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The Informational Text Structure Survey (ITS^2): An exploration of primary grade teachers' sensitivity to text structure in young children's informational texts

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ABSTRACT

There has been no research reported about if or how well primary grade teachers can identify information text structures in children's authentic informational texts. The ability to do so accurately and reliably is a prerequisite for teachers to be able to teach students how to recognize and use text structures to assist them in comprehending informational texts. The authors report the development of the Informational Text Structure Survey (ITS^2). Prior to training, primary grade teachers demonstrated low accuracy and reliability in identifying traditional expository text structures in well-structured children's grade level–appropriate informational texts. Results after training with the ITS^2 instrument showed significant improvements in the teachers' accuracy and reliability in identifying traditional informational text structures in well-structured children's grade level–appropriate informational texts after training with the ITS^2 instrument.

KEYWORDS

Informational text; reliability; teacher professional development; text structures

The ability to extract information from and understand informational texts is an increasingly essential ability for adults and school-aged students to have in a world awash in information. Duke (2002) reported that nearly 44 million adults in the United States have difficulty extracting meaningful information from informational texts in their careers, college, or personal lives. Reading scholars also have long held that the reading slump that occurs in students' reading achievement around fourth grade is due to their inability to read informational texts proficiently (Chall, Jacobs, & Baldwin, 1990; Duke, Halliday, & Roberts, 2013). The National Assessment of Educational Progress Reading Report Card (National Assessment of Educational Progress, 2011) revealed that large proportions of U.S. school-aged students struggle to read informational texts proficiently. Even more important, this same report suggests that persistently at-risk, low-income, and minority students are more likely than other students to struggle with comprehending and learning from informational text (National Assessment of Educational Progress, 2011).

Living in an information age, and with the changes in curriculum brought on by the Common Core State Standards (CCSS), increasing proportions of informational text reading will be expected of students and assessed in schools. Students must learn to read informational texts proficiently in order to be ready for college and to have productive careers. Kamil and Lane (1997) reported that approximately 96% of the text found on the Internet is informational. The majority of adult reading, as much as 85% or more, is done in informational text (Smith, 2000). In the future, much of students' school achievement, including achieving the college and career ready reading standards of the CCSS, will depend on their ability to extract information from and comprehend informational text proficiently (Duke et al., 2013).

Teaching text structures improves comprehension of informational text

Past and present research has shown that teaching text structures and text features typically found in informational texts enhances students' comprehension of these texts (Duke, Pearson, Strachan, & Billman, 2011). Decades ago, Pearson and Fielding (1991) asserted that almost any instruction focused on helping students identify and use informational text structures resulted in improved comprehension. In an Institute of Education Sciences (IES) Practice Guide titled *Improving reading comprehension in kindergarten through third grade*, Shanahan et al. (2010) strongly recommended that students in Grades K–3 receive instruction that increases their sensitivity to text structures in order to improve their comprehension of informational texts. Past findings indicate that teaching young children text structures to improve their informational text comprehension has been quite successful (Duke et al., 2011; Shanahan et al., 2010). A series of studies by Williams (2005, 2007) and Williams, Stafford, Lauer, Hall, and Pollini (2009) showed strong positive effects of teaching primary grade students a variety of informational text structures on their comprehension of informational texts.

Text structure, as described in Appendix A of the CCSS on text complexity, focuses on a text's organization and features including conventional and unconventional text structures, as

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well as the inclusion of text features such a signal or clue words or phrases, headings, subheadings, typography, paragraph structure, and graphic displays (Halladay & Duke, 2013; National Governors Association Center for Best Practices and Council of Chief State School Officers, 2010). Informational texts are organized using several conventionally or traditionally accepted expository text structures that may be employed singly or in combination within a single informational text as shown in Figure 1 (Dickson et al., 1998a; Duke et al., 2011; Meyer, Brandt, & Bluth, 1980; Meyer & Freedle, 1984; Meyer & Poon, 2001; Shanahan et al., 2010; Williams et al., 2007, 2009).

Primary grade students and those students who struggle with comprehension of informational texts often require explicit instruction in order to recognize and use text structures and text features to improve their comprehension (Dickson, Simmons, & Kameenui, 1998a; Pearson & Duke, 2002; Pearson & Fielding, 1991; Ruddell, 2006; Williams, 2005; Williams, Hall, & Lauer, 2004; Williams et al., 2007; Williams et al., 2009). The influence of text structure and text feature knowledge on students' comprehension is apparent when one examines the coherence representations of text constructed by good readers as compared with poorer and younger readers (Goldman & Rakestraw, 2000; Kintsch, 2013; Meyer & Wijekumar, 2007). Initially, young readers develop the ability to comprehend informational texts beginning with the early acquisition of disjointed information fragments moving to the formulation of more coherent knowledge networks based around extracting key concepts or main ideas. For proficient readers, the creation of text coherence is an automatic process (Kintsch, 2013). Proficient readers typically use generalized cognitive text comprehension strategies, such as attending to placement of topic sentences, text features including headings, bolded words, and summary statements, to facilitate the identification of a global text structure (Dickson et al., 1998b; Goldman & Rakestraw, 2000; Kintsch, 2013). Proficient readers have practiced these comprehension strategies to a point where use is automated and requires little attention. Consequently, proficient readers can increasingly allocate their cognitive attention from extracting key ideas and details to the integration of pertinent information gleaned from text to form a global internal representation of the text (van den Broek, Lorch, Linderholm, & Gustafson, 2001).

The coherence and global text representations formed by proficient readers are quite different from the text representations created by beginning or struggling readers. Due to the attention demands placed on beginning readers, such as the identification of words and comprehension of words, phrases, and sentences, they often do not have enough cognitive capacity available to accomplish the challenging task of formulating a coherent global representation of the text (Linderholm & van den Broek, 2002; van den Broek et al., 2001). Without recognizing and using text structure, beginning readers often fail to understand the importance of main concepts represented in

Text Structures	Attributes	Signal Words
Description	A major idea is supported by details or examples	for example, most importantly, another kind, described as
Sequence	A series of main ideas and details that must be understood within particular sequence	first, second, next, finally, then, before, after, when, until, and other signal words to indicate sequence of time or process
Problem/Solution	A problem or question is posed and an answer or solution is provided	the question is, the problem is, therefore, if…then, and other signal words to indicate questioning (5 w's and how)
Cause/Effect	A chain of events, details, or ideas that cause an outcome or an effect	before, since, therefore, as a result, thus, hence, and other signal words to indicate cause/effect
Compare/Contrast	Details and main ideas demonstrate how two or more concepts are similar or different	similarly, on the other hand, compared to, different from, same as and other signal words to indicate compare/contrast

Figure 1. Text structures found in informational texts.

informational texts or how these fit together (Alexander & Jetton, 2000).

As a result, early comprehension development is often marked by acquisition of disjointed knowledge structures unrelated to the main concepts in text. The ability to form connections among major ideas in text has been shown to differentiate skilled from less skilled readers and experienced from beginning readers, especially when reading challenging informational texts (Dickson et al., 1998a). Readers with coherent knowledge of and the ability to use text structures and text features that signal text structures recall more information and main ideas than do readers with less coherent knowledge structures and an inability to identify and use text structures to improve their comprehension of informational text (Dickson et al., 1998b).

Informational text structures are infrequently taught in classrooms

In order for primary grade text structure instruction to be optimally effective, teachers need to carefully build and support young students' emerging text structure knowledge using well-structured informational texts (Williams et al., 2007; Williams et al., 2009). "Well-structured" or model informational texts exhibit "simple, well-marked, and conventional structures" (Appendix A, National Governors Association Center for Best Practices and Council of Chief State School Officers, 2010, p. 5). Classic principles of good instructional design apply to the content, organization, and use of well-structured or model texts. Such classic principles of good instructional design would suggest that content is introduced in small increments, moving from the concrete to the abstract, from the simple to the complex, from the known to the new, while simultaneously, teachers provide modeling, guided practice, and feedback, with a fading of scaffolding that helps students process more complex texts with increasing independence (Williams, 2007). Such well-structured informational texts make use of signal or clue words (as shown in Figure 1) and other helpful text features such as tables of contents, headings, subheadings, and bold or italicized typography to signal for young readers important organizational units and transitions.

Using well-structured model informational texts to provide initial text structure instruction helps younger students more easily recognize and use knowledge of text structures to improve reading comprehension (Hall, Sabey, & McClellan, 2005; Williams, 2005; Williams et al., 2007; Williams et al., 2009). In short, without sufficient attention to informational texts in the early grades, students remain unprepared for the comprehension demands that await them later on (Bernhardt, Destino, Kamil, & Rodriguez-Munoz, 1995; Goldman & Rakestraw, 2000; Jitendra, Hoppes, & Xin, 2000). Recent instructional research demonstrates that young students can be effectively taught to identify and use text structure knowledge to increase reading comprehension of informational texts as early as second grade (Hall et al., 2005; Reutzel, Smith & Fawson, 2005; Williams, 2005; Williams et al., 2004; Williams et al., 2007; Williams et al., 2009).

Unfortunately, instruction that develops young students' sensitivity to informational text structures appears to occur rather infrequently in primary grade classrooms. In a three-year longitudinal observational study of 325 K–3 classroom teachers' literacy instruction, Donaldson (2011) found that K–3 teachers taught informational text structures a mere one-half of a percent of the total time observed during reading comprehension instruction. Research on core reading programs also revealed a similar lack of attention to teaching informational text structures (Dewitz, Jones, & Leahy, 2009). Researchers who have successfully trained teachers to teach informational text structures have suggested that the lack of instruction observed in classrooms may be due, in part, to teachers' lack of understandings of and insensitivity to informational text structures (Hall et al., 2005; Meyer et al., 2010).

What do teachers know about informational text structures?

In our past work with thousands of preservice and inservice primary grade classroom teachers, we, as teacher educators, have observed uncertainty among primary grade teachers about how to identify or teach informational text structures. This is particularly concerning since primary grade teachers play a critical role in increasing their students' comprehension of informational texts to not only be prepared for college and careers, but also to meet the higher expectations of the CCSS. Present research provides few insights into why primary grade teachers infrequently teach informational text structures.

Meyer et al. (2010) suggested that the discrepancy in comprehension outcomes observed in past text structure research may be related to substantial variability in teachers' knowledge of text structures and their instruction. Duke et al. (2011) pointed out the need for research on teachers' knowledge about the teaching of reading comprehension when they stated, "We need…research that examines the knowledge teachers need to engage in specific practices supportive of comprehension" (p. 82; Kucan, Hapgood, & Palincsar, 2011).

For beginning or less skilled readers to develop the ability to use text structures and features to in comprehending informational text, primary grade teachers must be knowledgeable about and be able to identify text structures found in children's informational texts. If teachers cannot reliably distinguish among text structures used in children's informational texts, simply increasing the number of informational texts available in the classroom alone will not positively impact the amount of time or the effectiveness with which teachers teach informational text structures. Teachers need to have knowledge of and the ability to accurately and reliably identify informational text structures to be able to provide evidence-based text structure instruction to increase beginning readers' or struggling readers' informational text comprehension (Duke et al., 2011; Shanahan et al., 2010).

Since there is a need for research that describes primary grade teachers' knowledge of and ability to identify informational text structures, the purpose of this study was threefold. First, we developed a new instrument, the Informational Text Structure Survey (ITS^2), to help primary grade teachers' identify typical text structures found in children's informational texts. Second, we conducted descriptive research on primary grade teachers' knowledge about text types, genres, text

structures, and text features as well as their ability to reliably sort text types found in children's narrative, informational, and mixed/hybrid texts and text structures found in children's informational texts. In this study, we defined text types as narrative, informational, and mixed or hybrid narrative–informational; text structures as description, sequential, problem-solution, compare-contrast, and cause-effect; and genre using such exemplars as historical fiction, contemporary fiction, and biographies, etc. The media of text presentation such as ebook or digital texts, trade books or textbooks are not defined as text types in this study. We did, however, consider trade books and textbooks as genre. A Google search of these terms yields great variability in the use and definitions of these terms suggesting considerable inconsistency in the field of literacy itself around the definition of these terms. Third, we described the planning and results of a professional development module that trained primary grade teachers to use the ITS^2 to accurately and reliably identify typical text structures found in children's informational texts.

Our rationale for conducting this exploratory study was to determine the status of primary grade teachers' knowledge about informational text structures and text features and to develop an instrument and professional development training module to help teachers accurately and reliably identify informational text structures in children's informational texts. Phase 1 of the study required us to develop and pilot the ITS^2. The following research questions, one before and one after training teachers to use the ITS^2, guided our study:

Research Question 1: What do primary grade teachers know about terms and concepts related to text types, genres, and text structures, and how accurately and reliably can they identify text types and text structures in children's informational texts?

Research Question 2: What were the results of developing and implementing a professional development training module focused on using the ITS^2 to train teachers' abilities to accurately and reliably identify informational text structures in children's informational texts?

Method

Design

We used an embedded mixed methods design to conduct this study (Creswell & Plano-Clark, 2011). An embedded mixed method design is used when a single type of data collection, either qualitative or quantitative, is insufficient to answer the research questions. Embedded mixed methods designs begin with either qualitative or quantitative data collection and then embed a complementary data collection approach, either qualitative or quantitative, to "enhance the overall design" (Creswell & Plano-Clark, 2011, p. 72).

We began our study with qualitative data collection in phase 1 to determine the domain specifications associated with identifying text structures in informational texts in order to develop the ITS^2. Next, in phase 2 we collected qualitative and quantitative data using the Teacher Text Structure Knowledge Survey (TTSKS) to assess primary grade teachers' knowledge about text types, genres, informational text structures and text features as well as their ability to accurately and reliably sort text types and structures found in children's texts and informational texts. We analyzed teacher responses to TTSKS qualitatively and the sorting tasks quantitatively. Finally, in phase 3 we embedded a quantitative analysis of teacher's use of the ITS^2 to accurately and reliably identify informational text structures while completing the informational text structure, sorting task using children's informational texts following completion of the professional development module training.

Participants

Phases 2 and 3 of this study (baseline data collection, professional development, and evaluation) involved twenty-one randomly selected primary grade teachers in two representative school districts in one state in the western United States. The two school districts selected for the study are considered urban-suburban and suburban-rural districts within the state's education agency description of school districts. There were two male teachers and 19 female teachers. The schools from which these randomly selected teachers were selected ranged from high poverty, low achieving, 95% diversity to schools that were affluent, high achieving, less than 30% diversity. The schools, in which the teachers in this study taught, ranged from 43% to 46% free and reduced lunch. Students in less diverse schools spoke English as their primary language. Those students in more diverse schools were English language learners who spoke Spanish as their primary language. Teachers were randomly selected from a grade level listing of primary grade teachers in these two school districts using an internet-based random number generator. Demographic information about the randomly selected primary grade classroom teachers is shown in each column in Table 1.

Once teachers were randomly selected, they were sent a letter of informed consent and an invitation to attend an initial information meeting. All twenty-one teachers began the study and participated in the professional development; however, only twenty teachers properly completed the final assessment, the Teacher Text Structure Identification Task (TTSIT). This teacher failed to rate all 20 informational texts on two rating occasions rendering her data unusable in the final analysis.

Procedures

This study was conducted in three phases: (a) the ITS^2 instrument development; (b) collection and analysis of teacher knowledge baseline data about text types, genres, structures, and features including two sorting tasks; and (c) designing and evaluating the efficacy of a professional development module for teachers on identifying informational text structures in children's informational texts. We begin by describing Phase 1, the development, piloting, and revisions of a new instrument, the ITS^2, to be used by primary grade classroom teachers to identify text structures found in children's informational texts available in primary-level classrooms.

Table 1. Demographic characteristics of the randomly selected 21 primary grade teachers.

Grade level taught	Number of years teaching	Number of years teaching at grade level	Highest degree	Endorsement, licenses, certificates	Self-rating of teacher knowledge about text structure
Grade 1 = 6	1–5 = 4	1–3 = 6	Bachelor's = 9	Reading level 1 = 8	Low (1) = 1
Grade 2 = 6	6–10 = 5	4–6 = 4	Master's = 9	Reading level 2 = 4	Low to moderate (2) = 6
Grade 3 = 6	11+ = 12	7+ = 11	Master's + = 3	Early childhood = 2	Moderate (3) = 9
Coach/specialist = 3	*M* = 16 years	*M* = 6 years		English as second language = 6	Moderate to high (4) = 5
				Mathematics = 1	High (5) = 0
					M = 2.85

Phase 1: Developing the ITS^2 instrument

The ITS^2 instrument development process was iterative using traditionally accepted instrument development procedures and guidelines (Crocker & Algina, 1986; Ebel & Fiesbie, 1991; Osterlind, 1989; Thorndike, 1982). To begin, we conducted a systematic research synthesis of the literature on text structures and text features found in informational texts, with a special focus on text structures found in primary grade informational texts. This information was then used to determine domain specifications for elements to be included in the pilot ITS^2 instrument. The domain specifications were modified as the research team worked through the initial use of the pilot ITS^2 instrument in order to develop the training and use protocol. The systematic text structure research synthesis provided the basis for the development of the initial or prototype version of the ITS^2 instrument.

Components of the ITS^2 instrument

The initial ITS^2 version was developed by (a) writing a purpose statement, (b) developing domain specifications, (c) writing instrument specifications, and (d) developing a scale.

Purpose statement

A clearly defined purpose statement was developed which described the object of measurement for which the ITS^2 was intended, the purposes for which the resulting scores were intended to be used, and the constraints under which the ITS^2 should be used (i.e., time required and preferred conditions for use) as outlined in widely recognized classical and modern testing theory and development texts (Crocker & Algina, 1986; Ebel & Fiesbie, 1991; Osterlind, 1989; Thorndike, 1982). We determined the following purpose for the ITS^2: The purpose of the ITS^2 is to be used by primary grade teachers for analysis of children's informational texts to determine their appropriateness for use in text structure instruction in Grades 1–3.

Domain specifications

Based on informed professional judgment and grounded in the understandings of informational text structures acquired from a systematic research synthesis using accepted content analysis procedures (Neuendorf, 2002), the researchers developed domain specifications (i.e., text features, text structures, categories, items, and descriptors) to provide an organizational scheme for use in writing the items contained in the ITS^2 flowchart, use protocol and scoring rubric. Three nationally renowned researchers in the field of literacy were invited to review the organizational scheme to determine that no relevant dimension or category related to informational text structures had been overlooked in the specification of text structure domains. These researchers indicated that attention to defining informational text, text types, and text structures met expectations and used generally accepted definitions and descriptions.

Instrument specifications

Instrument specifications define the item format, characteristics of item descriptors, directions for rating each item, and a procedure or protocol for rating (Crocker & Algina, 1986; Ebel & Fiesbie, 1991; Osterlind, 1989; Thorndike, 1982). The item format included (a) flow chart for determining if a text was indeed an informational text, (b) a scoring rubric containing a heading and definition for each informational text structure, (c) informational text feature boxes to be checked signifying each of five text structures, and (d) a four-option informational text structure categorization. The general guideline established for writing item definitions specified that the definition had to be a succinct, clear description of the text structure. In addition, a use protocol was also developed, which included step-by-step directions for using the ITS^2 to identify text structures in children's informational texts.

Scale development

The number of items written for the ITS^2 corresponded with the number of text structures identified in the table of specifications (Thorndike, 1982). Item content for the ITS^2 was derived from the systematic research synthesis. Initial tryouts of the pilot ITS^2 instrument by three expert raters

arranged into three rating pairs, all of whom were members of the research team, rated 25 randomly selected informational texts. The results yielded an average Cohen's kappa of .86. Follow up tryouts and refinements discussed by the raters resulted in perfect (100%) agreement among research rating pairs in identifying text structures found in randomly selected and independently rated Grade 1–3 informational texts (see Appendixes A and B for the final version of the ITS^2 instrument and its use protocol).

Phase 2: Baseline data collection using the TTSKS

In this phase of the study, we describe the design and administration of a four-part TTSKS to assess teachers' baseline knowledge of text related terms, informational text structures, how or if they teach them, and what value they perceive for knowing text structures, etc. The TTSKS involved teachers answering questions regarding their knowledge of text types (narrative, informational, and mixed/hybrids of the two), text structures (description, sequential, problem-solution, compare-contrast, and cause-effect), and genres (e.g., historical fiction, contemporary fiction, biographies). Part 1of the TTSKS asked teachers to respond to open-ended items that requested the following data: (a) Please list all the text types you can think of; (b) Please list all the text structures you can think of; and (c) Please list all the text genres you can think of. Part 4 of the TTSKS requested the following data: (a) In what ways do you teach text structure in your classroom; (b) how would you rate your knowledge of text types, structures, and genre; and (c) Do you think it is important for students to understand text structure? If so, why?

Parts 2 and 3 of the TTSKS consisted of two book-sorting tasks in which teachers sorted books into text types: (a) narrative, informational, and mixed/hybrid text types; and (b) into informational text structures: descriptive, sequential, problem-solution, cause-effect, and compare-contrast. Sorting tasks were scored dichotomously as correct or incorrect. These data allowed the researchers to determine if the primary grade teachers could accurately and reliably identify text types and text structures before they received training.

In the first TTSKS sorting task to determine teachers' knowledge of text types, the 21 primary grade teachers were given a stack of 15 texts for Grades 1–3 representing a mixture of narrative, expository, and mixed/hybrid texts (narrative/informational) to sort. Grade levels were determined by publisher grade level designations and Lexile levels. This text sort allowed researchers to gain insights into primary grade teachers' knowledge of text types—narrative, expository, and mixed/hybrid texts. In the second TTSKS sorting task, the 21 primary grade teachers were given a stack of 15 informational texts for Grades 1–3 to sort into text structure(s) (descriptive, sequential, problem-solution, cause-effect, and compare and contrast) identified by the researchers using the ITS^2 instrument. These 15 informational texts included trade books, core reading program selections, content-area textbook chapters, and other instructional informational texts (see Appendix C). Teachers were also asked to indicate whether the informational texts contained single or multiple text structures, or were a mixed/hybrid (narrative and informational) text type.

Data analysis

Answers to open ended questions on parts 1 and 4 of the TTSKS yielded qualitative data that were transcribed into an Excel (Microsoft Corporation, Redmond, WA) spreadsheet for open and axial coding. Open coding according to Strauss and Corbin (1990) is the process of breaking down, examining, comparing, conceptualizing and categorizing data. Axial coding is a process whereby data are placed together in new ways using conditions, consequences, context, actions, or interactional strategies after open coding is completed. We began with open coding of responses into conceptually grouped categories (See Table 2). Next, we regrouped the open coded data and categories into axial coded categories (See Table 2). Axial categories were created to represent consequences of the teachers' knowledge about text structures, features, types, and genres. Following the qualitative analysis of teacher responses to parts 1 and 4 on the TTSKS, quantitative data about primary grade teachers' abilities to sort texts into text types and into informational text structures, parts 2 and 3 of the TTSKS, were analyzed using percentage of accurately sorted texts and a single-facet G study of teachers' individual and collective reliability to accurately sort texts.

Phase 3: Professional development and efficacy study

Last, we describe how we developed and provided a professional development training module to teach primary grade teachers how to use the ITS^2 in their classrooms in order to accurately and reliably identify informational text structures in children's informational texts. In order to evaluate the efficacy of this training module, we developed and administered the Teacher Text Structure Rating Tasks (TTSRT). These tasks were used to determine the teachers' abilities to reliably identify text structures in children's informational texts typically available in primary grade classrooms and answer questions or comments on their decision-making processes in comment boxes. The professional development training module for using the ITS^2 instrument to determine informational text structures was provided to the same 21 randomly selected primary grade teachers after school in quiet locations in the school district office building in one district and in the school library at the other district. A PowerPoint (Microsoft Corporation, Redmond, WA) presentation was developed that contained step-by-step directions and examples of how to use the ITS^2 instrument. Two computer projectors were used, one to show the power point for training and the other to project high resolution color slides of the page(s) of children's informational texts used for the training. Training required between 2.5 and 3.0 hr using multiple text examples and rating texts until teachers felt that they could use the ITS^2 instrument accurately and reliably. After completion of the professional development training module, teachers were given the post training packets containing the TTSIT forms. These tasks required that teachers independently rate a collection of 20 children's informational texts using the ITS^2 instrument. Teachers were asked to categorize these informational texts as single, multiple, or mixed/hybrid or uncertain text structures. These 20 informational texts represented informational texts found in trade books, core reading

program selections, content-area textbook chapters, and shorter reading selections found in other instructional materials typically available in primary grade classrooms nationally using similar proportions of text structure exemplars as in Phase 2. As the teachers identified or categorized each informational text by structure(s), they were also asked to answer questions and write comments about their decision making processes in comment boxes next to each informational text sorting and categorizing task. Titles for the texts used in the professional development training module and the 20 titles used for the posttraining sorting tasks are listed in Appendix C. Once the initial TTSIT tasks were completed, teachers were asked to put the TTSIT forms into a sealed envelope and return them immediately to the researchers.

Next, teachers were instructed to wait at least 24 hr before rating the same set of 20 informational texts a second time. This allowed researchers to examine intrarater or occasion variance among the teacher raters using the ITS^2 instrument. Once the second task was completed, the teachers once again placed their second ratings into a sealed envelope and returned the second set of TTSIT forms to the researchers. One of the 21 randomly selected teachers did not follow the directions completely on this task and therefore her data were unusable for the final analysis.

Data analysis

We began with descriptive quantitative data analyses. We calculated primary grade teachers' accuracy in correctly identifying text types and informational text structures after participating in the professional development training module workshop. The quantitative data obtained from administering the TTSIT following the professional development training for using ITS^2 were also analyzed for the difference between the percent of informational text structure(s) correctly identified by the 21 randomly selected primary grade teachers pre- and 20 primary grade teachers postprofessional development training using results from both the TTSKS and the TTSIT. To perform this analysis, we used a related sample Wilcoxon Signed Rank Test.

Next, we used a two-facet (rater by occasion), fully crossed generalizability (G&D) study (GENOVA) to examine inter- and intrarater reliability as well as to determine cost–benefit advantages for reducing rater error and increasing rater reliability for absolute and relative decisions related to the use of the ITS^2 instrument (Brennan, 2001; Brennan & Johnson, 1995; Cronbach, Gleser, Nanda, & Rajaratnam, 1972; Shavelson & Webb, 1991). We selected a generalizability (G&D) analysis approach to avoid the known problems associated with employing classical testing theory related to variability or error. This is accomplished by factoring an observed score into a true score and an estimate of error. Unlike classical test theory, generalizability studies do not ignore systematic sources of variability by sweeping them under the virtual rug as error variance. Instead, generalizability studies assume that the effects of these factors are systematic rather than random. Most users of tests and other psychosocial instrumentation are interested in their suitability as a function of when the measurement is taken, who takes the measurement, and where it occurs (Shavelson & Webb, 1991). One advantage of generalizability studies is that error estimates can be factored into multiple sources using a type of analysis of variance (i.e., GENOVA; Brennan & Johnson, 1995; Crick & Brennan, 1983; Strube, 2000).

Thus, the purpose of our generalizability study (G study) was to evaluate the efficacy of the professional development training module on how to use the ITS^2 on primary grade teachers' ability to reliably identify text structure(s) in children's informational texts. If overall reliability of teacher informational text structure identification increased substantially and costs, in terms of the number of teacher raters decreased substantially to achieve minimally acceptable reliability or .70, then the professional development training module would be judged to be a success. By using a generalizability study, we were also able to determine the relative contribution of the potential sources of error to the total error variance (Strube, 2000). In other words, a G study attempts to measure how various factors may affect a measurement instrument or rater score and the reliability of that instrument or rater. Generalizability studies have been conducted for very few psychosocial measurements or for rater reliability studies because of the "demanding data collection and formidable mathematics" involved in such studies (Pressley & McCormick, 1995, p. 528).

In our G and D study, 20 children's informational texts were the object of measurement and two factors were facets of measurement (i.e., teacher raters and occasions; Shavelson & Webb, 1991). The object of measurement and each facet represented a potential source of error in the ratings. Teacher raters, rating occasions, and texts were considered random factors because each was considered to be "much smaller than the size of the universe" and "exchangeable with any other samples of the same size drawn from the universe" (Shavelson & Webb, 1991, p. 11).

By using analysis of variance (i.e., GENOVA), we estimated variance components for the object of measurement (i.e., text sets), each facet (i.e., teacher raters, rating occasions, and texts), and all possible two-way interactions (Crick & Brennan, 1983). The resultant variance components provided an estimate of the relative contribution of each of the error sources and possible interactions to the total amount of error in scores obtained from the use of the ITS^2.

Finally, to analyze the results of the TTSIT, qualitative comments made by the teachers in the comment boxes for each child's informational text were transcribed. Coding was accomplished using coding procedures described previously in this report (Creswell, 2013; Strauss & Corbin, 1990).

Results

Phase 2

Results of the coding process in relation to the TTSKS administration of parts 1 and 4 containing open-ended questions are shown in Table 2. To begin, we placed teachers' actual responses or raw data shown in plain faced print into open coding categories labeled in bold italicized print as shown in Table 2. Using the open coded categories, we grouped these together to create axial coded categories of macro and micro

Table 2. Qualitative coding of teacher responses to the teacher text structure knowledge survey: Parts 1 and 4.

	Open coding	Axial coding
What text types do you know?	***Text types:*** Narrative, expository, poetic ***Text genres:*** Comics, informational, fiction, nonfiction, newspapers, magazines, e-books, picture books, Instructional text, internet, fairy tales, fables, biographies, autobiographies ***Text features:*** Caption, labels, photos, diagrams, bold-face type, italics, highlights, underlining, table of contents, index, glossary, chapters, pictures, charts, and graphs ***Text structure:*** Description ***Rhetorical structures and literacy devices:*** Argument, persuasive, author's purpose	***Macro text variability:*** *Text genres, text structures, rhetorical structures and literacy devices* ***Micro text variability:*** *Text features*
What text structures do you know?	***Text types:*** Narrative, expository, poetic ***Text genres:*** Informational, textbook, novel, short story, poem, article, auto-biography, reports, instructional, letters, article, picture books, novels ***Writing genres:*** Letter ***Text features:*** Facts, statistics, details, and information about the subject, tables, charts, beginnings, middle, end, sequence words-first, then, last; heads, titles, subtitles, diagrams, labels, pictures, bullets, captions, index, glossary, table of contents, graph, illustrations, bold text, text outline, enumeration, timeline ***Text structures:*** Characters, setting, moral or a theme, plot, cause and effect, sequence/order of events, descriptive, problem-solution, sequence, cause and effect, compare/contrast, list, question/answer, enumeration, timeline ***Rhetorical structures and literacy devices:*** Persuasive, first person, third person, how to, personal narrative, 5-paragraph essay, paragraph structure, author's purpose ***Comprehension skills:*** Main idea-details, fact and opinion, draw conclusion/ inference, prediction	***Macro text variability:*** *Text types, text and writing genres, rhetorical structures and literacy devices, comprehension skills* ***Micro text variability:*** *Text features*
What text genres do you know?	***Text types:*** Narrative, expository, poetic ***Text Genres:*** historical fiction, sports, fantasy, realistic fiction, science fiction, humor/joke books, fairy tales, fantasy, tall tales, folk tales, historic fiction, myths, plays, humorous fiction, nonfiction, historic nonfiction, informational text, nonfiction article, mystery, biography, autobiography, journals, comics, fable, documentary, mystery, horror, kid books, comedy books, nursery rhymes, reference, news ***Text features:*** Tables	***Macro text variability:*** *Text types* ***Micro text variability:****Text features*
What ways do you teach text structure in your classroom? What ways do you teach text structure in your classroom?	***Instructional groupings:*** Whole class, guided reading groups, small groups, partners, one-to-one ***Instructional methods:*** Tell, teach, discuss, describe, read aloud, analyze text, writing ***Skill instruction:*** Sequencing, main idea, problems and solutions, cause and effect, compare and contrast ***Strategy instruction:*** Summaries ***Text features:*** Facts, tables, heads, titles, subtitles, diagrams, pictures, bullets, captions, table of contents, graphs, illustrations, timeline ***Instructional materials:*** Short passages, texts with different text structures, graphic organizers, question stems, flip books, posters, timelines ***Reading components:*** Fluency, comprehension ***Literary devices:*** Author's purpose ***Other text concepts:*** Narrative text, expository text, fiction, nonfiction, poetry	***Text focus:*** Text features, instructional materials, literary devices, other text concepts ***Instruction focus:*** Instructional groupings, instructional methods, skills, strategies, reading components
Do you think it important for children to know text structures? If so, why? Yes = 21, no = 0	***Literary devices:*** Author's craft, author's purpose ***Thinking skills:*** Relationships, analysis, make connections, make informed decisions, determine importance of ideas, critical thinking ***Organization:*** Structure, organization, processes, procedures, steps ***Comprehension:*** Comprehension monitoring, remembering or recalling, learning, knowledge acquisition ***Text features:*** Tables, subheads, headings, titles, diagrams, captions, graphs, charts, illustrations ***Writing:*** Use as a model for, better organized, improved quality	***Literacy processes:*** Comprehension, text features, writing ***Cognitive processes:*** Literary devices, organization, thinking skills

text variability, text focus, instruction focus, literacy processes, and cognitive processes—as shown in Table 2.

When asked about text types, these teachers responded with a variety of concepts to include text types, structures, features, genres, and rhetorical structures and literary devices. Similarly, when asked about text structures and genres they responded with a variety of related concepts as seen in Table 2. Teachers responded that they taught text structures in their classrooms using grouping approaches, instructional methods, skill instruction, strategies, text features, instructional materials, reading components, literary devices, and other related text concepts. From these results, it is clear that these teachers evidenced imprecise definitions for these text related concepts. Results of the open-ended responses in part 4 of the TTSKS indicated that teachers' rated their knowledge of text types, text structures, and genres moderate to moderately high (See

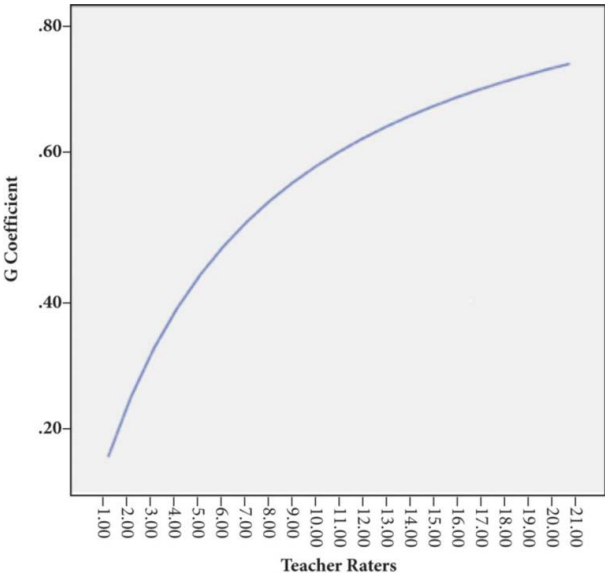

Figure 2. Baseline primary grade teacher rater reliability for identification of text structure(s) in 15 children's informational texts.

Table 1). Responses to the item in part 4 of the TTSKS asking teachers asking how teachers taught text structures in their classrooms revealed a range of responses from grouping strategies to instructional materials to text features and more (See Table 2). Responses to the item in part 4 of the TTSKS asking teachers about the importance of teaching text structures were unanimous in the positive. Axial coding categories were configured to denote the consequence of the open coding categories labeled as macro and micro text variability.

Results of the first sorting task, part 2 of the TTSKS administration, showed that this group of 21 randomly selected primary grade teachers sorted children's narrative, informational, and mixed/hybrid texts into text types (narrative, informational, mixed/hybrid) with 67% accuracy before training. Results of the second sorting task, part 3 of the TTSKS administration, showed that the primary grade teachers sorted children's informational texts into six informational text structure(s) (descriptive, sequential, problem-solution, compare-contrast, cause-effect, and multiple, or mixed/hybrid text type or uncertain) with 37% accuracy before training.

The results of a one-facet generalizability analysis of the second sorting task, part 3 of the TTSKS, indicated the number of raters (teachers) that would be required to achieve a minimally acceptable reliability (.70 G or phi coefficients) for identifying text structure(s) in 15 children's informational texts is shown in Figure 2.

Results indicated that it required all 21 teacher raters to reach a .77 G coefficient for making relative decisions or a .75 phi coefficient for making absolute decisions about the reliability of teachers' identification of text structures found in 15 children's informational texts. The results also indicated that it would require a minimum of 17 primary grade teacher raters to reliably identify, at a coefficient level of .70 or higher, the text structures found in this set of 15 children's informational texts. This result signals considerable variability and measurement error in this group of 21 primary grade teachers' identification of text structures found in 15 children's informational texts prior to professional development training. Additionally, these results indicate a high cost for achieving reliability among teachers in identifying texts structures in children's informational texts. To do so would have required a minimum of 17 teachers to reach acceptable reliability standards.

Table 3. Single- or one-facet fully crossed g theory analysis of primary grade teachers' abilities to reliably rate informational text structure(s) in 15 children's informational texts.

	df	SS	MS	Variance	Proportion
P	14.000	223.473	15.962	.579	.123
F1	20.000	171.721	8.586	.319	.068
P*F1	280.000	1065.994	3.807	3.807	.809
	Error variance			**G-coefficient**	
Relative	Absolute		G	Phi	
.181	.196		.761	.747	

Note. Generalizability theory analysis: Design type 1: Single-facet fully crossed design, as in O * F1; number of objects (O): 15; number of levels for facet 1 (F1; number of teacher raters): 21

Phase 3

Following the professional development module training of how to use ITS[2], these primary grade teachers were able to accurately identify the text structure(s) in 20 children's informational texts with 77% accuracy. A related-samples Wilcoxon signed rank test was used to examine the magnitude of the difference between the baseline and postprofessional development percentage of informational text structure(s) accurately identified by 21 randomly selected primary grade teachers. The results of the Wilcoxon signed rank test indicated a significant asymptotic difference ($p < .0001$) showing that professional development training in the use of the ITS[2] instrument resulted in significantly enhanced abilities for primary grade teachers to accurately identify the text structures found in 20 children's informational texts.

To examine these primary grade teachers' abilities to reliably identify the text structures found in children's informational

Table 4. Two-facet fully crossed g theory analysis of primary grade teachers' abilities to reliably rate informational text structure(s) in 20 children's informational texts after informational text structure survey professional development.

	df	SS	MS	Variance	Proportion
P	19.000	702.964	36.998	.867	.408
F1	19.000	51.164	2.693	.007	.003
F2	1.000	1.051	1.051	.000	.000
P*F1	361.000	641.061	1.776	.582	.274
P*F2	19.000	22.024	1.159	.027	.013
F1*F2	19.000	23.424	1.233	.031	.015
P*F1*F2	361.000	221.001	.612	.612	.288
	Error variance			**G-coefficient**	
Relative	Absolute		G	Phi	
.058	.059		.937	.936	

Note. Generalizability theory analysis: Design type 3: two-facet fully-crossed design, as in O * F1 * F2; number of objects (O): 20; number of levels for facet 1 (F1; number of teacher raters): 20; number of levels for facet 2 (F2; number of rating occasions): 2. One or more negative variance estimates have been set to zero.

Table 5. Increase by rater number in G and phi reliability coefficients for primary grade teachers' abilities to rate informational text structure(s) in 20 children's informational texts after informational text structure survey professional development.

G-study G-coefficients (relative decision)	Rater rating occasion 1	Rating occasion 2	D-study phi coefficients (absolute decisions)	Rater rating occasion 1	Rating occasion 2
.000	1.000	2.000	.000	1.000	2.000
1.000	.415	.490	1.000	.408	.484
2.000	.581	.654	2.000	.574	.649
3.000	.671	.737	3.000	.664	.732
4.000	.727	.786	4.000	.721	.782
5.000	.765	.819	5.000	.760	.816
6.000	.793	.843	6.000	.788	.840
7.000	.814	.861	7.000	.810	.858
8.000	.831	.874	8.000	.827	.872
9.000	.844	.885	9.000	.841	.883
10.000	.855	.894	10.000	.852	.892
11.000	.864	.902	11.000	.861	.900
12.000	.872	.908	12.000	.870	.906
13.000	.879	.914	13.000	.876	.912
14.000	.885	.918	14.000	.883	.917
15.000	.890	.922	15.000	.888	.921
16.000	.895	.926	16.000	.893	.925
17.000	.899	.929	17.000	.897	.928
18.000	.902	.932	18.000	.900	.931
19.000	.906	.935	19.000	.904	.934
20.000	.909	.937	20.000	.907	.936

texts after the professional development using the ITS^2 instrument, the results of the two-facet (rater by occasion) fully crossed generalizability study (G&D study) for making absolute and relative decisions was reported in Table 3.

These results indicated that a .70 G coefficient for making relative decisions about the reliability of teachers' ratings of text structures found in 20 children's informational texts could be achieved in one of two ways as shown in Table 4.

First, four teachers could achieve a .70 reliability level on one rating occasion (see Table 5). The second approach indicated that three teachers could achieve this reliability level with two rating occasions. The results of the G study using the entire group of 21 teachers as raters achieved a .91 G coefficient on one rating occasion and .94 G coefficient on two rating occasions for making relative decisions about the reliable use of the ITS^2 instrument to identify text structure(s) in children's informational texts. Similarly, the results of the D study using the same number of teacher raters after the professional development training achieved a .91 phi coefficient on one rating occasion and .94 phi coefficient on two rating occasions for making absolute decisions about the reliable use of the ITS^2 instrument to identify text structure(s) in children's informational texts as shown in Figure 3.

Figure 3 shows visually the effect of adding raters and rating occasions. This figure demonstrates that adding a second rating occasion only marginally increased rater reliability whereas

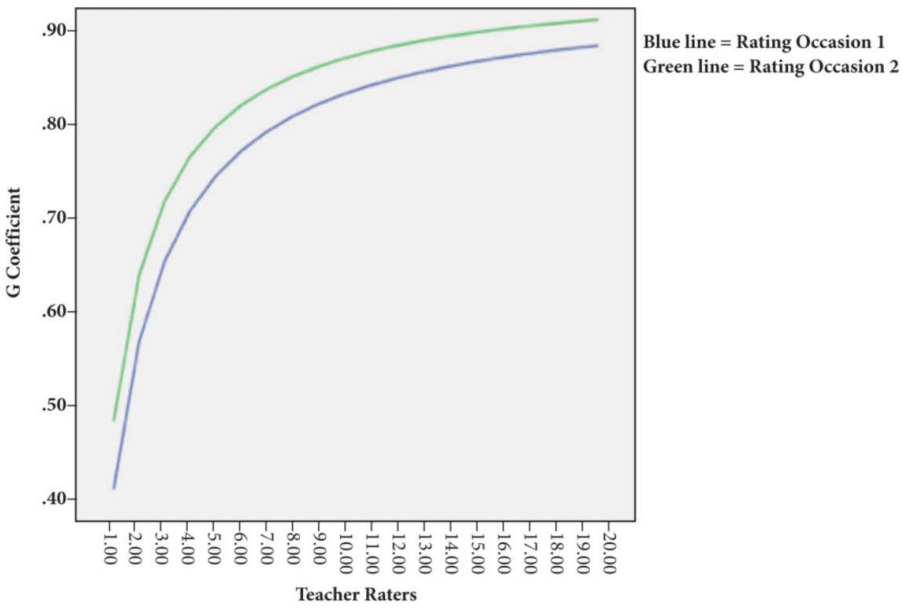

Figure 3. Primary grade teacher rater reliability for identification of text structure(s) in 20 children's informational texts after Informational Text Structure Survey (ITS^2) professional development.

adding raters, from one to four raters rapidly increased reliability levels.

Teacher comments provided in the comment boxes were analyzed qualitatively and consistently indicated that the ITS^2 instrument professional development increased teachers' knowledge of and confidence in their abilities to identify text structures found in children's informational texts. An example drawn from these comments illustrated a Grade 2 teacher's increased knowledge and confidence as follows:

> The title of the book indicates a comparison between two concepts – needs and wants. The text asks children to find the 'differences' between the two concepts. Using this process [the ITS^2] sure helped me to be more clear about how the author has organized this information book.

Discussion

The results of teachers answering questions and engaging in text type and informational text structure sorting tasks prior to receiving training revealed considerable variability among the 21 randomly selected primary grade teachers pertaining to their knowledge of and sensitivity to informational text structures as found in children's informational texts. First, primary grade teachers often evidenced a great deal of variation around the three text concepts: text type (i.e., narrative, informational, mixed/hybrid), text structure (i.e., descriptive, sequential, problem-solution, compare-contrast, cause-effect, and multiple), and genre (i.e., historical fiction, contemporary fiction, and biographies). Teachers' responses to all three text related concepts resulted in redundant and often overlapping answers to the three questions in part 1 and 4 of the TTSKS. From these findings, it was clear that the primary grade teachers in this sample were unclear or inconsistent about the differences among these three text related terms and the concepts that appropriately attach to them. Furthermore, the coding of these questions often revealed teacher responses that were related to but not part of the definition of specific text concepts. For example, for the term text type (narrative, informational or mixed/hybrid) teachers responded with ideas such as author's purpose, craft, argumentation, and a listing of text features such as headings, and diagrams. Similar variability and imprecision were noted with the terms text structures and genre. One of the teacher's responses summed up well the general findings from other similar teacher responses to these three questions with the following comment, "Sorry, too many differing philosophies and confusion over text structure, type, and genre." These responses verified our collective personal experiences with teacher training at both inservice and preservice levels. These findings also supported the previously expressed concerns voiced by other researchers about teachers' uncertain knowledge of text structures and other text related concepts (Hall et al., 2005; Meyer et al., 2010).

Responses to first sorting task of the TTSKS, text types, showed the primary grade teachers in this study were able to distinguish accurately the text types of 15 children's books (narrative, informational, and mixed/hybrid) in two of three cases. Although this is considered in many academic settings to be passable performance, it is nonetheless below typically established minimum mastery levels of 80% accuracy. This is problematic and may represent too little preparation in teacher education programs on understanding and analyzing text as an integral part of knowledge necessary for providing evidence-based comprehension instruction in the primary grades. This finding may also signal concerns about teachers' abilities to understand issues that render texts more or less qualitatively complex insofar as the CCSS 10–Text Complexity is concerned. An examination of these teachers' responses also revealed that most of the text type sorting problems emerged when the text to be sorted was a mixed/hybrid text type, such as a narrative-informational text. The understanding of mixed/hybrid text types apparently required teachers to engage in finer grained text analysis than did the larger grained categories of narrative or informational text types.

The response to the second sorting task of the TTSKS, informational text structures, showed that primary grade teachers in this study were able to correctly identify typical informational text structures found in 15 children's informational texts with only 37% accuracy. This finding seemed to document the concerns expressed by previous researchers about the potential lack of text structure knowledge teachers possess (Hall et al., 2005). The reliability achieved in the second TTSKS sorting task of informational text structure (s) indicated it would require a group or panel of 17 teacher raters to achieve minimally acceptable reliability for identification of informational text structures. These results provide evidence that this group of 21 randomly selected primary grade teachers were neither highly accurate nor minimally reliable in text structure identification. Given teachers' varying, overlapping, or imprecise distinctions among text types, text structures, and genres coupled with what appeared initially to be an idiosyncratic approach for identifying text structures, the low base line accuracy and reliability results for the TTSKS informational text structure sorting task were anything but surprising.

The teachers' responses to part 4 of open-ended questions of the TTSKS indicated self-reported levels of knowledge and sensitivity to informational text structures averaging 2.85 on a 5-point Likert-type scale ranging from 1 (*low*) to 5 (*high*) as shown in Table 1. This mean indicated that teachers felt they had moderate to moderately high knowledge of informational text structures. Comparing this self-rating to their text sorting accuracy percentage and initial reliability, teachers' self-ratings reflected a somewhat inflated view of their actual text structure knowledge. Past research by Cunningham, Perry, Stanovich, and Stanovich (2004) focused on the calibration between self-reported teacher knowledge about teaching reading and direct measures of teacher knowledge about teaching reading showed that teachers often overestimated their reading instructional knowledge in comparison to direct measures of that same knowledge. This finding demonstrates clearly that these teachers' knowledge was insufficient to provide effective instruction in informational text structures. Teachers may know about the five typical informational texts structures, but they were not able to articulate clearly or enact this knowledge when needed to identify text structures in

children's informational texts accurately or reliably. Consequently, teacher preparation and professional development programs are needed to help teachers acquire the knowledge they need to competently analyze text as an object of study.

All 21 of these primary grade teachers expressed in their responses to the part 4 open-ended questions of the TTSKS that teaching text structure was important. However, past and recent studies do not bear out that the assigned importance given to the teaching of text structures by teachers are actually occurring in observations of classroom reading instruction (Durkin, 1979; Donaldson, 2011).

Qualitative analyses of answers to the item asking about how teachers teach text structures also demonstrated wide variation and often-imprecise understandings of how to teach text structures. For example, one teacher's answer to how to teach informational text structures such as cause-effect, sequence, and compare-contrast was to make use of narrative texts—which employ story structure rather than information text structure as the macro text organization. Moreover, teachers and publishers tend to conflate the teaching of comprehension strategies such as text structures with older notions of teaching comprehension skills such as sequencing (Afflerbach, Pearson, & Paris, 2008; Dewitz et al., 2009).

Although we cannot say with certainty that these findings fully explain primary grade teachers' infrequent teaching of text structures as observed by Donaldson (2011), the findings do suggest that these teachers were unsure and inconsistent about text structures and other text related concepts and were unable to accurately or reliably identify text structures in children's informational texts (Hall et al., 2005). Another potential explanation for the infrequent teaching of text structures found in primary grade classrooms may be that the texts available in classrooms, such as those in core reading programs, instructional reading materials, and trade books, do not routinely identify for teachers or students text structures, nor do they routinely recommend the teaching of text structures. It may also be that publishers need to develop exemplar text structure sets to be used expressly for text structure instructional purposes to save teachers time searching for informational texts that provide exemplary or well-structured text structure instructional affordances.

The results of the professional development training module on how to use the ITS^2 produced a 40-percentage-point gain from baseline 37% accuracy to posttraining 77% accuracy among these randomly selected primary grade teachers. The results of the G&D study demonstrated increased overall reliability for this group of teachers from .77 to .94 in accurately identifying text structures in children's informational texts. The G & D study also showed a need for fewer raters to obtain a minimally acceptable reliability coefficient of .70 moving from 17 teacher raters prior to training to only 3–4 teacher raters following training. These results clearly showed a significant reduction in variability and error in this group of primary grade teachers' text structure identification ratings in 20 children's informational texts after the training. Additionally, these results indicated the cost of reliably doing so using the ITS^2 instrument would be relatively modest, even quite practical within a single school setting, requiring only 3–4 teachers to reach minimal reliability standards. These results represented a significant overall increase in reliability and at the same time a significant decrease in cost/benefit in teacher time and effort. It is also worth noting that a .70 coefficient obtained with only four raters occurs when a perfect agreement of informational text structure ratings is achieved by three of four raters, with a fourth person disagreeing by only one adjacent rating score. Consequently, an interrater agreement of .70 with only four raters is commonly seen in the assessment scoring industry as a very strong result (Brennan, 2001; Burdick et al., 2013).

The comments recorded by teachers in the comment boxes were uniformly positive in relation to the professional development training module and the value of the ITS^2 instrument. One teacher commented, "This really helped me examine the text better and kept me from looking at distracting information and features in the texts that were irrelevant." Another teacher commented, "I really liked the ITS^2 instrument because it made it easier for me to follow a plan to make decisions about text structures."

The fact that all teachers felt that the training and the ITS^2 instrument were worth their time was gratifying indeed. But more importantly, teachers were asking for their districts and schools to receive the training as well. Qualitatively speaking, these comments seemed to reflect a new confidence in identifying text structures in informational texts that was grounded in teacher performance data and rather than in self-reports (Cunningham et al., 2004).

The professional development training module and the use of the ITS^2 instrument provided these primary grade teachers with a systematic framework for analyzing informational text that increased accuracy and consistency between and within teachers in identifying text structures in children's informational texts. Although these teachers may have possessed some knowledge about informational text structures by definition and description, they were neither skilled at analyzing information texts systematically to determine text structures in this study nor were they be able to identify and use model/exemplar informational texts to teach young students text structure knowledge to improve their comprehension as a result (Shanahan, 2013; Shanahan et al., 2010).

Primary grade teachers, as shown in this study, may need significant and specific support and training to use an instrument such as the ITS^2, to identify well-structured exemplar/model informational texts within their own classroom informational text collections for teaching text structures to young children (Duke et al., 2011). Publishers may also need to accurately label text structure(s) on the covers of informational texts marketed to schools to save teachers a great deal of time in locating well structured exemplar/model informational texts. Similarly, core reading programs may also need to develop classroom sets of well-structured exemplar/model informational texts as part of the instructional programs sold to schools. Teacher education programs will need to increase attention to training inservice and preservice teachers in text analysis skills (Shanahan,

2013). Our experiences as teacher educators suggest that this is an area where considerable new attention needs to be focused in anticipation of preparing teachers to teach the CCSS effectively and to assist them in developing the insights and skills necessary to determine the appropriate text complexity-reader match for providing effective comprehension instruction using informational texts (Duke et al., 2013).

Limitations

This study was limited in several ways. First, the school districts in the study were not randomly selected leading to a potential sampling selection bias. Although two districts were purposively sampled to represent urban, suburban, and rural settings, the districts may not be representative of other such districts nationally. Second, although we were able to demonstrate that training in the use of the ITS^2 resulted in increased accuracy, reliability, and teacher confidence in their abilities to identify text structures in children's informational texts, there is no evidence that doing so will necessarily lead to greater frequency or quality of teachers' text structure instruction in primary grade classrooms. Third, this study does not provide evidence for primary grade teachers' improved abilities to select exemplar or model informational texts from those texts available in their classrooms in order to provide text structure instruction to improve their students' acquisition of the CCSS Reading Standards for Informational Text or to improve their students' reading comprehension of informational texts.

Implications

There are several implications to be drawn from this study. First, a group of randomly selected primary grade teachers in rural, urban, and suburban school districts showed imprecise initial understandings of several text-related concepts—text types, text structures, and genres—as well as marginal to very poor abilities to accurately or reliably sort children's texts according to text types or text structures. These findings draw attention to teacher preparation programs and teacher inservice professional development. It is clear that teachers need greater clarity around several confusing text-related constructs in their preservice and inservice training. They also need training that engages them more intently on studying text as an object (Duke et al., 2011; Shanahan, 2013). This can be accomplished through the use of structured sorting tasks and scaffolded support using an instrument such as the ITS^2 to help them think about and identify accurately, reliably, and confidently text types and text structures found in children's texts. Research shows that primary grade teachers teach text structures very rarely (Donaldson, 2011; Hall et al., 2005), so it is unlikely that primary grade teachers will teach text structures often or well to their young students if they struggle with precisely discriminating text concepts such as text types, text structures, and genre as well as evidencing poor ability to accurately and reliably determine these same constructs in children's informational texts. Core reading programs do little to help teachers with this problem. If anything, core reading programs may exacerbate teachers' indistinct understandings about how to provide text structure instruction.

Additional observational research is needed to determine whether training using the ITS^2 improves primary grade teachers' abilities to select exemplar or model informational texts from those informational texts available in their classrooms to provide text structure instruction (Duke et al., 2011). Research is also needed that examines the instructional supports provided to primary grade teachers when using their core reading programs for teaching text structures in informational texts. More research is needed to determine if training primary grade teachers to more accurately, reliably, and confidently identify text structures in children's informational texts in their own classrooms will lead to greater frequency and quality of primary grade text structure instruction to improve students' comprehension and achieve the CCSS goals of producing career and college ready students. Finally, this research contributes to the field, as recommended by Duke et al. (2011), by providing the knowledge primary grade teachers needed to engage in specific practices supportive of comprehension, namely how to accurately, reliably, and confidently identify informational text structures found in children's informational texts.

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Appendix A

Informational text structure survey (ITS^2) protocol

This protocol has been designed to provide directions on how to use the Informational Text Structure Survey (ITS^2). The purpose of the ITS^2 is to be used by primary grade teachers for analysis of children's informational texts to determine their appropriateness for use in text structure instruction in Grades 1-3.

Things to remember:

- There are two sides to the ITS^2. Be sure to review both sides.
- The **coding unit** is/are the text structure(s) used in any informational text being examined.
- You can use this form to analyze information books, chapters, sections, text passages, or paragraphs but each of these levels of text should be coded separately!
- There are five types of text structures coded using the ITS^2 form:
- **Sequence:** Text that explains a time order, cycle, or process/procedure.
- **Compare/contrast:** Text that explains how things are similar and different.
- **Cause/effect:** Text that explains how an initiating event leads to other events that culminate in an outcome or effect.
- **Problem/solution:** Text that explains what went wrong and how it was or could be fixed or asks a question and gives an answer.
- **Description:** Text that tells about a single or multiple topics.

1. Begin on the **flow chart** side of the form. Record the rater name and the title or source of text. First, you need to determine whether or not the text you are examining is informational text. This is done by taking a picture/text walk through the entire information book. Look at the text, pictures, and text features (e.g., headings, table of contents, subheadings) to get an overall impression of the content and organization of the informational text. Ask yourself if the information presented in this text is informational text. Use the six criteria for determining informational texts as outlined by Duke (2000) at the top of the flow chart to make this decision (check each number of the six). Mark 'yes' or 'no.' If the text you are analyzing does **not** meet all of these six criteria, then stop. Do not use the ITS^2. If the text you are analyzing does meet all of these six criteria for an informational text then move to the next question in the flowchart.

2. Next, you need to determine if the text contains *only sentences* or if it *contains at least one or more paragraphs*. Texts with only sentences are usually texts for younger children with a sentence on each page. Texts that contain at least one or more paragraphs are longer texts. Mark either 'only sentences' or 'contains at least one or more paragraphs.'

3. If you have marked 'only sentences, you will need to mark the 'skipped' box for both *Table of Contents* and *Headings* on the reverse side. Instead of looking for the table of contents or headings, you will look for the topic or lead sentence to set up the text structure using signal words.

4. If you marked 'contains at least one or more paragraphs,' you will look for the *Table of Contents* and *Headings* to determine the text structure.

5. Now move to the reverse side of the ITS^2 form. On this side, you will see the five text structures listed across the top with features of informational text (such as the title, table of contents, headings, sentences, and the use of signal words) listed under each of the five text structures. These elements of informational text will be used to help you determine the text structure being used by the author of the text you are examining.

6. **Definition:** Having looked through the entire informational text, which of the five text structure definitions most closely matches the informational text's organization and purpose? Underline the parts of the definition that this text matches. Read the text structure definitions from left to right across the top of the second page of the ITS2 form. Use the "descriptive text structure" as a default structure if none of the other previous four text structures as defined are clearly indicated. Check the box for the definition under the corresponding text structure.

7. **Title**: Read the title of the informational text. Which of the five text structure definitions is indicated by the title? Underline the parts of the definition that this title matches. Check the box for the title under the corresponding text structure. If no text structures are indicated, leave this box blank.

8. **Table of Contents**: Read the table of contents (if there is one included). Which of the five text structure definitions is indicated in this table of contents? Underline the parts of the definition that the table of contents matches. Check the box for the table of contents under the corresponding text structure. Remember, the table of contents may not indicate the same text structure as the title. If no text structure is indicated, leave this box blank. If there is no table of contents included in this text, mark the box "skipped."

9. **Headings**: Read the headings used in this text (if there are headings included). Which of the five text structure definitions has been indicated in these headings? Underline the parts of the definition that the heading matches. Check the box for the headings under the corresponding text structure. Remember, the headings may not indicate the same text structure as the title or table of contents. If no text structure is indicated, leave this box blank. If there are no headings included in this text, mark the box "skipped."

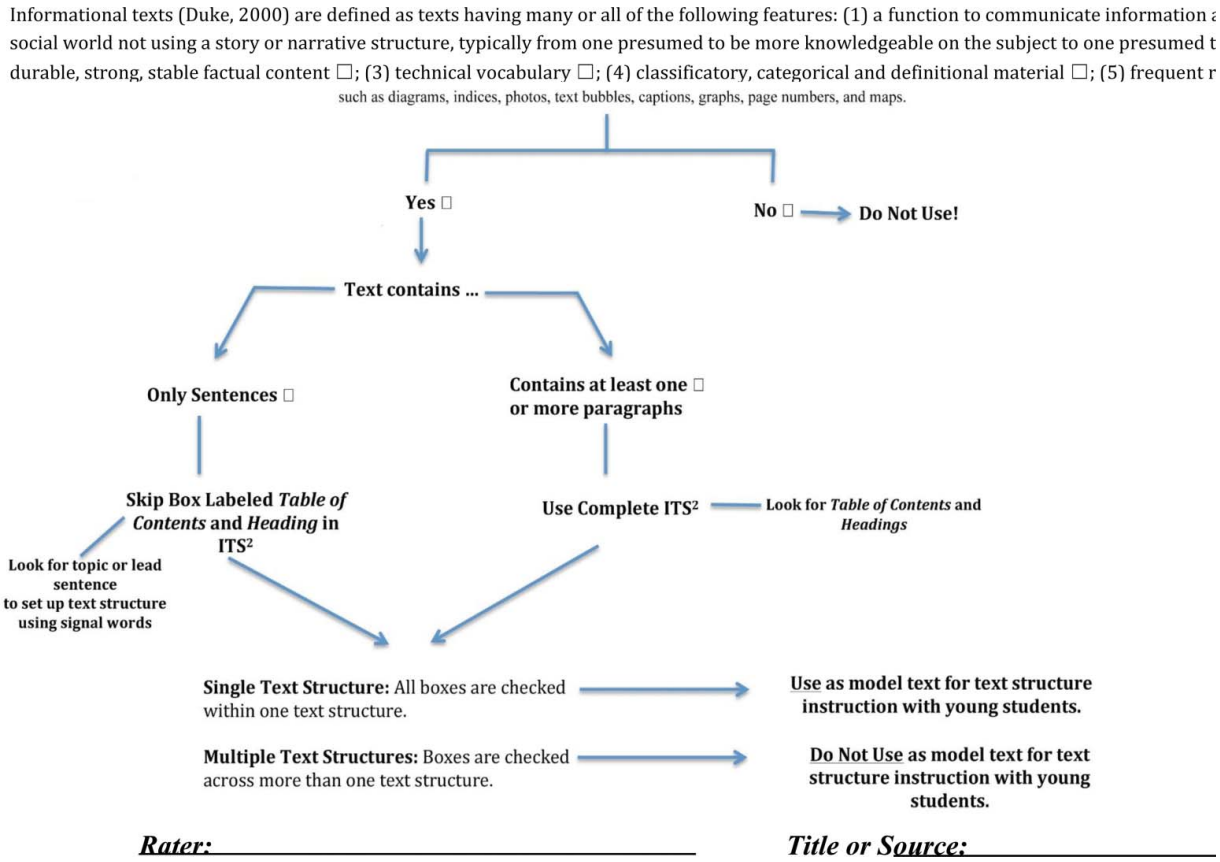
10. **Sentences**: Now read the sentences in this text. Which of the five text structure definitions matches the majority of the sentences? Underline the parts of the definition that the sentences match. Check the box for the sentences under the corresponding text structure. The majority of the sentences must align with the text structure you selected. There may be a sentence or two that do not fit this text structure, but if the majority of the sentences do, then check the box next to the

corresponding text structure. If no text structure is indicated from the sentences, leave this box blank.

11. **Signal words**: Look through the informational text for signal words used by the author to indicate the text structures. Underline signal words found in the text. These signal words may be found throughout the text. Check the box for the majority of the signal words under the corresponding text structure. Remember, there may not be signal words used to indicate a text structure, especially in texts for younger students.

12. **Analysis**: You are now ready to analyze your findings. First, record any notes or comments you have about this text. Next, find the column corresponding to the type of book you

Appendix B
Flow chart for Informational Text Structure Survey (ITS^2) informational text?



Sequence (S) Text Structure	Compare/Contrast (CC)	Cause & Effect (CE)	Problem/Solution (PS)	Descriptive (D) Text Structure
Definition: Text that directly explains a time order, cycle, or process/ procedure. ☐	***Definition:*** Text that explains how two or more categories of people, places, things, or actions are alike and different. ☐	***Definition:*** Text that explains how an initiating event leads to other events that culminate in an outcome or effect. ☐	***Definition:*** Text that explains what went wrong and how it was or could be fixed, or asks a question and provides an answer. ☐	***Definition:*** Texts that tells about single or multiple topics. ☐
☐ ***Title:*** Title indicates a time order, process, cycle, timeline, chronology, procedure, steps, and directions.	☐ ***Title:*** Title indicates how two or more categories of people, places, things, or actions are alike and different.	☐ ***Title:*** Title indicates how an initiating event leads to other events that culminate in an outcome or effect.	☐ ***Title:*** Title indicates that something went wrong and how it was or could be fixed or asks a question and provides an answer.	☐ ***Title:*** Title represents a single topic label or category label of multiple topics, e.g., seeds, reptiles, or weather.
☐ ***Table of Contents:*** Indicates a time order, process, cycle, timeline, chronology, procedure, steps, and directions. -or- ☐ **Skipped** (No table of contents)	☐ ***Table of Contents:*** Indicates how two or more categories of people, places, things, or actions are alike and different. -or- ☐ **Skipped** (No table of contents)	☐ ***Table of Contents:*** Indicates how an initiating event leads to other events that culminate in an outcome or effect. -or- ☐ **Skipped** (No table of contents)	☐ ***Table of Contents:*** Indicates that something went wrong and how it was or could be fixed or asks a question and provides an answer. -or- ☐ **Skipped** (No table of contents)	☐ ***Table of Contents:*** Lists a series of descriptions about single or multiple topics. -or- ☐ **Skipped** (No table of contents)
☐ ***Headings:*** Represent a time order, process, cycle, timeline, procedure, steps, or directions.	☐ ***Headings:*** Represent how two or more categories of people, places, things, or actions are alike and different.	☐ ***Headings:*** Represent how an initiating event leads to other events that culminate in an outcome or effect.	☐ ***Headings:*** Represent what went wrong and how it was or could be fixed or asks a question and provides an answer.	☐ ***Headings:*** Represent a single topic label or category label of multiple topics, e.g., snakes, clouds, and vegetable seeds.

(*Continued*)

-or- ☐ **Skipped** (No headings) ☐ Majority of sentences explain a process, cycle, timeline, chronology, procedure, steps, and directions. ☐ ***Signal words:*** First, second, third, etc., to begin, starting with, next, then, after, finally, following, at last, to sum up, up to now, in conclusion, etc.	-or- ☐ **Skipped** (No headings) ☐ Majority of sentences explain how two or more categories of people, places, things, or actions are alike and different. ☐ ***Signal words:*** Instead, alternatively, or, but, on the other hand, comparison, contrast, the same as, just as, unlike, despite, both, alike, different, likewise, etc.	-or- ☐ **Skipped** (No headings) ☐ Majority of sentences explain how an initiating event leads to other events that culminate in an outcome or effect. ☐ ***Signal words:*** As a result, because, since, thus, so therefore, as a consequence, reasons why, on account of, it follows, etc.	-or- ☐ **Skipped** (No headings) ☐ Majority of sentences explain what went wrong and how it was or could be fixed or asks a quest-ion and provides an answer. ☐ ***Signal words:*** Problem, what, why, when, where, how, question, issue, trouble, solution, answer, response, puzzle, issue, the trouble, to solve the___, comeback, response, etc.	-or- ☐ **Skipped** (No headings) ☐ Majority of sentences describe single topic label or category label of multiple topics. ☐ ***Signal words:*** For instance, like, such as, in other words, thus, that is, for example.

Rater notes:
Scoring section:
Narrative (not informational) ☐
Mixed/hybrid narrative and informational ☐
Multiple text structures (more than one box checked here) ☐ S ☐ CC ☐ CE ☐ PS ☐ D ☐
Single text structure (only one box checked here) ☐ S ☐ CC ☐ CE ☐ PS ☐ D ☐

analyzed (sentences only or one or more paragraphs) and count the number of checks made. Do not count the boxes that are left blank. The number of checks within one text structure will help you identify the text structure used by the author of this text. There are four possibilities. Please mark the box that best matches the information you have coded on the ITS[2]:

- Narrative (This is not informational text) ☐
- Mixed/Hybrid Narrative and Informational ☐
- Multiple Text Structures ☐ (More than one box checked)

D☐ S ☐ CC ☐ CE ☐ PS ☐
Single Text Structure ☐ (Only one box checked here)
D☐ S☐ CC ☐ CE ☐ PS ☐

Appendix C

Baseline sort of 15 children's informational text titles

1. *Animal moms and dads*. (2009). In Macmillan−McGraw Hill, Treasures, First Grade.
2. Anman, Z. (2006). *Six simple machines*. Marlborough, MA: Sundance.
3. Berger, M. (2007). *An apple a day*. Northborough, MA: Sundance/Newbridge.
4. Berger, M. (2007). *Make mine ice cream*. Northborough, MA: Sundance Newbridge.
5. Fowler, A. (1997). *Energy from the sun*. Canada: Children's Press.
6. Goodridge, C. (2011). *Michelle Kwan*. Pelham, NY: Benchmark.
7. Haydon, J. (2002). *Now it's hot*. Barrington, IL: Rigby.
8. *How my family lives in America*. (2011). In Scott Foresman, *Reading street*, Third Grade.
9. *How we keep in touch*. (2009). In Macmillan−McGraw Hill, Treasures, Third Grade.
10. Kottke, J. (2000). *From tadpole to frog*. Canada: Rosen Book Works.
11. Moore, E. (1999). *The Magic School Bus: The search for the missing bones*. New York, NY: Scholastic.
12. *Saving the sand dunes*. (2009). In Macmillan−McGraw Hill, Treasures, Third Grade.
13. Thomson, S. L. (2006). *Amazing snakes*. New York, NY: Harper Collins.
14. *We celebrate holidays*. (2011). In Scott Foresman-Social Studies, All Together, First Grade.
15. *What's the life cycle of a bean plant*? (2010). In Scott Foresman, The Diamond Edition, Second Grade.

After professional development training sort of 20 informational text titles

1. *Animal moms and dads*. (2009). In Macmillan−McGraw Hill, Treasures, First Grade.
2. Anman, Z. (2006). *Six simple machines*. Marlborough, MA: Sundance.
3. Berger, M. (2007). *An apple a day*. Northborough, MA: Sundance/Newbridge.
4. Berger, M. (2007). *Make mine ice cream*. Northborough, MA: Sundance Newbridge.
5. Clyne, M., & Griffiths, R. (2005). *Sand*. Boston, MA: Pearson.
6. Daronco, M., & Presti, L. (2001). *Measuring tools*. Northborough, MA: Benchmark Education
7. Feely, J., & Curtain, M. (2004). *City and country*. Northborough, MA: Sundance Publishers.
8. Fowler, A. (1997). *Energy from the sun*. Canada: Children's Press.
9. Goodridge, C. (2011). *Michelle Kwan*. Pelham, NY: Benchmark.
10. Haydon, J. (2002). *Now it's hot*. Barrington, IL: Rigby.
11. *How we keep in touch*. (2009). In Macmillan−McGraw Hill, Treasures, Third Grade.
12. Kottke, J. (2000). *From tadpole to frog*. New York, NY: Scholastic Inc.
13. *Needs and wants*, (2010). In Scott Foresman, The Diamond Edition, First Grade.
14. Nelson, R. (2003). *From cocoa bean to chocolate*. Minneapolis, MN: Learner Publications Co.
15. Nobleman, M. T. (2000). *America's symbols – The Statue of Liberty*. North Mankato, MN: Capstone Press.
16. *Saving the sand dunes*. (2009). In Macmillan−McGraw Hill, Treasures, Third Grade.

17. *Stormy weather*. (2009). In Macmillan−McGraw Hill, Treasures, First Grade.
18. Thomson, S. L. (2006). *Amazing snakes*. New York, NY: Harper Collins.
19. *We celebrate holidays*. (2011). In Scott Foresman-Social Studies, *All together,* First Grade.
20. *When you mail a letter*. (2009). In Macmillan−McGraw Hill, First Grade.