the cognitive, linguistic, and sociocultural—underpin this study. From a **cognitive** perspective, disciplinary literacy demands that students

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orchestrate various thought processes to engage purposefully and critically with text, drawing on the epistemic norms associated with different disciplines (Goldman et al., 2016). Studies on how discipline experts think differently about texts are highly influential in the literature on literacy (Pressley & Afflerbach, 1995) and in disciplinary literacy specifically (Shanahan et al., 2011). From a linguistic perspective, reading in the disciplines exposes students to varying ways of using language to construct meaning. For example, a historian might draw on metaphorical terms like the *Dark Ages* to describe an extended period of time, while a scientist is likely to draw extensively on words with morphologically complex structures to explain phenomena (Schleppegrell, 2004; Shanahan et al., 2011). **Sociocultural** perspectives provide crucial insights into how patterns emerge in the construction of knowledge among members of a disciplinary community and how students engage with literacy in collaboration with other members of their school (and broader) community (Moje, 2008). Approaching literacy from a sociocultural angle requires

that attention is afforded to student strengths, student funds of knowledge, and out-of-school literacies (Moll et al., 1992).

Research Context and Design

The study on which this article is based (Burke, 2022) employed design-based research (Reinking & Bradley, 2008), conducted in six “typical” classrooms, to investigate *how* to teach disciplinary literacy in *multiple* subjects. The focus on disciplinary literacy was sparked by recent changes to the Irish primary school curriculum, which highlighted the potential of teaching disciplinary literacy at the elementary level for the first time. The subjects of science, history, and visual arts were chosen because they provide contrasting ways of constructing and validating knowledge and are each taught by generalist elementary teachers in Irish classrooms. Over 7 months, teachers ($n = 6$), students ($n = 131$), and the researcher worked in partnership to develop

PAUSE AND PONDER

- How can literacy instruction extend and deepen the learning taking place in other subjects on the curriculum?
- How can you ensure that literacy supports authentic ways of inquiring and thinking in multiple subjects?
- What are the benefits of pairing disciplinary knowledge development with literacy instruction?

Table 1
Contrasting Ways of Knowing and Using Literacy in Science, History, and Visual Arts

	Science	History	Visual arts
Epistemology <i>How do experts in the discipline create new understandings about the world?</i>	Scientists construct knowledge by observing the natural world and inferring explanations about how it works; scientific understanding is never absolute (Lederman, 2007)	Historians rely on <i>interpretation</i> of the past; no one account will ever be fully complete or objective (Vansledright, 2002); attention is given to the <i>source</i> , the <i>context</i> in which it was written, and <i>corroboration</i> (Wineburg, 1991)	The arts are suggestive and multi-layered; artistic pieces need time to be fully understood (Novitz, 2004); identity and context are important (Barton, 2013)
Use of language to convey meaning <i>What is distinctive about how language is used in the discipline?</i>	Academic language characterized by, for example: dense sentence structures, specialized vocabulary, and nominalization (Shanahan & Shanahan, 2008)	Use of language to organize rhetoric and make causal claims (Schleppegrell, 2004)	Language is used to describe/critique artistic elements (Barton, 2013); <i>visual</i> communication is foregrounded
Texts <i>What texts are used to communicate and carry meaning in the discipline?</i>	Reports, explanations, arguments, often relying on cause-effect/problem-solution text structures; texts that integrate print with diagrams/figures (Seah, 2016)	Texts (sources) may come in many multi-modal (e.g., photos, videos) as well as print-based forms; focus on explanation and interpretation (Schleppegrell, 2004)	Texts may come in many forms; visual and multi-modal texts are foregrounded; print-based texts also play a role but are secondary (Moxley et al., 2012)

and trial approaches to disciplinary literacy that gave equal attention to literacy development and disciplinary knowledge. The teacher participants taught in the upper elementary grades in Ireland (5th/6th grade; 10–12-year olds). Purposive sampling ensured the representation of different school contexts. [Table 2](#) provides overall demographic information for the teachers and children who took part in the study.

At the outset of the study, several instruments were used to inform the design and content of instructional materials, bearing in mind the theoretical perspectives outlined previously. [Table 3](#) illustrates some of the key findings from these initial measures.

This preliminary phase was followed by three cycles of design-based research in which cumulative and recursive analysis of multiple data sources led to ongoing refinements in teaching and learning approaches (Reinking & Bradley, 2008). Each cycle focused on the literacies of a new discipline—science, history, and visual arts—chosen to provide contrasting experiences on how knowledge can be constructed and communicated. Experts in each of the disciplines reviewed the disciplinary content of each unit of work to ensure its authenticity and rigor. During each cycle, teachers participated in joint professional learning sessions with the researcher in which instructional practices, research, and ongoing progress were shared and discussed (totaling six 150-min sessions, two per cycle). Teachers were released

from school to come together at the researcher's institution for these sessions. For example, the first session in cycle two started with a shared reflection on learning/progress from cycle one, a discussion of Wineburg and Reisman's (2015) article on reading in history, researcher modeling of new instructional practices (e.g., corroboration), researcher guidance on locating primary and secondary sources, and a preview of the relevant instructional materials for the cycle.

Qualitative data generated during the instructional cycles included student focus groups, open-ended field notes from classroom observations, and student work samples. Teachers' experiences and professional learning were also captured in in-depth interviews and recordings of professional learning sessions. All data were analyzed using the constant comparative method, involving the line-by-line coding of data units and comparing codes across cases and time points to identify patterns that capture the essence of the data (Glaser & Strauss, 1967).

Ongoing data collection and analysis followed the guidance of Reinking and Bradley (2008) to pinpoint enhancing and inhibiting factors, unanticipated effects, changes to the instructional environment, and necessary modifications. New practices were introduced developmentally. For example, the importance of reading across texts was first introduced in cycle 1 (science) and extended to take on a historical and artistic manifestation in cycles 2 and 3. In

Table 2
Demographic Details for Teachers and Students; All Names Are Pseudonyms

School code	Class code	Context	Teacher details	Student details
A	1	Mixed gender; Rural	Andy , male; 14 years teaching; Master's degree	6th grade 19 students <i>Mean age</i> = 11.47
	2	<i>As above</i>	Sarah , female; 8 years teaching; Master's degree	6th grade 19 students <i>Mean age</i> = 11.27
B	1	Single sex (girls); Suburban	Emer , female 14 years teaching Master's degree	5th/6th grade combination 22 students <i>Mean age</i> = 10.95
	2	<i>As above</i>	Siobhán , female; 7 years teaching; No additional educational qualifications	5th/6th grade combination 20 students <i>Mean age</i> = 10.85
C	N/A	Single sex (boys); Suburban; linguistically diverse	Maura , female; No additional educational qualifications	5th grade 27 students <i>Mean age</i> = 10.28
D	N/A	Single sex (girls); Urban; linguistically diverse	Mairéad , female; No additional educational qualifications	6th grade 25 students <i>Mean age</i> = 11.16

Table 3
Key Findings and Implications from a Selection of Measures Conducted Prior to DBR Cycles

Teacher data sources (<i>n</i> = 6)	Sample findings	Implication for design
Researcher-designed questionnaire on typical literacy practice, supplemented with semistructured interviews	All teachers reported integrating literacy with other subjects, but they did not draw on disciplinary manifestations of literacy in doing so	Explicit introduction to and exemplification of disciplinary literacy needed
Student data sources		
<i>Data sources gathered with all students (n = 131)</i>		
Drawing tasks ; students represented their understanding of the work of a scientist, historian, and artists through drawing	Stereotypical representations of scientists (e.g., wearing a lab coat and goggles) and artists (e.g., wearing a beret and porting a paintbrush) were common	Care was needed in the photos/representations of scientists/historians/artist throughout; instruction needed on how <i>literacy</i> supports the work of each discipline
Reading/Writing Motivation Profiles (Codling & Gambrell, 1997; Malloy et al., 2013)	Students were more motivated to write in the narrative genre ($M = 18.2692$) than in the expository genre ($M = 15.5736$), $t(128) = 5.765$, $p < .001$	Careful choice of interesting expository texts needed; use of narrative texts where appropriate to the discipline
Researcher-designed literacy questionnaire on student preferences (in/out-of-school)	Outside of school, students were far more likely to indicate that they enjoyed reading in a fictional genre (88 references) than in a nonfiction genre (15 references)	
<i>Data sources gathered with student sub-sample (n = 18)</i>		
Think aloud protocol of reading in science, history, and visual arts	Students made limited intertextual connections, despite texts being chosen to support this process (e.g., three related sources on the history of the Loch Ness)	Explicit teaching and scaffolding on comparing and corroborating information across texts needed

the following sections, we outline just two of the critical practices and findings from each cycle. Illustrations of the instructional approaches and materials from across all cycles can be seen in Table 4. It is important to note that these were crafted responsively throughout the project rather than being predetermined.

Cycle 1: Thinking and Communicating like a Scientist

Two crucial instructional foci in this cycle involved focusing on language and dialogue to support scientific thinking and carefully balancing first-hand inquiry with reading scientific texts.

A Focus on Scientific Dialogue and Language

Dialogic approaches to teaching emphasize meaningful classroom talk to foster student thinking and learning, in

which the teacher refrains from being the sole voice heard during content-area lessons (Alexander, 2014). Though there are many ways of promoting this dialogue, the scaffolds provided by *Accountable Talk* (Resnick et al., 2018) are particularly effective for discussion in a disciplinary community. Teachers introduced the three forms of accountability deliberately: accountability to *community*, *reasoning*, and *knowledge*. For example, teacher Sarah (all names are pseudonyms) used an anchor chart (see Figure 1) to explicitly teach her students how to agree and disagree and build on each other's contributions during scientific debate. With practice, students began to see how this type of talk can extend across the school day:

Student 011: I feel like after we learned about thinking and reading like a scientist, you kind of used it in like if we're answering questions or something, or if we're talking about something. Some people say like 'Following on from what Mike was saying...' and stuff like that. We use it out of not just for, that specific lesson, we use it kind of everyday.

Table 4
Examples of Key Content, Teaching Points, and Resources Used to Teach Disciplinary Literacy in Science, History, and Visual Arts

	Science	History	Visual arts
Inquiry Focus	How do microorganisms affect our everyday lives?	Did the moon landing really matter? Was it worth the effort?	Addressing an issue of importance to children using mixed media (inspired by the work of Oliver Jeffers)
Disciplinary knowledge/skills	Fair-testing of the impact of cleaning/hygiene materials on microbe growth using nutrient agar plates/swabs	Using historical evidence; developing an understanding of time and chronology; empathy; synthesis and communication of historical information	Sourcing, using, and creating artwork using mixed media Looking and responding to the picture books, installations, social media postings, and fine art of Oliver Jeffers Capturing and developing ideas using sketchbooks Understanding of art elements (color/texture/ space)
Oral language	Ground rules for classroom discussion Using evidence in oral arguments Talk and discussion of reading texts	Using evidence in oral arguments Talk and discussion of reading texts	Oral discussion of artwork, drawing on visual thinking strategies (Yenawine, 2017)
Reading	Comparing 2/3 sources offering contrasting information on microbes (e.g., extracts from <i>The Bacteria Book</i> by Steve Mold, <i>It's Catching</i> by Jennifer Gardy & Josh Holinaty) Read-aloud to build background knowledge (<i>Tiny Creatures: The World of Microbes</i> by Nicola Davies & Emily Sutton)	Comparing three (or more) multi-modal historical sources (e.g., archival footage of the moon landing; newspaper extracts— <i>New York Times</i> ; interviews/videos with people from the time in news archives) Reading like a historian (drawing on the work of Wineburg, 1991) Read-aloud (<i>Moonshot</i> by Brian Floca)	Comparing multi-modal and print-based texts Read-aloud and discussion of themes in Jeffers' picture books (e.g., <i>The Fate of Fausto</i> ; <i>The Heart and the Bottle</i>)
Writing	Writing an argument using scientific evidence (drawing on first-hand inquiry and reading)	Writing an argument using historical sources (drawing on multiple sources); citing sources in writing	Writing an artist's statement
Vocabulary/ Language focus	Connectives to support scientific argumentation	Relevant terminology, including metaphorical terms, for example, the <i>Cold War</i>	Language to describe art elements (color/texture/ space)

Student 001: It's almost second nature now.

This practice was honed in subsequent cycles to focus on the types of questions and talk associated with other disciplines (history and visual arts).

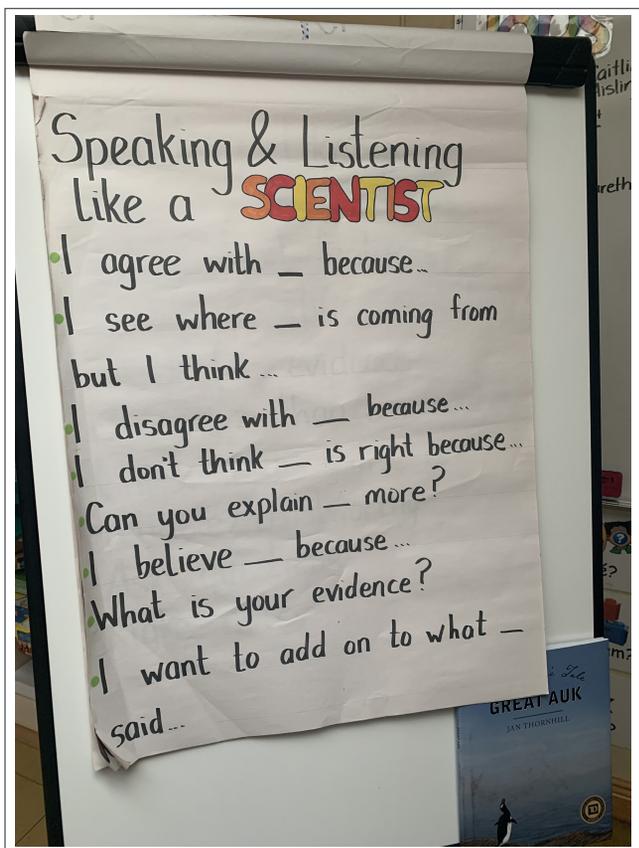
While disciplinary literacy grows in classrooms with open talk and discussion, it thrives when students are equipped with the language to discuss new and complex phenomena. A defining characteristic of disciplinary

literacy is that a scientist's talk is likely to be dotted with terminology that varies from that of an artist or a historian (Shanahan & Shanahan, 2008). Teachers must be mindful of this vocabulary and teach it using research-informed routines. This may extend to teaching students how words are used differently in the disciplines. For example, students in Sarah's class learned how scientists draw on words with Latin and Greek roots to label new discoveries. In later cycles, this explicit language teaching shifted to the terminology associated with history and the visual arts.

Inquiry and Reading across Discipline-Specific Texts

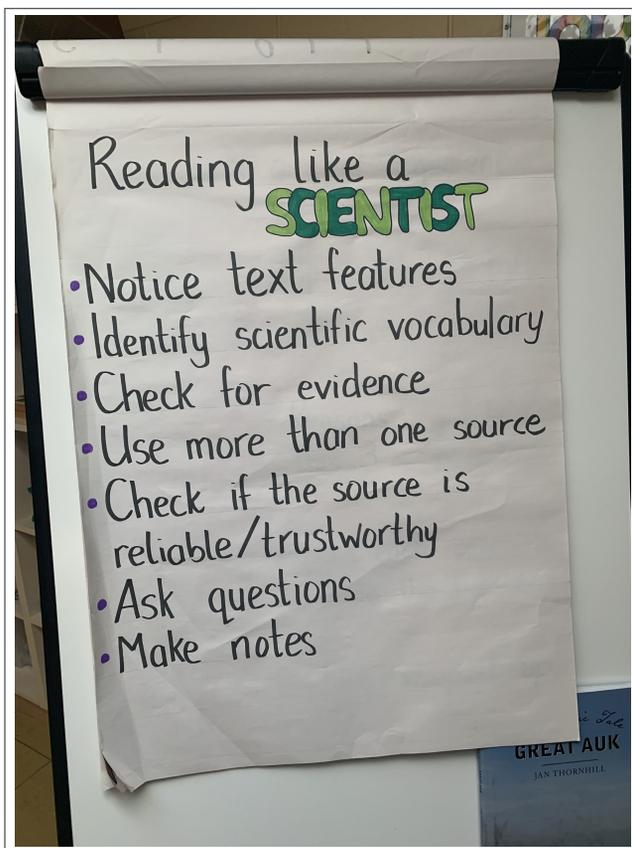
In a unit on microbes (see Table 4), students engaged in inquiry on questions like "Where are the most microbes in the classroom?" and "Does washing our hands make a difference to the number of microbes on our skin?". To do this, they engaged in fair-testing, deciding how to use agar dishes and swabs to compare different conditions.

Figure 1
Anchor Chart to Support Speaking and Listening like a Scientist



Alongside first-hand inquiry, literacy lessons introduced some of the vocabulary and thinking processes that would support critical consumption of a *single* text before building this up to two and three texts. The need to draw on multiple texts to pursue new knowledge is a core feature of disciplinary literacy teaching (Goldman et al., 2016; Shanahan & Shanahan, 2008). These texts offered multiple perspectives on the phenomenon under study (Colwell, 2018). However, balancing, processing, comprehending, and critiquing multiple texts can challenge teachers and students alike, particularly when they are more accustomed to learning from single textbooks. The research on multiple-text comprehension attests to the complex cognitive processes involved in this endeavor (Bråten & Strømsø, 2011; Goldman et al., 2016). This work was scaffolded by careful modeling, drawing on the gradual release of responsibility (Pearson & Gallagher, 1983) and the judicious use of graphic organizers. Critical practices were highlighted and summarized in anchor charts (see Figure 2). Student engagement was supported using a variety of attractive texts, the use of dialogic practices, and pair/group work.

Figure 2
Anchor Chart to Support Reading like a Scientist



Cycle 2: Exploring Perspectives in History

Teaching in Cycle 2, which focused on history, extended the practices developed in Cycle 1. Here, we detail how teachers supported the critical analysis of sources and the exploration of multiple perspectives.

Critical Source Analysis

Authentic engagement with a discipline should help students to understand how knowledge is constructed (Moje, 2008). In line with Moje's writing, we interpret critical literacy to involve knowledge of the disciplines *and* an understanding of how knowledge is produced and critiqued. Teaching discipline-specific literacy practices provides rich potential for helping students to gain the background knowledge and ways of thinking necessary to move beyond surface-level treatment of a text. Teachers in this study started by asking students to think more carefully about the author of texts (*What are their qualifications to write on this subject? What viewpoint might they bring? Why did they write the book?*). This progressed to teachers drawing extensively on the work of Wineburg (1991) on epistemic thinking in history to also think about the context for the source (*When was it written? What was happening at the time?*) and corroboration for its contents (*Is this information backed up in another text?*). See an anchor chart from teacher Andy in Figure 3. Teachers commented on the value of this level of critical interrogation:

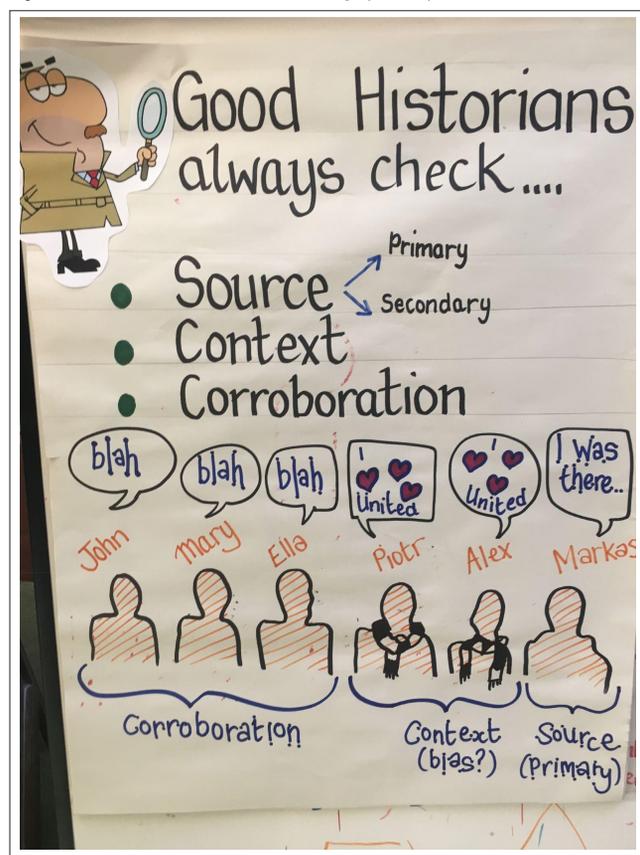
it's really important in the age that they live in that they're not just receiving content as this kind of one way of thinking, showing them new ways of looking at ... information and them being able to evaluate it for themselves, do you know what I mean? And read between the lines ... I just think it was all kind of very relevant to our current situation [reference to coronavirus pandemic/disinformation].

(Teacher Maura)

Multiple Perspectives on Historical Events

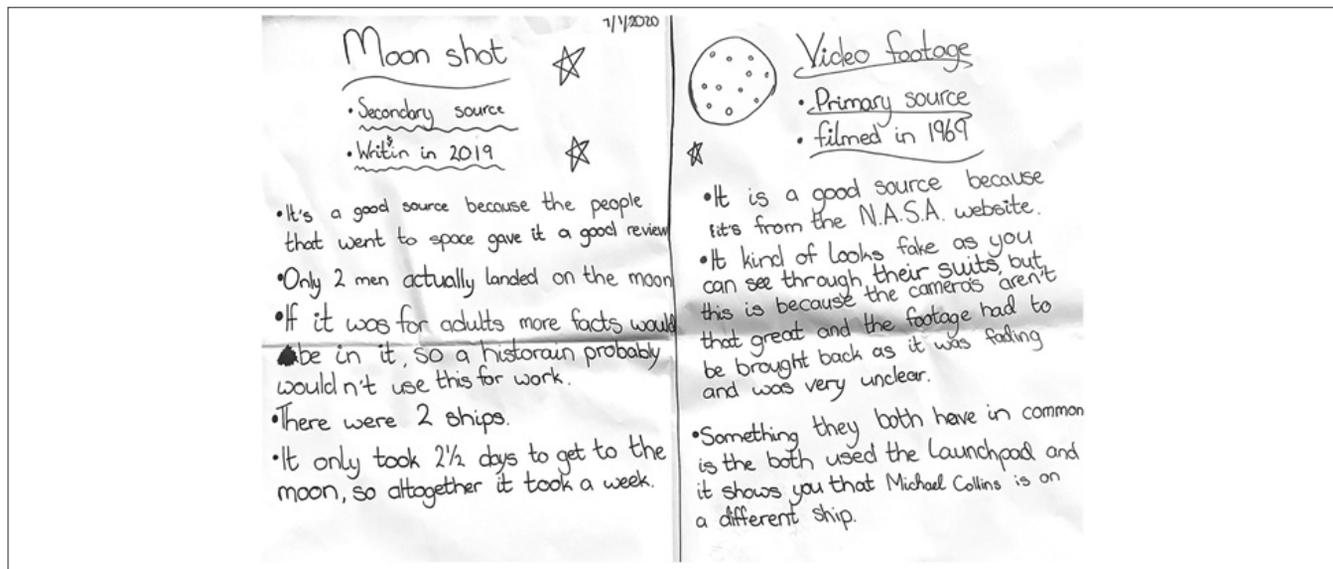
Delving into history required students (and teachers) to dispel the notion that one source was sufficient to describe the complexities of any one event, person, or period from the past. Making meaning from texts in history is "slippery and elusive" (VanSledright, 2012, p. 212). Thus, students had to understand that multiple realities and perspectives could be represented in contrasting sources. The history textbook alone could not serve this purpose. This need to explore multiple perspectives was demonstrated in a unit on the space race and the first moon landing. It was important that students understood the broader context for these momentous

Figure 3
Anchor Chart to Support Analysis of Text, Informed by the Research of Wineburg (1991)



events (through exploration of the term the *Cold War*) and were exposed to multiple perspectives: the local (Irish) and the international (US and USSR). In one lesson, students in Andy's class worked in small groups to consider two sources on the moon landing itself. The first, a picture book (*Moonshot: The Flight of Apollo 11* by Brian Floca), provided a retrospective, child-friendly account. The second, NASA video footage, provided a different perspective on the same event. As seen in Figure 4, student analysis of the sources demonstrated their ability to think not just about the *content* of each but how they may be framed from a historian's perspective. Students continued to draw on multiple sources (including oral interviews with family members alive during the moon landing) to build their understanding of the event before writing a related argument on a topic of their choice. In this argument, students demonstrated their knowledge of the rhetorical structures associated with the genre and their ability to draw on primary and secondary sources. This shift from writing *about* an event to *crafting an argument* was significant and required explicit teaching.

Figure 4
Student Analysis of Two Sources



Cycle 3: Creative Communication in Visual Arts

Focusing on literacy in the visual arts afforded significant opportunities for the divergent applications of literacy. We highlight here how teaching and learning in this cycle supported creativity and expression and broadened student (and teacher) conceptualizations of text.

Creative Interpretation and Expression

Though a solid basis for discussion had been established in previous instructional cycles, it was essential to explore open-ended interpretations of artwork during this cycle. Visual Thinking Strategies (Yenawine, 2017) provided a constructive framework for this endeavor. Discussion was sparked through the use of three key questions: *What's going on in this picture? What do you see that makes you say that? and What more can we find?* (Yenawine, 2017). Crucially, the teacher acted as a facilitator of student responses, deliberately seeking to avoid the confirmation of individual interpretations. This facilitation involved paraphrasing student responses, linking responses, and maintaining a neutral stance. Teachers avoided providing "correct" interpretations of the artwork, which students noted:

Student 050: Usually when we're doing things, when people would ... like say there was a question, and say, the answer was two, and someone said three, you kind of feel like 'oh, like I got it wrong', but with that, you got to like... em... you got to always get it right, if you get what I mean? So you could express whatever you thought about it.

Students also documented their thoughts visually using sketchbooks, in which they incorporated multiple modes (often a mixture of drawing and writing). Inspired by the mixed-media artwork of Oliver Jeffers, they explored materials to create their own collages. Afterwards, they drafted artist's statements that captured their thoughts on their creations. Throughout the unit of work, teachers embedded the language needed to describe various art elements (e.g., color, space). As noted by teacher Mairéad, these varied modes of expression provided an outlet for students that they may not otherwise have encountered: "I think a lot of them are escaping through their little sketchbook... their emotions or feelings... and as opposed to writing about their emotions, they're drawing."

Expanding Conceptions of Text

Artists draw on print-based texts as part of their work (Andrelchick, 2015; Moxley et al., 2012), but these cannot be considered the *primary* means of communicating for a visual artist. In the arts, meaning is conveyed through visual, embodied, and aural modes (Barton, 2013). An important characteristic of disciplinary literacy is that it draws upon the literate practices of the discipline. Thus, it was necessary to expose students to various text types and forms (Colwell, 2018; Shanahan & Shanahan, 2014). For example, when exploring and responding to the work of Oliver Jeffers (an artist, author, and illustrator) as part of their learning in the visual arts, students were deliberately introduced to artist statements, extracts from his visual monograph (Jeffers, 2018), his original artwork (see

www.oliverjeffers.com), a newspaper interview, and multi-modal sources (video interviews and Instagram posts). Analyzing texts in art stretched and student thinking, as noted by teacher Maura:

[responding to Jeffers' work] got the girls thinking I suppose that there was a deeper meaning, whether it was desertification or whether it was pollution, like he had a meaning behind his work, so it comes back to ... a text is not just written word, a text is photos and paintings, different media in art, which is something I hadn't thought about.

Looking across the Disciplines: Addressing Challenges and Reaping Rewards

For elementary teachers new to disciplinary literacy, its application in the classroom may seem daunting. This section highlights the cross-cutting challenges and benefits associated with this work.

The elementary teachers in this study brought different experiences and preferences for science, history, and visual arts. Maura, who was far less comfortable exploring artwork with children, thrived when teasing out sources with students in history. Emer, who clearly preferred artistic thinking, deemed the demands of disciplinary literacy in science far more challenging. In working together and sharing experiences, teachers became more comfortable exploring the idiosyncratic ways of communicating across disciplines. Professional learning, supported by an external colleague (in this case, the researcher and first author), also provided scaffolding for this experience.

Another critical challenge in enacting disciplinary literacy is sourcing and navigating texts in various forms. Though helpful advice is available on the types of texts suitable for elementary disciplinary literacy in some subjects (e.g., Colwell, 2018), this is not the case for subjects like visual arts. It is also clear that a higher level of preparation is required to use multiple sources rather than relying solely on the subject textbook. The *Take Action* panel provides a starting point for teachers embarking on this endeavor in their classrooms.

Throughout the project, multiple qualitative data sources attested to the potential for disciplinary literacy to support student engagement. Engagement was conceptualized as the visible manifestation of a student's motivation (Afflerbach & Harrison, 2017), demonstrated through, for example, interest, enjoyment, sustained participation, and deep cognition or thinking about new learning (Parsons et al., 2015). This engagement was documented through qualitative sources (interviews, focus groups,

and observational data). Though students will naturally express varying preferences for the subjects they encounter in school, there was evidence that this form of instruction supported further engagement:

Before, I really didn't like science, I just didn't think it was that interesting and I had subjects that I liked and subjects that I didn't like, science was definitely one that I didn't like. But now that we've gotten into more science and things I think it's actually getting more interesting

Several factors explained this engagement. Maura noted that students "were reading for a specific purpose ... So it just becomes more meaningful for them". This was also more *realistic*, as noted by Sarah:

If you're learning about something in real life, you're going to see different sources from loads of different places ... that's a huge skill for them to have and for them to be able to extract information from a lot of different sources rather than just kind of neatly packaged in a textbook, what they typically get in school. I think it's a really good skill for them to get in the latter years of primary school, to challenge them and open up their mind to other sources of information.

The high levels of dialogue and collaborative work were also crucial, as noted by one student:

I think it's better when we're talking about it rather than just like writing answers down in a copy or something. When like you get shown a picture and we all talk about it and what we think, we can get ideas from other people as well as just what we think, and I think it's just a better way of doing it

The true benefit of linking literacy with learning in *multiple* subjects is the potential for expanding student perspectives on how we learn about the world. In her writing on secondary disciplinary literacy, Moje (2008) calls for teaching that supports students to be *metadiscursive*; they must be able to knowingly traverse disciplines and their boundaries. Of course, students encounter multiple disciplines long before they enter secondary school. Students stretched their analysis of texts to search for evidence in science, analyze different perspectives in history, and critique *visual* means of communication in visual arts. They were challenged to adopt more nuanced ways of supporting their thinking with evidence:

And I think that one of the positive challenges for them was having to be more accountable for their opinions. So if they're presenting a fact or an article or a proof or a visual or whatever it might be, you know, being accountable, back it up, how can you look at or read something and prove its authenticity or value or maybe you know if they have an answer for something, probing them on "why do you think that?"

(Teacher Emer)

TAKE ACTION!

- 1. Choose a subject that interests you:** Disciplinary literacy must draw on the texts and ways of thinking that are true to a discipline. Beginning with a subject with which you are familiar can make the jump into varied text types less daunting.
- 2. Think of an inquiry focus, ideally with input from students:** Construct an overall inquiry focus that gives a focus to a unit of work. Disciplinary thinking is best realized in the pursuit of an answer to a meaningful question.
- 3. Gather texts that provide multiple perspectives:** Construct a text set that represents several different genres and text types, as well as various perspectives on the phenomenon. If you must use a subject textbook, include this as *one* of the core texts in your text set.
- 4. Sequence your teaching:** Gradually introduce and layer the disciplinary literacy practices you wish to introduce (e.g., moving from comparing two texts to *three* texts on a topic).
- 5. Employ the Gradual Release of Responsibility** (Pearson & Gallagher, 1983): Carefully introduce and model new ways of critiquing text or crafting writing; ensure students have explicit mentors/models to aid their disciplinary work.
- 6. Remember language, dialogue, and discussion:** The most substantive and thorny issues in the disciplines generate a lot of (evidence-informed) talk and debate. Remember to build appropriate opportunities for this throughout a unit of work.

This capacity for source analysis and deep thinking is increasingly important in the modern world.

Conclusion

There is significant potential to bring the teaching of literacy into closer harmony with subject-area teaching in elementary school. Increasingly, the research has highlighted the need to ensure that the teaching of *generic* literacy skills does not undermine the time available for the discipline-specific, rich learning offered by the broad range of subjects in the elementary curriculum. Billman and Pearson (2013, p. 27) write that “it is best to situate literacy as a set of tools not a set of goals”. In enacting this principle, the teachers in this project drew on literacy as a vehicle for deepening learning in—and supporting engagement with—the broader curriculum.

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Conflict of Interest

None to report.

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