‘COULD THAT REALLY HAPPEN?’ ELEMENTARY INQUIRY AROUND INFORMATIONAL AND NARRATIVE TEXTS

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Abstract

Attention to literacy has raised attention to the use of texts in science learning. Elementary teachers are encouraged to use informational texts in their science teaching. Students need to learn to read and make sense of information from these texts. Concurrently science educators focus on helping improve the inquiry skills and practices taught in schools. An assumption is that children can learn about inquiry by using informational texts to find answers to questions. This research describes findings from a longitudinal case study of one classroom. The findings suggest that students tend to raise questions and engage in inquiry oriented activity when responding phenomena represented in narrative texts. Students’ utterances raise questions or attempt to explain phenomena occurring in narratives. In comparison, students’ responses to informational text tend to be conceptual. Students’ utterances made limited connections to phenomena and did not offer explanations or inquiries about phenomena. The findings reported here suggest a role for carefully selected narrative texts as contexts to engage students in meaningful inquiry about phenomena. This does not reject informational texts as valuable, but restructures notions about how different text genres are meaningful and useful in science learning.
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Subject/Problem

National standards call for students to learn about and participate in scientific inquiry (National Research Council, 1996, 2000). One problem is that the vague definitions often leave teachers unsure about how to teach and engage students in inquiry. This problem is confounded by the fact that elementary teachers face many curricular demands for student performance (Mathison & Freeman, 2003). One recommendation is to develop integrated learning experiences including reading appropriate text genres in science learning (Ford, Yore, & Anthony, 1997; Ford, 2004; Hapgood, Magnusson, & Palincsar, 2004; Magnusson & Palincsar, 2004; Pappas, Varelas, Barry, & Rife, 2004). While it is important to help students gain familiarity with different text genres, this research questions whether familiarity with the genre provides the kind of restructuring that will facilitate learning about text genres and about scientific inquiry. The research question for this study is: in whole class discussions about different text genres, how does students’ discourse vary around issues of inquiry including: identifying meaningful scientific problems, raising questions that drive inquiry, and generating theories or explanations of phenomena?

Relevant Research

Elementary classrooms infrequently use informational texts. The result is that students are not familiar with the genre making it difficult for students to interact with and make meaning
from these texts. (Duke, 2000) Research also suggests that using informational texts in elementary classrooms provides students experiences with the kind of language that scientists use (Pappas et al., 2004). Finally informational texts, especially trade books, can serve as tools in inquiry to facilitate students’ sense-making and developing understandings based on inquiry (Ford, 2004; Pappas et al., 2004). The outcome of these and other\(^1\) findings is that there are benefits to engaging students in the use of informational texts. In particular Pappas et al. (2004) showed that informational texts provide opportunities for teachers and students to engage in dialogic inquiry. Few studies compare students’ discourse about phenomena in informational and narrative texts; does students’ discourse generate student-motivated scientific inquiry? How does students’ co-constructed discourse vary when comparing these genres?

Since this study is concerned with students’ learning about inquiry, research examining young learners’ inquiry and reasoning about phenomena is important. Research describes the nature of the classroom community that support students’ inquiries (Herrenkohl, Palincsar, DeWalter, & Kawasaki, 1999) as well as the inquiry process (Whitin & Whitin, 1997). Studies also examine how certain text structures support students’ development of scientific reasoning, though not necessarily their engagement in inquiry (Hapgood et al., 2004; Magnusson & Palincsar, 2004). Related these findings, research describes how students reason about phenomena (Rath & Brown, 1996) and use logic of informal reasoning and imagination to explain phenomena (Warren, Ballenger, Ogonowski, Rosebery, & Hudicourt-Barnes, 2001). But as these findings intersect, a question arises about the ways that different text genres invite students to bridge their everyday worlds with scientific inquires about phenomena in experienced and imaginary contexts.

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\(^1\) Many studies have examined many facets of issues of reading and writing in elementary science classrooms. Space does not permit a full review in this proposal.
Theoretical Framework

This study assumes that participants negotiate situated meanings in contexts to explain phenomena as well as communally validate which questions and inquiries are meaningful and useful (Lave & Wenger, 1991). Such negotiation occurs in discussions which create dialogic interactions that allow for the definition of meanings and participants in relation to one another (Bakhtin, 1986). Thus communities both define contexts and explanations that are meaningful to the members of the community and the questions and evidence that will be validated as relevant and useful.

In terms of the process of situated meanings and communal validation, it is important to have perspectives describing how discourse allows the construction of meaning. Lemke’s (1990) description of semantic relationships and thematic patterns explains how students’ utterances help facilitate co-construction of meaning and helps describe students’ reasoning and inquiries. Discussions in elementary classrooms may not reveal the complex semantic relationships and thematic patterns described by Lemke (1990). Yet the constructs are useful in analyzing students’ co-construction of accounts. Since, co-construction relies on students’ utterances becoming taken as shared (Cobb, 1994; Cobb & Bowers, 1999; Cobb & Yackel, 1995) the semantic relationships and thematic patterns also help identify instances of students’ collaboration on inquiries, evidence about what students find meaningful in answering questions, and the approaches that students use to answer their inquiry questions.

Methods

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2 Here utterance means the single oral language meaning unit. This does not necessarily mean a sentence. Linguists (e.g. Grice, 1999, Austin, 1999, & Bahktin, 1986) argue that utterances are more appropriate analytic units in discourse analysis.
Design – data

The study was part of a larger study that took place over two years in a multiage-looping elementary classroom in a neighborhood school in an urban district (Weiner, 2000). Consistent with typical assumptions, the students were predominantly minorities from low-income families. However, contrary to common assumptions, the classroom was well equipped with materials, books, and supplies. Students had a great deal of student autonomy, necessary to facilitate a multi-age program. Whole group instruction was limited but did occur. In all content areas there was limited use of textbook based curriculum materials. Students wrote in journals in all subject areas. Finally, whole group talk was a regular activity of this classroom; as a result students had multiple experiences talking about their ideas.

The data for this study were purposefully selected from the larger study in order to have comparison cases of data relevant to the research question. The primary data consist of video-recorded whole-class discussions focused on reading and responding to texts in one elementary classroom. Discussions were selected that focused on reading and responding to narrative and informational texts. Furthermore, within each video-recording multiple events occur. For example the teacher might lead students in a discussion, then read one of the texts, then lead a follow-up discussion about the text, and ask students to apply information from the text to a new context. This study focuses on reading events. Therefore, only those events related to the ext are included in analyses. This allows comparison of students’ discourse in response to the two different genres of texts. The discussions were primarily student directed, with the teacher assisting them in moderating and also scaffolding student entry into the discussions.

Analytic Framework and Methods
The theoretical framework for the study guided the analytic framework examining students’ co-construction during discussions, instances of intertextuality with texts read, and utterances that led to instances of inquiry. The analysis focused on students’ utterances as they engaged with and discussed in whole group discussions informational and narrative texts. Coding schemes were developed to examine three aspects of discourse: intertextual engagement with text, utterances that indicated attributes of inquiry, and students’ interaction with and uptake of one another’s ideas. The coding schemes were resulted in hierarchical codes based on the work of Pappas et al (2004) for intertextuality, the National Research Council (2000) for inquiry, and standard notions about repetition and revoicing to determine uptake of one another’s ideas [refs]. These codes can be represented as follows:
Video recordings were coded, focusing on students’ discourse using Studiocode (XXXX). Studiocode software produces timelines, frequency counts, and graphical representation of coded video recordings. The analysis did not examine the texts read, only
discourses associated with the reading of each text. Based on these analyses it was possible to produce frequency charts to identify instances and patterns in student engagement with text. Looking at timelines produced in Studiocode also facilitated the creation of categories that identified points of intersection of intertextuality and inquiry instances.

Video recordings were also summarized in narrative annotations which described the text briefly and the core events of the video recording. These narrative annotations were used to derive a sense of the larger context of reading events. These narratives, in conjunction with transcripts and multiple reviews of the video recording allowed the comparison of the different reading events.

The following coding scheme was developed based on theoretical principles described above. Table one lists the qualities and values assigned to each quality. For intertextuality these included: interpretation, relating to phenomena, and impetus for making connections. Inquiry categories included: asking questions, relying on evidence, and making explanations. In each category qualities were defined. These categories and codes are summarized in Table 1.

Table 1: Rating scale for reading events

<table>
<thead>
<tr>
<th>Intertextuality</th>
<th>Interpretation</th>
<th>Relate to Phenomena</th>
<th>Impetus</th>
</tr>
</thead>
<tbody>
<tr>
<td>interpret = 3</td>
<td>specific in-class = 3</td>
<td>student = 3</td>
<td></td>
</tr>
<tr>
<td>relate = 2</td>
<td>specific home = 3</td>
<td>teacher = 2</td>
<td></td>
</tr>
<tr>
<td>retell = 1</td>
<td>generic = 1</td>
<td>text = 1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inquiry</th>
<th>Ask Question</th>
<th>Evidence</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>explanatory = 3</td>
<td>personal = 3</td>
<td>evidentiary = 3</td>
<td></td>
</tr>
<tr>
<td>phenomena = 2</td>
<td>patterns = 2</td>
<td>causal = 2</td>
<td></td>
</tr>
<tr>
<td>descriptive = 1</td>
<td>anecdotal = 1</td>
<td>authority = 1</td>
<td></td>
</tr>
</tbody>
</table>

Then each reading event was rated along these qualities for observable characteristics to rate each reading event. Using this rating scale, entire reading events for each book were coded
to give each book a numeric score for each category to arrive at a cumulative score for intertextuality and inquiry (max 9). This allowed generation of quality scores in terms of the reading event.

Findings

Analysis reveals that students engaged differently with the two text genres. Text genre did not significantly or uniquely impact students’ attempts at co-construction based on the text. This is to say that students were no more likely in one genre than another to share ideas and build on one another’s utterances. However, each transcript reveals differences between the nature of co-construction around the text read. Analysis reveals genre specific patterns in students’ co-construction around: interpreting text and/or pictures, sharing intertextual references with the text and one another, and proposing questions and explanations for phenomena represented in the text. Findings relevant to these issues are described in this section. The section begins with general descriptions of the texts and students’ interactions with the text. Then students’ intertextual and inquiry orientations are examined. Finally the intersection of intertextuality and inquiry are described.

Descriptions of Texts & Students’ Interactions with the Texts

The following descriptions, classify the books read as expository or narrative, summarize the books, and identify and quantify students’ interactions with each text. Frequencies of instances of interactions are listed in parentheses after each type of interaction for each book. These descriptions intend to provide a broad context and limited data about the texts and their use. More detailed data and analyses are provided below:
• **Tadpole Diary** – Expository Text – This leveled text primarily presents information, using a somewhat narrative format. Information is communicated through the text in the form of a generic science journal that documents a classroom observing tadpoles becoming frogs. The text was written based on experiences by a group of students, synthesizing the groups’ experiences into a single volume for use in shared reading contexts with other elementary students. After reading the book students’ discussion involves a significant amount of intertextual connections to the students’ experiences in the classroom (7). Students’ classroom experiences focused on live tadpoles in the classroom to observe. There are many instances of inquiry (23) in the discussion. These are based on reviews of students’ writing in a classroom tadpole observation journal (6), brainstorming questions students had about tadpoles (4), and considering evidence in the observation journal (6), in the context of a pre-reading discussions (5), and during reading (2). The teacher, either through scaffolded discussion or questioning, prompts all but one of these instances. Furthermore only one question relates to reading the text.

• **Push and Pull** – Expository Text – This Big Book was read as part of a longer lesson that also involved looking at the illustrations in a narrative text (see 3 Pigs below). The book, read in a whole-group reading context, provides basic information about forces (described as pushes and pulls). The text focuses on contact forces, but also includes gravity. During a pre-reading discussion, the students make intertextual connections with prior reading (4) and a group investigation about rolling objects (1). As the teacher reads the book there are limited indications that students are interpreting or making sense of the text in any way. After reading the teacher leads a brainstorming discussion in which students share examples of forces in the natural world (7 instances). The students’ examples could be based on the text;
but there is no clear evidence to support that claim. When the teacher reintroduces the narrative text in this context and asks the students to think about how the informational text relates to the narrative, there is one instance of intertextuality between the texts.

- **Investigating Rocks** – Expository Text – This Big Book describes rocks, rock formation, and geologic formations. The book shows pictures of rocks and rock formations. The book also describes processes that form rocks. During whole class shared reading and discussion there were several interactions with the text. Students’ interactions with the text included observing and describing rocks and geologic formations pictured in the book. Students make limited intertextual connections to other texts (1) and a few intertextual connections to generalized events (3). The interesting points are when students relate phenomena presented in the text with phenomena in their own lives. The students also respond to questions in the text, but fail to rely on the information in the text to explain phenomena or answer questions. One instance is unique because students interpret a graphic image showing layers of the Earth and relative temperatures to offer an explanation about how the Earth gets hotter closer to the core.

- **Wind** – Expository Text – This leveled reader explains causes of wind. Reading this book is a unique event because the teacher introduced the book to help students answer a question that arose in a whole group discussion. During the discussion students described observations of phenomena (8) and attempted to explain those phenomena (6). However, students were unable to describe or explain causes of wind. After reading students made two intertextual connections with the text. One involved interpreting the explanation of wind. The second involved using information from the text to explain phenomena they had experienced and
were part of prior discussion. The teacher coached students toward both of these intertextual connections.

- **Three Pigs** – Narrative Text – This story was previously read as part of an on-going unit about fables and fairy tales. Previously the students had identified an event in the story that they thought was interesting or problematic from the perspective of the phenomenon represented. Using that phenomenon as motivation, students designed investigations to test the accuracy of the representation. In the analyzed lesson, the teacher showed each page of the book, asking students to identify forces represented in the book. When students looked at the illustrations in the book, they made connections with hands-on investigations (2) and other books (3). When looking at the illustrations, students do engage in inquiry oriented activity, including identification of evidence for the natural world (3) and challenging the accuracy of an explanation (1).

- **William and the Magic Ring** – Narrative Text – This unique book uses shadows to create the illustrations in the book. The story, written in verse, tells about the imagination of a little boy who sees different shadows formed in his room at night. To read the story the class went to a room in the building without windows so that the cast shadows would be more distinct. The students were excited and focused on the story when it was being read, making comments like ‘cool’ or ‘this is getting good,’ but made only one intertextual connection while reading. When the teacher finished reading the story, the students were asked to share something they liked about the story or why they thought this was a good story to read in science. The students’ commented on their experiences (personal and in the story) with shadows (6), general explanations of shadows (3), and aspects of the story that they found compelling (8).
• **Dreams** – Narrative Text – This book tells a story in which a paper mouse falls from window in a tall apartment building. As the paper mouse falls it is blown by the wind and casts shadows on the walls of the building. The book was read aloud in a prior lesson. Students identified that there were aspects of the illustrations that seemed improbable in reality (3) and attempted to explain why these might be probable (2). During this lesson, the illustrations are re-examined and modeled to consider representation of shadows in the illustrations. Modeling the phenomenon represented in the book raises additional questions and a problem (1) by the students (4). However through shared investigation and modeling, the students arrive at explanations (2) of shadow phenomena illustrated in the book.

• **Little Cloud** - Narrative Text – This picture book tells about a cloud that undergoes changes and eventually becomes a rain cloud. Students make only two intertextual connections with the text. The students do ask questions (2) about things that happen and appear in the text. In contrast when the teacher asks students to predict what will happen in next in the story, the students’ predictions (2) suggest that they rely on experiences with phenomena to imagine what might happen. After reading the book, the class observed images of clouds projected with an overhead and wrote descriptions of the clouds.

In summary, there were four expository texts and four narrative texts examined in this study. Students’ interactions varied and will be explored in greater detail in the following subsections.

*Students’ Intertextual Connections*
This section focuses on students’ intertextual connections with the different texts used in conjunction with science learning experiences. To begin with, it is important to recognize that the data reported in this manuscript focus on the reading events in which a particular book was being read. All such events are bounded by discourse either in pre-reading events, in follow-up discussions, and/or discussions of first-hand investigations. In particular this section presents data from two perspectives: the broad findings in terms of themes of intertextual connections and also in terms of specific types of intertextual connections that students made during reading.

**Themes of Intertextual Connections**

Intertextual connections with texts refer to the moments in which a student or the teacher relates the book being read to another text. The construct of ‘text’, following the theoretical framework for this study, refers broadly to linguistic resources shared by the class including questions generated by teacher and/or students, students verbally described personal experiences, students’ first-hand experiences in the classroom, students’ written work, and other books, texts, and written materials. In addition, it will be interesting to consider when students generate questions and/or make inferences about phenomena presented in the book.

Using the coding scheme described above, patterns in instances were collapsed into themes of intertextual and inquiry instances. Ten themes arose in the data. These were: Student Identified Problem in Text, Student Question: Phenomena in text, Student Question: General Phenomena, Student explanation of phenomena in text (or peer?), Student inference/prediction about phenomena in text, Text stimulates hands-on investigation, Text used to answer student question, Text is related to phenomena, Teacher raises question connecting text & phenomena, and Text related to another text.
The findings for students’ intertextual connections along these themes in the context of reading events are summarized in Figure 1 below. The figure combines the findings for each book to help compare the books with one another.

![Figure 1: Intertextual Connections](image)

One observation from data reported in Figure 1 findings is that there were only 3 books that generated more than 10 intertextual connections for students. Of these, two were expository and one was narrative. In contrast, when we consider the variety of types of intertextual connections that students made, a slightly different image of the data emerges. On average, expository texts yielded fewer types of intertextual connections than did narrative texts.

**Specific Intertextual Connections**

In terms of intertextuality, there is an interest at the most basic level whether students make connections between the text being read and some other text. If this is constrained to consider the number of instances in which children refer to another text, there are few instances in this data set. Figure 1 above shows that students did this one time in two of the expository texts and one time in two of the narrative texts. It was uncommon for students’ utterances to refer to another text or reading in this data set.
However, students did interact with texts in ways that might lead to or be described as making intertextual connections. One very common interaction with text was for students to make observations, interpretations, or predictions about what things represented in the text. As shown in Figure 1, students interacted with texts in this way in all but two of the books read. It is worth noting that the two books in which students did not observe, interpret, or make predictions were both expository texts. However, it is also important to note that of these interactions, in two of the reading events, the teacher scaffolded such interactions by asking students questions about the texts. Furthermore, these interactions can be challenged as not actually representing intertextuality since they represent instances in which students talked about the book being read, but did not necessarily connect the book to previously read texts, classroom discussions, or experiences.

The most common intertextual connection made by students was to connect phenomena in the natural world with phenomena in the text. This happened in all but one of the reading events. The one standout, reading the book Little Cloud, was actually read by a student teacher as one of her first lessons. The book is a short narrative that personifies a cloud growing larger. Furthermore, the book seems to be an opening activity, setting the context for a larger activity about describing cloud features. This context resulted in few opportunities for students to connect the book with phenomena in the natural world. In the other reading events, the teacher was very instrumental in scaffolding students’ relating the books to phenomena in the natural world. However, students independently and spontaneously made intertextual connections with phenomena when reading four of the eight books (evenly split between expository and narrative texts).
Students’ Inquiry

The other aspect of this study considers the ways students’ interactions with and responses in reading events reveal their engagement with scientific inquiry. Scientific inquiry in this manuscript follows the principles defined in Inquiry and the National Science Education Standards. While a number of these things have been implicit above some specific issues are important to examine further. The findings reported below focus on students identifying meaningful problems in the text, students asking phenomenological questions, and having books lead to the development of empirical investigations of phenomena.

Identification of meaningful problems

Fundamentally science is about explaining phenomena in the world. Books and stories, excepting highly imaginative fantasy stories, are situated in contexts in the natural world. As a result picture books (the type of books focused on in this manuscript) that are both narrative and expository include representations (either photos or illustrations) of phenomena in the world. However, it is possible that these representations can inaccurately represent phenomena from the perspective of science. In this study one of the books stands out uniquely in comparison to the others. The book, Dreams, is a narrative that has a paper mouse as the central character. The paper mouse falls and creates shadows on the walls of a tall apartment building. When reading the book, students identified a number of problems in the illustrations that did not fit their ideas about what was possible in the natural world. One student says, “I don’t understand how there can be shadows if it is night.” Another student helps explain that there are streetlights that make the shadows. The first student responds that she didn’t see a streetlight in the book. Similarly another student comments that, “the shadows don’t make sense entirely.” Thus students were identifying problems in the illustrations that did not reflect their conceptions of the natural world.
This type of discussion only occurred in this narrative book. However, it is included as a finding since the explanation of phenomena is at the heart of science. Such instances represent students trying to explain phenomena in the context of a reading event.

Asking questions about the text and about the world

We often think of asking questions as being a hallmark of inquiry. Thus, it is interesting to consider the questions that students ask in the context of reading events. Students’ questions can be both about phenomena represented in the text and also about phenomena that could be answered by reading expository texts. The following findings present students’ questions about phenomena in the text and also their questions about phenomena that they hope to answer through reading.

When looking at using texts to answer students’ questions, it is not surprising that students are more likely found in the context of reading expository texts. Figure 1 above shows that there was only one observation of students using text to answer a question. This occurred when reading Tadpole Diary an expository text. However, expanding this notion to include the teacher’s actions in these reading events, there are a number of instances in which the teacher scaffolded questioning in order to help students connect information and ideas in reading events with phenomena. For example in one case, the students were discussing how wind affected different objects. Through this discussion, it became clear that students could not explain what caused wind. The teacher introduced a book that explained the causes of wind. Then the students, with help from the teacher, applied their new understandings of wind (based on the reading) to relate weather conditions on the day that they made observations and the ways that wind was affecting objects in the air (bubbles). Thus students used the text to answer a question, though one that was prompted by the teacher, about wind. Similar kinds of events occurred in all
the reading events except one. The one exception, reading Little Cloud, did include questions, but these were of a different type.

The other kind of questions that occurred in during reading events involved students asking questions about phenomena in the book. For example in the discussion described above in response to the book Dreams, students eventually began asking, ‘how could the shadows shown in the pictures get formed?’ The reading of Little Cloud, while it did not generate much discourse, did raise on question of this type. As the story goes on, the cloud becomes bigger. At one point the teacher reads, “…and Little Cloud grew bigger.” To this one young student responds, “Why [did the cloud get bigger]?” Such questions engage students in asking, ‘could that really happen?’ or ‘why did that happen?’ in reference to illustrations and images in books. The interesting thing is that this kind of question occurred more commonly in reference to narrative texts (9 of 11 instances; see Figure 1). One expository text did generate student questions about phenomena. While reading Tadpole Diary students did ask two questions about phenomena represented in the book. However, their questions focused on interpreting the meaning of the book. One student asked about a representation in the book compared the size of a tadpole to the size of a human hand (done graphically). Similarly another student asks about one of the pictures to clarify her understanding of the book. In both of these cases, students were not necessarily challenging the accuracy of the book or wondering about the causal representations shown in the book. Rather the students were interpreting phenomenological information represented in the book.

Generating empirical investigations

A final observation in terms of inquiry involves students’ engagement with the reading event such that it stimulates a new empirical investigation of phenomena. While reading Dreams
(as described above) students identified a problem and implied a question about how the shadows shown in the story did and did not make sense according to their understandings of shadow formation. As a result, the class designed an investigation in which the teacher and students collaborated to model all the images shown in the illustrations of the story and then attempt to explain the illustrations based on their shared empirical investigation. A similar event occurred during the first reading of *The Three Pigs* (not analyzed here) which lead to reading *Push and Pull* in order to develop common vocabulary with which to describe and explain students’ investigations of the forces inferred in the illustrations in *The Three Pigs* (debriefing and revisiting this reading event was analyzed here). The generation of empirical investigations based on a reading event only occurred in conjunction with reading a narrative text and only once in the data set. However, it seems an important observation that reading events can stimulate empirical investigations of phenomena.

*Combining Intertextuality and Inquiry*

Throughout the preceding presentations of data, there is overlap between students’ intertextual connections with text and students’ inquiries into phenomena. Thus a natural question arises about what might be observed if these two constructs were treated as complementary and cumulative. In other words, what does it look like if the reading events are examined from the perspective of intertextuality plus inquiry. The challenge is that the reading event for each book varies in time, participants, context, and placement in the instructional

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3 *The Three Pigs* was examined multiple times in conjunction with a unit on Force and Motion. The initial lesson in which students became engaged with and curious about forces represented in the illustrations was not recorded and thus is not data presented here. However, subsequent lessons using this text and reading events associated with it were analyzed for this study.
sequence. Using scoring procedures described in Table 1, resulted in the following observations, coding, and analysis are presented in Figure 2 below.

![Figure 2: Intertextuality + Inquiry](image)

Figure 2 highlights that reading events associated with narrative texts (the 4 right most columns) average higher scores in this evaluation. Furthermore, the individual scores as well as combined scores of inquiry plus intertextuality. Thus a general inference from these data is that narrative texts seem to lead to more intertextual and inquiry oriented discussions. However, this is a slightly oversimplified interpretation.

One more subtle comparison can come from looking at the scores for Wind as compared with Little Cloud. While there are some variations in the contexts, these two books and the associated reading events produced identical scores. While the books share a common content of weather phenomena, the reading events in for the two books are quite different. The reading event associated with Wind was relatively short but focused on answering a shared question
about what causes wind. Thus the reading involved getting information from an expository text to answer a question. In contrast, the reading event involving Little Cloud was longer but did not begin with a student question. However, students did ask questions during the reading and made connections to other experiences. Ultimately both reading events involved students in making connections between the text and their personal experiences with phenomena.

Another interesting observation from this analysis involves the reading event associated with Investigating Rocks. While reading, the teacher repeatedly asked students what they noticed in the book and to predict, based on information in the text, what they though would happen to particular rocks or geologic formations. This implicitly helped students connect phenomena they had experienced with information in the book. Students were fairly good at describing aspects of different earth materials illustrated in the book. However, this was primarily motivated by the teacher and students rarely commented on things that were not presented in the book. Similarly students engaged in making explanations, but each time they explained something is was as a result of either the teacher asking or a question posed in the book. So in the case of this reading event, while students appear engaged and interested, it appears more like the book constituted knowledge delivery to students.

Discussion & Implications

The findings reported in this study raise questions about children’s learning about scientific inquiry. Scholars have argued that narrative ways of knowing and reasoning are useful in making concrete connections between experiences and abstract phenomena [ref Egan]. The findings reported here suggest that students were more likely to raise questions and relate these
questions to experiences with phenomena when discussing narrative as compared with informational texts. Thus these findings support a notion that narrative texts support connections between experiences and inquiries. This supports arguments for the value of narratives in teaching and learning science.

This inference leads to an implication that there is merit to thinking about how to meaningfully use different text genres in science teaching. Many suggestions for teachers include integrating science into other content areas. While this often results in suggestions for use of informational texts in science learning, there may be value to considering the productive use of narrative texts to engage students in meaningful inquiry that supports making connections between their lived experiences and explanations of related phenomena as represented in texts.

In the context of this study the teacher was able to engage students with meaningful content in the context of at times seemingly unrelated narratives (e.g., force and motion in the story of the 3 pigs). One question this raises is whether this is reasonable and possible for elementary teacher, traditionally having weak subject matter knowledge, to examine narratives and implement instruction using them to engage students in asking and answering questions about phenomena in the natural world. In most cases, the subject matter of elementary science is not so complex that teachers would be unable to successfully identify narratives useful in this kind of inquiry. However, the potential is that teachers could make productive use of descriptions of relevant science content found in narrative texts and useful in conducting inquiry.

Another issue has to do with what this suggests for other text genres. Scholars have argued (as described earlier) that it is important to consider uses of informational texts in elementary teaching and learning. The inference from this study could be that the findings reported here are contrary to those scholars. However, this is neither the intent nor the
implication to be drawn from these findings. Following notions of developing literate members of discourse communities, students need abilities to engage with all genres of text. Furthermore having flexible abilities to intertextually inquire (as well as develop understandings) is supported through experiences with multiple genres. Yet an important research question arising from this is whether experiences with multiple genres is mutually beneficial to learning about text, text genres, developing intertextual abilities, and using texts in conducting inquiries.

There are also implications from these findings for teacher education in terms of integration of science into other content areas. Often our notions about integration focus on either topical integrations or following disciplinary perspectives (e.g. Schwab, 1978) to create authentic learning experiences. However these findings suggest that there may be value to more conceptual integration that allow multiple entries into content and uses concepts as lenses on the entire curriculum. Thus the findings may have implications for teacher education. This is consistent with Beane’s ideas about curriculum integration which moves beyond topical to thematic integration based on disciplinary knowledge and concepts.

Finally it is important to note that these findings describe on group of students’ discourse around 2 text genres. The findings do not: lead to causal claims, offer comparable cases to determine which genre more effectively supports inquiry, and offer generalizable claims. All of which suggest the need for further study and investigation to more fully explore the explanations and implications of these findings.

References


