

Towards Disciplinary Reading

Summary

Increasing attention is focused on reading in the content areas in the upper primary and secondary grades. This is because reading helps students in learning content in various disciplines. The development of vocabulary, in particular, is closely linked to the acquisition of concepts as knowledge is represented by words which make up the schemas that readers use as background knowledge required for comprehension. In addition to developing the vocabulary knowledge of students, there is a need for content subject teachers to teach explicit discipline-specific reading comprehension strategies to their students so that students can read like a scientist or historian.

To help pre-service and in-service teachers adopt discipline-specific reading strategies in the classroom, teacher educators can design courses that focus on discipline-specific literacy instruction that goes beyond directed study skills and textbook-based reading skills for upper primary and secondary teachers. For lower primary teachers, more professional development on vocabulary instruction will help them adopt a more deliberate and systematic instructional approach to developing their students' vocabulary and comprehension. Leaders in education can plan for these reforms in reading instruction by having a long-term orientation towards reading instruction so that students are capable of reading across disciplines at the end of their school years.

Introduction

There is an urgent need to address literacy skills which are associated with twenty-first century demands given the current economic climate (Murnane, Sawhill, & Snow, 2012). There has been a growing awareness that reading ability affects achievement in school and post-school life. Increasingly, assessments based on more authentic and challenging tasks are designed to tap the higher level literacy skills that are directly relevant to academic success and to contemporary workplace demands.

Higher-level skills refer to the ability to learn from texts which are more complex at the word, sentence, and structural levels, which present greater conceptual challenges to the reader, contain more detailed graphic information, and require the reader to synthesize information (Carnegie Council on Advancing Adolescent Literacy, 2010). At the end of their secondary school education, students are expected to possess high levels of literacy that include the ability to reason while allowing for the systematic

development of ideas, the ability to make sound choices, and the ability to make and understand persuasive arguments (The American Diploma Project, 2004).

Indeed, Murnane, Sawhill, and Snow (2012) noted that students are now required to acquire deep reading comprehension skills. Deep comprehension skills include reading to learn totally new subjects, to gain access to the world of knowledge, to synthesize information across different sources, to analyse perspectives on an issue, to critique arguments on a variety of dimensions, and to assess the credibility of sources of information. Students have to go beyond simply acquiring simple comprehension skills that enable them to read relatively neutral texts to answer brief comprehension questions if they wish to explore fields such as history, science, and mathematics, to achieve educational success in postsecondary education, to earn a decent living in a knowledge-based labour market, and to participate as citizens in an increasingly complex world. Yet, Shanahan and Shanahan (2012) believe that many teachers are not

prepared to address the multiple challenges that adolescents face when reading and learning from academic texts across the disciplines.

Literacy educators and reading researchers have recognized that reading not only helps students develop general language proficiency, it also helps them in content learning (e.g., Kucer, 2005; Smith, 2004). However, Shanahan and Shanahan (2012) pointed out that it has been documented that pre-service and in-service content subject teachers have resisted content area reading methods because they were not interested in applying generic routines. Content area reading methods are thought to be generic reading approaches because they focus on general study techniques and reading approaches that can help someone understand or remember text better in any discipline. In content area reading approaches, the type of text in question is not given much attention.

In contrast, disciplinary reading, as defined by Shanahan and Shanahan's (2012) view of disciplinary literacy, emphasizes the unique uses and implications within each discipline. In other words, reading strategies are discipline-specific. For example, Shanahan and Shanahan (2012) found that content area reading approaches assumed that students could learn vocabulary in the same way across the subjects and that teachers needed to guide students using approaches such as making connections among concepts or analysing semantic features of words. However, they argued that there were discipline-specific distinctions in vocabulary. For instance, science vocabulary terms tend to be constructed from Latin and Greek (e.g., *herbivore*), whereas history is rife with openly metaphorical terms such as the *Dark Ages* and the *Gilded Age*.

Shanahan and Shanahan (2012) noted that content subject teachers found it difficult to integrate content area reading routines into their already full agenda of instruction because these reading approaches did not fit well with the kind of texts that they used in the classroom. Thus, Shanahan and Shanahan (2012) thought that disciplinary reading approaches might be more appealing to these teachers because the insights and strategies of disciplinary reading were drawn from the disciplines themselves, which were more tied to the teachers' identities as mathematics,

science, English, or history educators. These instructional practices drawn from examinations of disciplinary texts and studies of expert interactions with such texts might help encourage teachers to use disciplinary reading procedures in the classroom.

Reading in the primary grades

As explained above, a good foundation in reading is key to reading content subject texts in middle school or the upper primary grades. To ensure that students possess enough reading skills towards the end of primary school so that they will be ready for reading in content subjects such as science and history, research has shown that the following needs to be implemented in primary schools: (a) an emphasis on instructional approaches; (b) more curriculum time for children's learning; (c) a long-term orientation towards reading instruction and reform; and (d) professional development for harder-to-master skills such as vocabulary, conceptual and content knowledge, and comprehension.

Emphasis on instructional approaches

Studies have documented that more emphasis is needed on instructional approaches (Duke & Block, 2012; Murnane, Sawhill, & Snow, 2012). Duke and Block (2012) discussed the role of instruction in improving reading achievement in the primary grades. Reviewing research on improving primary grade reading published since 1998, they found that interventions in cognitive flexibility—the ability to simultaneously consider letter-sound and semantic information—have resulted in significant gains for reading comprehension in young children. For example, teaching children about multiple-meaning words such as *spell* or *plane*, and multiple-meaning sentences such as *The woman chased the man on a motorcycle* helped them gain reading comprehension.

Instruction on word-reading skills, especially in kindergarten and first grade, has led to improvements in reading achievement in decoding, i.e., the student's ability to recognize printed words accurately and efficiently. Gamse et al. (2008) reported that the *Reading First* programme produced a positive and statistically significant effect on decoding among first-grade

students in the United States as a result of increased instructional time spent on reading instruction (phonemic awareness, phonics, vocabulary, fluency and comprehension). However, there was no significant effect found on reading comprehension for students in grades one, two or three. Given the observation by Donaldson (2011) that kindergarten through third-grade teachers in 22 high-poverty low-performing American schools who took part in the *Reading First programme* over a period of three years typically spent an average of 23 per cent of their literacy instruction time on comprehension instruction and that less than 50 per cent of the teachers observed provided vocabulary instruction, this non-significant finding is not surprising. Furthermore, the type of vocabulary instruction tended to be the teaching of word definitions.

Connor, Morrison, and Petrella (2004) also found little time was spent on reading comprehension instruction for 73 third-grade American students from 43 classrooms in a large Midwestern city. They reported that less than one minute per day on average was spent in teacher-managed reading comprehension strategy activities (whole class, small group or individual activities directed by the teacher). It should be noted that the results of this study indicated greater reading comprehension growth, over the span of one year, for children, with low to average reading comprehension scores at the beginning of the school year, who received more teacher-managed reading comprehension instruction.

Hemphill and Tivnan (2008) tracked first-grade predictors of literacy development over time in 16 urban Boston schools in America and found that although beginning-of-first-grade letter-word identification and word attack skills were the strongest predictors of reading comprehension at the end of first grade for low-income students, vocabulary was the best predictor of reading comprehension at the end of second and third grades. In other words, for at-risk populations, teachers need to focus on a wide range of language and literacy skills because these skills undergird later reading success. The authors

suggested that reforms on vocabulary instruction could complement instruction on decoding skills in preschools and kindergartens as weak early vocabulary appeared to limit children's growth in comprehension abilities. They also identified larger teacher effects on literacy achievement, which is consistent with the findings from a large-scale study on variability across schools and teachers as larger teacher effects were found in schools with lower socioeconomic status levels as opposed to higher socioeconomic status levels (Nye, Konstantopolous, & Hedges, 2004). They suggested that the Boston districts' strong emphasis on developing word fluency through expanded classroom libraries, home reading programmes, a city-wide emphasis on writing development, and expanded time on task by instituting district-wide literacy blocks were effective components of the children's literacy experience and might have contributed to the children's achievement in word reading.

Developing the vocabulary knowledge of students is important because it mediates the acquisition of conceptual and content knowledge which brings about higher knowledge of content subjects.

Since Hemphill and Tivnan (2008) have shown that vocabulary and language knowledge surpasses word reading as a predictor of reading comprehension by the later primary-school years and that vocabulary

instruction promotes reading comprehension, we will now turn our attention to studies discussing why vocabulary instruction is crucial for students to become successful readers. Developing the vocabulary knowledge of students is important because it mediates the acquisition of conceptual and content knowledge which brings about higher knowledge of content subjects such as social studies and mathematics (Duke & Block, 2012). As Murnane, Sawhill, and Snow (2012) explained, knowledge, some of which is acquired outside reading, is one of the major inputs to successful reading comprehension as knowledge creates the framework on which reading comprehension builds. They also noted breadth of knowledge is often represented by vocabulary which is essential to any existing schema in the reader's knowledge. Readers need to hang individual words on these schemas that they use as the background knowledge required for comprehension. Vocabulary development is therefore very closely linked with concept development.

In the same vein, learning the language for a discipline is related to forming rich conceptual networks of words and understanding how these words are related to each other (Nagy & Scott, 2000). Goldschmidt (2010) reported that in a study of 100 Grade 2 to 5 teachers, the science-literacy integrated programme *Seeds of Science/Roots of Reading* intervention, which teaches students explicitly to read, write, and discuss as scientists do, resulted in substantially higher student performance in science content, vocabulary, and writing, but not in reading. The author reported that the experimental group teachers spent less time on reading than the control group teachers, which could account for the non-significant result in reading performance. Thus, to improve reading comprehension in science, more time on the explicit teaching of reading strategies specific to science may be needed as the results showed that student gains in reading achievement were related to higher science content post-test scores. This approach to improving reading comprehension may also be extended to other disciplines.

The following studies show that a more deliberate systematic vocabulary instruction programme can help develop students' vocabulary and comprehension effectively in the primary grades (Brabham & Lynch-Brown, 2002; Beck & McKeown, 2007). Brabham and Lynch-Brown (2002) compared the effects of three types of reading-aloud styles—just-reading, performance reading, and interactional—on the vocabulary acquisition and comprehension of 117 first graders and 129 third graders. In the just-reading treatment, pre-service teachers asked the students to listen to the story without asking questions or making comments and produced verbatim readings that lasted for about ten minutes. Subsequently, they asked students to write or draw silently and independently for twenty minutes. For the performance reading treatment, the teachers used scripted comments and questions that targeted specific words and concepts, and invited discussions during the first five minutes of the session. This was followed by a verbatim oral reading of the text by the teachers and a discussion with scripted questions for

twenty minutes. Interactional readers used scripted questions to encourage story-related interactions before, during, and after the reading of the story. For all treatments, these sessions were repeated over three consecutive days to maximize vocabulary and comprehension gains. The authors found that the interactional reading-aloud style had statistically significant effects compared to the other read-aloud styles. Students acquired more vocabulary from stories read aloud with word explanations done throughout the lesson. Performance reading did not produce maximum gains in vocabulary. The interactional read-aloud style also produced a significant effect for comprehension, with the effect size being larger for third grade students compared to first grade students. Therefore, Brabham and Lynch-Brown (2002) proposed that teachers should time their word explanations to occur throughout the lesson to facilitate word acquisition and comprehension from read-alouds in the early primary grades.

Students who read multiple texts scored higher on history content and used the heuristics of a historian—sourcing and corroboration—more often than those who read traditional textbook material.

Similarly, in the first of two studies on which they reported, Beck and McKeown (2007) found that students from an urban low-achieving all African American primary school

learned significantly more words when advanced vocabulary from books was taught deliberately than when the books were just read aloud. The mean gain for 52 kindergarteners in experimental classes was 5.58 words compared with 1.04 words for the 46 students from comparison classes and the effect size was strong. In contrast to Brabham and Lynch-Brown's (2002) study, vocabulary instruction took place after the story had been read and discussed because the authors' goal was to enhance general vocabulary development rather than comprehension. Thus the story only provided a rich context with which to spur vocabulary growth.

In the second study which took place in a different school in the same school district, Beck and McKeown (2007) found that the vocabulary gains were twice as large when the vocabulary instruction time doubled and the results showed that more vocabulary instruction was beneficial for both kindergarteners and first graders. The words taught in this second study were largely

adjectives and adverbs because they were more abstract and thus conceptually more difficult. In learning the words, children were asked to make decisions about the appropriateness of contexts for the words they learnt, develop new uses for new words, and explain whether these uses made sense.

Murnane, Sawhill, and Snow (2012) underscored that the practice of reading aloud is particularly good for struggling readers in the primary grades because these students find it daunting to decode multisyllabic words, i.e., translate the sounds or meanings of these words from the written to spoken form. Releasing the need for these students to decode therefore allows them to discuss and evaluate competing interpretations of a character's actions and competing explanations for physical phenomena without having them read the texts. These students can subsequently read and integrate information from different sources, thus engaging in deep comprehension activities.

More curriculum time for children's learning

Murnane, Sawhill, and Snow (2012) advocated more curriculum time for children's learning in the primary grades especially in content area subjects as more time would help children acquire the necessary skills in vocabulary, conceptual and content knowledge, and comprehension, skills that are essential in the middle grades and above to read texts of increasing complexity and more varied genres. They believe that this will help ease the transition from the lower primary to upper and post-primary grades where students with marginal reading skills and good readers with limited vocabulary stores face the challenge of reading texts whose literacy demands deviate from those of books that these children read in earlier grades.

Duke and Block (2012) argued that although expectations of what children should be able to do at the end of primary grades were greater than what they had ever been, the amount of curriculum time had not kept pace with these increased demands. They suggested that educators and policy makers needed to consider

lengthening the school day or year, making full-day kindergarten available to all children, investing heavily in preschool education, and making more deliberate use of the time that students have outside of school.

Long-term orientation towards reading instruction and reform

Duke and Block (2012) proposed a long-term orientation towards reading instruction and reform in schools because they believe that one of the key obstacles that had prevented the adoption of best practices in teaching reading was a short-term orientation towards reading

Educators need to think about the different needs of proficient and less proficient readers when they plan reading instruction.

instruction and reading instruction reforms that focused on easier-to-learn reading skills at the expense of harder-to-master reading skills such as the teaching of vocabulary, conceptual and content knowledge, and reading comprehension strategies. They think that schools tended to have a short-term orientation towards reading instruction and reform as it was easy to show reading improvements in terms of phonological awareness, alphabet knowledge or letter-sound knowledge, and word reading in a short period of time. In contrast, it was harder for schools to show gains in reading comprehension, vocabulary, and conceptual knowledge quickly because they were harder to measure and harder to achieve.

Professional development for harder-to-master skills

Duke and Block (2012) underscored that a major obstacle to improving reading in the primary grades in American schools was teacher expertise because the curriculum alone could not bring about changes in students' development of vocabulary, conceptual and content knowledge and reading comprehension skills. Therefore, they supported professional development for harder-to-master skills such as vocabulary, conceptual and content knowledge, and comprehension. This lack of skills may have resulted in the teachers' avoidance of teaching these skills to their students, focusing instead on easier-to-master skills such as decoding.

Disciplinary reading in the secondary grades

Shanahan and Shanahan (2012) highlighted that, entering the secondary grades, students are engaged in reading practices that differ substantially across disciplines. They need to be socialised into literacy practices specific to each discipline when they read in their areas of specialization. Instructional programmes need to teach students to ‘read like a scientist’ or ‘read like a historian’.

To date, there have been a few quantitative studies investigating the effectiveness of disciplinary reading at improving literacy achievement or subject matter success in secondary schools (De La Paz & Felton, 2010; Nokes, Dole, & Hacker, 2007). Nokes, Dole, and Hacker (2007) conducted an intervention that involved 246 students, aged 16 to 17, in eight history classrooms in two secondary schools in the United States. The students were randomly assigned to one of four interventions to test the effectiveness of different types of instruction and texts on secondary school students’ learning of history content and a set of heuristics that historians use to think critically about text. Students who read multiple texts scored higher on history content and used the heuristics of a historian—sourcing and corroboration—more often than those who read traditional textbook material. The findings of this study suggest the value of having a collection of thoughtfully selected texts for the learning of historical content. Students who were taught the heuristics with multiple texts also scored significantly higher than their counterparts who used traditional textbooks with or without heuristics to study content. Thus, the authors felt that this provided empirical support for the teaching of historiography along with content in the history classroom.

De La Paz and Felton (2010) found that an experimental group of 81 students receiving instruction in historical reasoning and a pre-writing strategy for composing argumentative essays, wrote essays that had significantly greater historical accuracy, and were significantly more

persuasive than those of the comparison group of 79 students. Both groups of students read the same primary and secondary source documents, and received feedback on written essays on the same topics. What was different was the instruction received. Teachers instructing the experimental group modelled the historical reasoning heuristics and the planning strategy for writing an argumentative essay. Students learnt strategies for reconciling primary and secondary accounts offering conflicting information or perspectives of a historical event, and to plan and compose argumentative essays. However, it should be noted that unlike Nokes, Dole, and Hacker’s (2007) study, it is unclear the extent to which the historical reasoning heuristic strategy contributed to the higher quality student work compared to the writing argumentative essay strategy.

To ensure that they teach disciplinary reading effectively, Shanahan and Shanahan (2012) believe that educators need to think about the different

The activation or building of important knowledge is an essential component in preparing students for reading.

needs of proficient and less proficient readers when they plan reading instruction. They propose that proficient and less proficient readers might need differentiated reading procedures. For less proficient readers who get easily distracted or who do not think much or well about what they are reading, teachers can have them summarize what they read, ask questions about information in the text, and set purposes for their reading. For proficient readers who do not have trouble concentrating on the text but who do not always engage in the highest levels of interpretation, reading strategies could include guiding students to think more effectively in a discipline-specific manner. However, Shanahan and Shanahan (2012) also pointed out that struggling readers could also benefit from disciplinary reading approaches because these instructional approaches might stimulate them to engage with text.

Earlier researchers suggested that to promote literacy engagement in adolescents, students should be given a choice of books (Goldman, 2012; Harmon, Wood, & Stover, 2012; Thames & York, 2003), a choice of topics (Harmon, Wood, & Stover, 2012), and a choice in the order they completed a task (Harmon, Wood, & Stover,

2012). However, Harmon, Wood, and Stover (2012) cautioned that while choice was important, a balance between student choice of text and teacher selection was needed to ensure that students were given academically significant and realistic choices.

Harmon, Wood, and Stover (2012) suggested that when choosing texts for adolescents, teachers needed to choose texts that were accessible to their students as texts that were too difficult for students, even with support from the teacher or peers, might not be productive for learning. They also argued that students were not able to successfully engage in higher-level, critical reading of texts that did not match their ability level. Teachers might have to modify instruction or texts so that students' understanding of the texts can be supported or extended (Bain, 2010; Reisman, 2012b; Roberts, 2013). Roberts (2013) noted that as students become more familiar with the language of a given discipline, the need to modify the text will diminish. Reisman (2012b) described how his research team modified primary source documents such as historical government reports, diaries, letters and speeches according to three principles of adaptation: (a) focusing, (b) simplification, and (c) presentation. They first excerpted from each source the portion of the document that shed light on the historical question under investigation. Second, they simplified the vocabulary, conventionalised spelling and punctuation, and re-ordered sentences into more straightforward sentences while attempting to preserve the document's original language and tone.

The following sections show what teachers can do before and during the reading of the text to help students make meaning from it.

Before reading

Researchers have suggested the following pre-reading activities for use in the classroom (Harmon, Wood, & Stover, 2007; Reisman, 2012a; Reisman, 2012b; Roberts, 2013): (a) the activation or building of important knowledge to stimulate

interest and motivation to learn, (b) the stimulation of interest and motivation to learn the topic to be addressed, (c) the provision of a purpose for reading, (d) explicit instruction on genres and discourse structures; and (e) the provision of reading tools such as organizers.

The activation or building of important knowledge is an essential component in preparing students for reading (Harmon, Wood, and Stover, 2007; Reisman, 2012a; Reisman, 2012b; Roberts, 2013). Teachers could begin their lessons with a review of relevant background knowledge in the form of a lecture, a video, or textbook questions, or prime students' background knowledge by offering them an incomplete or inaccurate account of a historical event, for example (Reisman, 2012b). This could help their students activate and use relevant background knowledge to fully understand a text (Goldman, 2012; Lesaux, 2012) by relating the concepts within the text with what they have already acquired.

Students who participated in classroom discussions using mathematical language scored higher on standardised achievement tests of reading and mathematics than those who did not engage in such talk.

Harmon, Wood, and Stover (2012) proposed stimulating students' interest in learning the topic to be addressed. This interest to read the text will motivate them to start and finish reading it (Lesaux, 2012). At the same

time, teachers could provide students with the purpose for reading the text (Harmon, Wood, & Stover, 2012; Murnane, Sawhill, & Snow, 2012; Thames & York, 2003), and reading tools such as organizers (Goldman, 2012). These reading tools could highlight the different text genres explicitly taught by teachers (Murnane, Sawhill, & Snow, 2012).

During reading

During the reading process, the use of prompts has been proposed to stimulate response and help students grapple with important and difficult concepts (Murnane, Sawhill, & Snow 2012). Demonstrating how to understand difficult oral and written texts can be particularly helpful to students who struggle with such texts (Harmon, Wood, & Stover, 2012; Murnane, Sawhill, & Snow, 2012). Giving students multiple documents offering different perspectives can reinforce the value of multiple perspectives to decode sources

of evidence (Bennett, 2011; Roberts, 2013). Letting students engage in repeated readings of the same text helps students to become more efficient in recognizing words, especially high frequency words, and in increasing their reading rate, as well as to broaden their understanding, develop conceptual ideas, clarify information and find new facts in content area classrooms (Harmon, Wood, & Stover, 2012).

Having students discuss the texts as a class, group or pair is helpful as learning occurs through social interaction (Bennett, 2012; Goldman, 2012; Harmon, Wood, & Stover, 2012; Reisman, 2012b; Thames & York, 2003). Goldman (2012) found that in the nine interventions that she reviewed, by focusing on varied types of text from science to history, and sharing a dialogic orientation, students were more active in articulating meaning in and around text and had improved literal and inferential comprehension. Goldman (2012) described an approach to teaching literature that was developed and tested by Judith Langer and her colleagues, which focused on classroom discussion. Langer and her colleagues found that dialogic classroom discussion was significantly related to performance on tasks requiring students to adopt interpretive stances in literature.

Goldman (2012) also cited studies by Catherine O'Connor and her colleagues which examined the impact of introducing a conceptually based mathematics programme with dialogic discourse to students from grades four to seven on their reading and mathematical achievement. The teachers in these studies encouraged students to provide multiple answers to a problem, to explain how they arrived at the answer, and why their method worked. In the event of students having different methods, the teacher facilitated discussion of why more than one method worked. If the answers were different, the teacher asked which answers were the most reasonable in mathematical terms. Teachers voiced students' contributions in mathematical language. The results of this study indicated students who participated in classroom discussions using mathematical language scored higher on

standardised achievement tests of reading and mathematics than those who did not engage in such talk.

Professional development to improve disciplinary reading

There has been research reported on professional development to improve disciplinary reading instruction (Lesley & Matthews, 2009; McArthur, 2012; Pytash, 2012). Courses dealing with reading in the content areas were found to be not favourably received by pre-service teachers because the one-size-fits-all approach did not take into account the literacy practices that are specific to each discipline (Pytash, 2012). Content area reading strategies were perceived as teacher-directed study skills and textbook-based reading skills that drained time away from content area instruction (Lesley & Matthews, 2009). Pytash (2012) explained that teacher educators were in the process of moving pre-service education courses from content area literacy instruction for content subjects to a more discipline-specific literacy instruction as conceived by Fang and Schleppegrell (2010), Moje (2008), Olson and Truxaw (2009), and Shanahan and Shanahan (2008).

Another issue to be addressed is that pre-service teachers demonstrated behaviours reminiscent of passive, reluctant and struggling readers, possessed little self-efficacy as readers, and showed negative literacy identities as readers (Lesley, Watson, & Elliot, 2007). Lesley, Watson, and Elliot (2007) argued that such deeply rooted negative attitudes towards reading might deter these teachers from teaching reading in their content area classrooms and they believed that teachers needed to see themselves as capable of reading across multiple genres of text within their discipline and across disciplines. Both pre-service and in-service teachers also need to see reading and writing as tools that students need to develop subject matter knowledge (McArthur, 2012). To help pre-service teachers become better readers in at least their own discipline so that they can role-model reading in their discipline, researchers have investigated the following

Both pre-service and in-service teachers also need to see reading and writing as tools that students need to develop subject matter knowledge.

professional development programmes involving pre-service teacher participants as readers (McArthur, 2012; Pytash, 2012):

- (a) Doing a metalinguistic think-aloud journal (McArthur, 2012);
- (b) Writing reflections of their experience as readers and of the implications for classroom practice (McArthur, 2012; Pytash, 2012);
- (c) Discussing genres particular to their discipline (McArthur, 2012);
- (d) Analysing anchor texts representative of a genre (Pytash, 2012); and
- (e) Closely following teacher educators annotating a text and closely studying a piece of writing for structure, purpose, audience, form, content, language and mechanics (Pytash, 2012).

McArthur (2012) emphasized that pre-service teachers should recognize the importance of background knowledge, technical vocabulary, the lexical density of text, and specialized knowledge needed to understand a given text when they plan lessons and select texts for their lessons. To help her pre-service teachers think about disciplinary reading, she gave them a metalinguistic think-aloud journal assignment where they had to write their thinking associated with what was written in a text related to their discipline. However, she first modelled the thinking she did while reading a new text related to her discipline. She then asked the pre-service teachers to choose a primary source document from their field and complete the journal at home. Next, the teachers partnered with someone outside their discipline to discuss the ways of thinking, background knowledge, text structures and text features, specialized language and cognitive reading strategies that they encountered while reading the document. For example, history majors shared that reading in history always began with finding out the author of the document and the time period while a mathematics major explained that visualising was important in his discipline. These discussions helped them to understand better the reading strategies specific to their discipline and how they could plan their classroom instruction to

communicate to their future students the way experts approach the reading of a text.

Thus, in pre-service education, Bain (2012) suggested that teacher educators could identify practices of discipline-specific reading for learning content and frame them in a way that would help pre-service teachers use them in their teaching. For instance, when selecting a text, Bain (2012) explained that history teachers are required to understand the content as well as anticipate their students' understanding of the content so as to be able to identify the texts that can support, extend or challenge their students' thinking. If teachers think that the text might contain challenges for their students in terms of structure, vocabulary or assumed background knowledge, they will need to frame their instruction in such a way as to help students establish the purpose for using the text, develop the knowledge necessary to comprehend it, and the skills required to read it.

One possible way of easing the transition necessary for literacy instruction is for pre-service teachers to work with skilled veteran teachers who have been carefully selected to model a particular aspect of effective teaching (Bain, 2012). Bain (2012) suggested that pre-service teachers could go to a wide range of instructional settings and work on important practices—selecting and using texts for instruction, planning for instruction, assessing and learning from students, and developing student writing—in different settings before they start their student teaching.

Conclusion

To help prepare our students to cope with the increasing demands in school and the workplace, we need to address issues related to the amount of curriculum time spent in helping students reach a high level of literacy, the type of instruction that fosters the development of literacy, and the professional development needed to implement reading instruction in both English language and subject content classrooms. The quoted research indicates that in the lower primary grades, teachers need to have a more deliberate and systematic approach to teaching vocabulary to allow students to acquire enough vocabulary to develop conceptual understanding in subject

matter in the upper primary and secondary grades. Teachers in the upper primary and secondary grades need to engage in discipline-specific reading instruction to support student learning. Leaders in education also need to have a

long-term orientation towards reading instruction and reform for both primary and secondary grades in order to bring about the necessary changes that will enable students to engage in disciplinary reading.

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