DOI: 10.20472/IAC.2015.020.065

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BOYS' AND GIRLS' ABILITY TO COMPREHEND SCHOOL BOOK TEXTS IN SIXTH GRADE

Abstract:

When studying almost any area in the school curriculum, the students use texts to acquire new information. It seems that for the students in primary, and especially, in secondary school, the textbooks are still today an important source of information. A considerable part of the time the students spend in their classroom and doing their homework is involved in textbook material.

The goal of the study was to find out how well sixth graders (11–12 year-olds) comprehend the textbooks used in the sixth grade history and natural sciences classes; and if there are differences in the girls' and boys' reading comprehension skills. Altogether, 247 students (122 girls and 125 boys) took part in the study. About half of them read the text about whales in their natural science book and the other half the text about the great wall in China in their history book. After reading the text, the students answered ten questions and explained the meaning of the ten words underlined in the text.

The results show that the students in both groups had no difficulties in answering those questions to which the answers were directly found in the texts. However, those questions proved to be difficult that required inference skills. The girls succeeded in both groups significantly better than the boys in answering the questions ($t= 3.57$, $p= .000$; $t= 2.73$, $p= .008$). For instance, there were two questions related to the history book chapter that not a single boy was able to answer correctly. Deriving the meaning of the words from the text context and explaining them proved to be even more demanding. The girls were significantly more skilful in explaining the words in the natural sciences book than the boys ($t= 2,70$, $p= .008$) but in explaining the meanings of the history book concepts there was no significant difference between the genders.

The results of the study show that there are many students who enter secondary school with very poor reading comprehension skills. Therefore, it is important that the students are taught to comprehend texts related to different school subjects. They should learn to choose the best strategies when reading various types of texts. The textbooks of different school subjects may be constructed differently and contain different vocabulary and concepts. Consequently, the students need to be taught how the text context helps to understand the meaning of an unfamiliar word.

Keywords:

reading comprehension, gender, textbooks, deriving the meaning of words

Introduction

When studying almost any area in the school curriculum, the students use texts to acquire new information. It seems that for the students in primary, and especially, in secondary school, the textbooks are still today a central source of information in content area classes. A considerable part of the time they spend in their classroom and doing their homework is involved in textbook material. To become academically successful they have to learn to comprehend the contents of the textbooks and find the main ideas in the texts they include. However, many students do not succeed in this. The texts contain words and concepts that are unfamiliar for them. Furthermore, they may not notice the organizational features that are intended to help text comprehension. They are unaware of the purpose of text features such as bold or italic print and coloured headings. In addition, they do not use the information the titles, sub-headings, and pictures provide. Consequently, they get frustrating experiences when trying to learn from texts that are too difficult and their motivation to study declines. (Allington, 2002; Conderman & Elf, 2007; Merisuo-Storm & Soininen, 2012.)

Reading comprehension

Reading comprehension is a complex process: the reader constructs meaning by interacting with text using his or her previous knowledge and experience and the information that can be found in the text. The more background information related to the text the reader possesses, the easier it is for him or her to understand the text. When reading he or she activates the previous knowledge about the topic. Moreover, each text is unique as regards the structure of the text, its genre, vocabulary, and language. Several factors influence a reader's interaction: how easy the text is to read, how accurately it follows the conventions of its genre or structure, the language it is written in, and even the type and the size of font. (Blair-Larsen & Vallance, 2004; Pardo 2004.) When reading non-fiction, the readers need to comprehend the topic, learn new facts related to it, and be able to find and remember the central information. Skilful readers find several pieces of information in the text that make the understanding easier and locate the basic facts from the text. (Scharer, Pinnell, Lyons, & Fountas, 2005.)

Integrating the teaching of comprehension strategies to learning information in content areas could effectively develop pupils' reading skills. However, research has shown that during the first school years the children do not get many opportunities of reading and writing information texts in school. (Fang, 2008; Reutzel, Smith, & Fawson, 2005.) Therefore, they are able to understand narrative texts more easily than information texts. Information texts often have complex structures and include new concepts. (Best, Floyd, & McNamara, 2008; Williams, Hall, Lauer, Stafford, DeSisto, & deCani, 2005.) Still, during the next years most of the reading materials they encounter are expository texts. School knowledge is constructed through expository language and therefore teachers should give more attention to the features of this language. The pupils need help to be able to learn from expository text. The teachers should discuss the features of textbooks, e.g. boldface words, diagrams, and photographs with captions with their pupils. This makes it easier for young readers to learn more content and meet the

language demands presented in textbooks. (Bryce, 2011; Guthrie & Klauda, 2012; Swanson, Edmonds, Hairrell, Vaughn, & Simmons, 2011.)

Textbooks include many words that are unfamiliar to pupils. If an important word or concept is unknown, it is possible that the meaning of the whole text passage remains unclear to the readers. Pupils should be taught to derive the meaning of an unknown word from written context. Strategies for deriving the meanings of words from context focus on using pieces of information the text provides to infer the meanings of unknown words. The pupils' ability to derive a word meaning improves if they have an opportunity to explain the reasoning behind their definitions or the correct definitions of the words. Their skills improve also when they hear the teacher and other pupils think aloud during the word explanation process. (Cain 2007; Tomesen & Aarnoutse, 1998.)

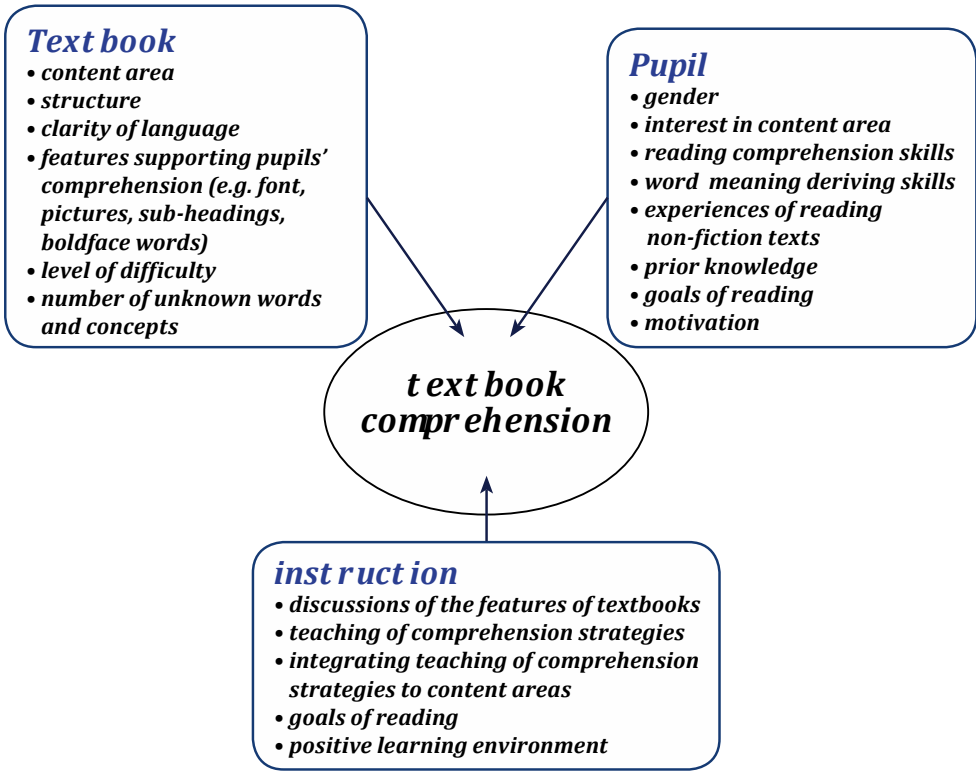
Good readers summarise while reading and it helps them to remember and connect the important ideas of the text. Nevertheless, many students struggle with determining the main ideas and themes of the text as well as combining similar ideas, and synthesising them into a coherent whole. Often they just repeat most of the text or give a very vague statement. Still, a good summary should give a whole picture of the story, and include only the important parts in the same order as the text as well as the knowledge of how they are related. (Diehl, 2005.) The older the pupils get the more they need their comprehension skills to acquire new information. They are, after reading a text, frequently expected to remember the main ideas and concepts from the assigned passage. In addition, they are often asked to explain their decisions.

Already after four school years the pupils are expected to have good reading skills that enable them to use reading as a tool for acquiring new information in content areas. However, still after six school years some pupils have great difficulties in comprehending different texts. (Merisuo-Storm 2010) There are also great differences in pupils' reading motivation. Their interest in reading content area textbooks depends on one hand on the topic of the text and on the other hand on the learning environment. As was mentioned above, the more background information related to the text the reader possesses, the easier it is for him or her to understand the text. In addition, the pupils are more motivated to read the texts that are related to the topics that they are interested in. They think that the texts are worth reading if they provide new information that is important to them. It seems that especially boys do not want to do tasks that they do not consider meaningful. (Ramsey & Sperling 2015; Merisuo-Storm 2010; Merisuo-Storm & Soininen 2014.)

As Guthrie and Klauda (2012) write, "the most overwhelming obstacle is boredom". Also skilful readers may consider the contents of a textbook uninteresting. However, a pupil's interest in the topic of the text has a positive effect on his or her reading comprehension. It has been found that the interest level of the reading material has a stronger influence on boys than on girls. When a boy considers the content of a text interesting, he wants to understand what he is reading. This stimulates processes that are important in

comprehension, for instance, making inferences based on text and the reader's previous knowledge. Nonetheless, girls comprehend both fiction and non-fiction better than boys and the difference between the two genders' skills becomes even more significant in higher grades. Boys often lack ability to read texts effectively; they do not read texts from the beginning to the end but dip in and out. Since there will be several occasions when they have to read and understand texts that they find uninteresting, it is necessary to teach them suitable reading strategies. (Oakhill & Petrides, 2007; Prado & Plourde, 2011; Topping, Samuels, & Paul, 2008.) Figure 1 shows how the pupil, instruction and textbook influence a pupil's comprehension of a textbook.

Figure 1: The influence the pupil, the textbook, and the instruction have on the pupil's comprehension of a textbook



The study

The goal of the study was to find out 1) how well sixth graders (11–12 year-olds) comprehend the textbooks used in the sixth grade history and natural sciences classes; and 2) if there are differences in the girls' and boys' reading comprehension skills. Altogether, 247 pupils (122 girls and 125 boys) took part in the study. They all studied in schools located in southern Finland. About half of them read a text about whales in their natural science book and the other half a text about the Great Wall of China in their history book. After reading the text, the pupils answered ten questions and explained the meaning of ten words underlined in the text.

Results

In the questionnaires related to both textbook chapters there were four questions to which the answers were directly found in the texts. Answering five questions in both questionnaires required combining different pieces of information from the text or making inferences. Answering one question in both questionnaires required deeper understanding and reasoning.

In both groups, the pupils had no difficulties in answering those questions to which the answers were directly found in the texts. The easiest question related to the history book text was *Why was the Great Wall of China built?* and *What were the new inventions that the Chinese had made?.* Almost all pupils (98%) answered the first question correctly and 82% the second one. The easiest questions related to the natural science book text were *How long the whales can be submerged?* and *What are the krills?* Almost all pupils (94%) answered the first question correctly. However, the second one was a little more difficult because only 77% of the pupils gave a correct answer.

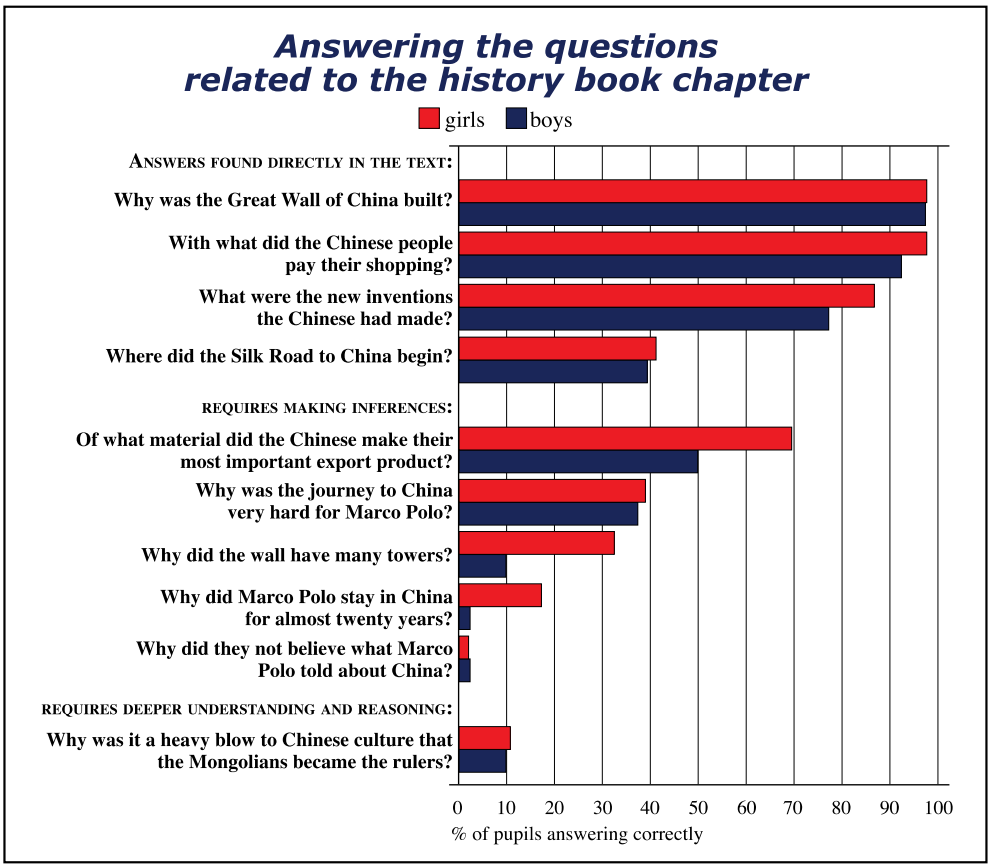
Those questions proved to be considerably more difficult that required inference skills. For the pupils in the history book group the most difficult to answer was *Why did they not believe what Marco Polo told about China?.* Only 2% of them succeeded in finding a correct answer: e.g. China was in many aspects more advanced than the European countries and their inventions were unfamiliar to the Europeans. This question proved to be even more difficult than the question that required deeper understanding of the text and own reasoning: *Why was it a heavy blow to Chinese culture that the Mongolians became the rulers of China?.* Only 11% of the pupils could answer this question correctly. The best example of a correct answer was: 'Chinese people had until that been able to live in peace. Now the Mongolians could change their culture and habits because the most important offices were held by the Mongolians'. For the natural science group the most difficult question was *In what way has the number of whales varied and what are the reasons behind the variation?*. Only 9% of the pupils gave a correct answer that included all three pieces of information that were found in the text. However, one third of the pupils (33%) answered the question that required deeper understanding of the text and own reasoning correctly: *What does the title of the chapter 'The giants of The Pacific' mean?.*

The girls succeeded in both groups significantly better than the boys in answering the questions (history book group t= 2.73, p= .008; natural science group t= 3.57, p= .000). In the natural science group, the two pupils who answered all questions correctly were both girls. In the history group, while one third of the girls (33%) understood why there were many towers on the Great Wall only 10 % of the boys gave a correct explanation. All in all, the text in the history textbook proved to be more difficult to understand – for both the girls and the boys – than the text in the natural science book. Consequently, the pupils need teacher's guidance especially when reading the textbooks in history lessons. For instance, it was surprising that 61 % of the pupils could not answer the question *Where did Silk Road to China begin?* correctly although there was a map

above the text passage where the road was clearly marked. Equally surprising was that in the natural science group two thirds (66%) of the pupils did not understand the meaning of the title of the chapter. As was mentioned above, it is important that the teachers discuss the features of textbooks, e.g. boldface words, diagrams, and photographs with captions with their pupils. (Swanson et al., 2011.)

The results show that for the sixth graders the history book text was more demanding than the natural science book text – as well for the girls and the boys. In the history book questionnaire, there were four questions that less than one third of the pupils could answer correctly. In the natural science book questionnaire, there was only one equally difficult question. Although the pupils in Finland have hardly ever seen whales, many pupils – especially girls – are interested in animals. Therefore, they have background information that helps them to comprehend that kind of text that the natural science book includes. The contents of the history textbook were more difficult to understand. Figure 2 shows the girls' and the boys' success in answering the questions related to the history book chapter.

Figure 2: The girls' and the boys' success in answering the questions related to the history book chapter



Deriving the meaning of the words and explaining them proved to be a demanding task for many pupils. Sometimes it was also difficult for the pupils to explain words even if they understood what they meant. However, it seems that same pupils succeeded best

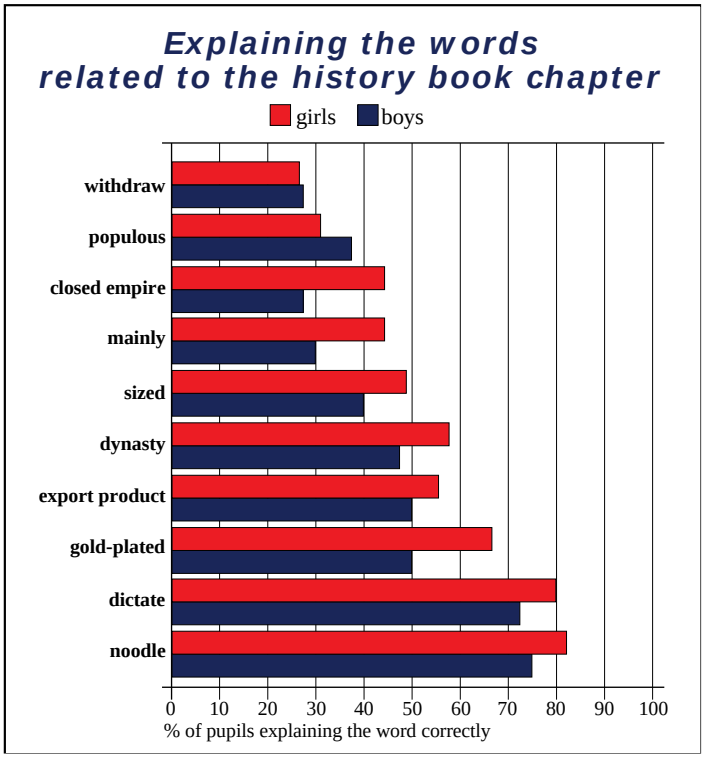
in answering the questions and explaining the words. There is a strong correlation between these two tasks (r= .39**, p .000). When explaining the words the pupils were instructed to consider how they would explain them to a friend who does not know what the words mean. When reading the results, one has to take into account that there are differences between Finnish and English language. Consequently, the words may be more difficult in Finnish or in English. The words on both questionnaires included four nouns, three verbs, two adjectives, and one particle. The easiest to explain proved to be the concept *valaiden laulu* [whales' song] in the natural science group's questionnaire as 91% of the pupils gave a correct explanation. Most pupils (86%) could also explain the word *vaeltaa* [migrate]. In the history book questionnaire, the easiest word was *nuudeli* [noodle] and 79% of the pupils explained it correctly. Almost as many pupils (77%) explained correctly the verb *sanella* [dictate].

The textbooks included also words that were not familiar to most of the pupils. They could not derive the meanings of these words from the context either. However, it is possible that even if the pupils understood a word they could not always explain it. In the history book text, the most difficult word was the verb *perua* [withdraw]. Only 27% of the pupils gave an acceptable explanation. Only one third of the pupils (34%) explained correctly the word *väkirikas* [populous; verbatim translation from Finnish 'rich of people']. This was the only word that the boys explained slightly more successfully than the girls. The particle *lähinnä* [mainly] in the sentence: 'At the end of the 1000th century, gunpowder was used in China mainly in firework displays' was almost as difficult to explain. Only 37% of the pupils succeeded in the task.

In the science book text, the adjective *virtaviivainen* [streamlined] was used to describe the appearance of the whales. Less than one fourth (23%) of the pupils could explain the word. In the textbook the noun *haaremi* [harem] was used to describe the group of female whales that a male whale had around him. Only 28% of the pupils explained it correctly. In addition, the particle *jopa* [as much as] seemed to be difficult to explain. A little more than one third of the pupils (37%) explained it correctly. It seems that the pupils were not used to explaining words and concepts because often they used the same word in the explanation (e.g. withdraw means to withdraw something; withdraw means to withdraw his words).

The chapters of the textbooks that were used in this study included many other difficult words too. In the history book wordlist, there were only two words that more than 70% of the pupils explained correctly. Four words were too difficult for half of the pupils and four words could be explained by 50–60 % of the pupils. Only 3% of the pupils explained all words correctly and 5% of the pupils could not explain any of them. This can make understanding of the whole chapter impossible for them. In word explaining, the difference between the two genders was not significant in the history book group. The girls' results were only slightly better than the boys' results (max. 10; girls: mean 5.4, SD 2.2; boys: mean 4.6, SD 2.4). Figure 3 shows the pupils' success in explaining the words related to the history book chapter.

Figure 3: The girls' and the boys' success in explaining the words related to the history book chapter



However, in the natural science book group the girls succeeded notably better than the boys (max. 10; girls: mean 6.2, SD 2.20; boys: mean 4.58, SD 2.39). The difference between the two genders was significant (t= 2.70, p= .008). Although the words in the natural science book seemed to be easier to explain than those in the history book many pupils had difficulties in understanding them too. In the natural science book wordlist, there were four words that more than 70% of the pupils explained correctly. Four words were too difficult for half of the pupils and two words could be explained by 50–60 % of the pupils. Only 3% of the pupils explained all words correctly and 2% of the pupils could not explain any of them.

Conclusion

The results show that the pupils need help when reading the textbooks that are used in the content area classes. In this study, especially the sixth grade history textbook proved to be too difficult for many pupils. It is important that the pupils are taught how to read the textbooks of different school subjects. They should learn to choose the best strategies when reading various types of texts. The textbooks of different school subjects may be constructed differently and contain different vocabulary and concepts. Consequently, the students need to be taught how the text context helps to understand the meaning of an unfamiliar word. They should learn what kind of clues a text can provide and how to find those clues. The results of the study showed that deriving the

meaning of an unknown word from the written context is very difficult. It seems that the pupils had not had enough practice in it because they often produced a meaning for a word that it has in some other context. The publishers should also be aware what kind of text is suitable for the pupils in different grades. If the text includes too many unfamiliar words, the idea of the whole text can remain unclear.

As an explanation for the fact that the girls succeeded significantly better in explaining the words in the natural science book than the boys may be that they found the text more interesting. It is also possible that the boys are more interested in history than in animals. As was mentioned above, a pupil's interest in the topic of the text has a positive effect on his or her reading comprehension. In addition, the interest level of the reading material has a stronger influence on boys than on girls. When a boy considers the content of a text interesting, he wants to understand what he is reading. (e.g. Guthrie and Klauda 2012.) The use of versatile learning materials in addition to textbooks could help to make learning easier and more interesting.

The results show that children are not used to answering questions that require ability of making connections and inferences. In addition, many of them were happy to give as an answer only one piece of information although there would have been several ones in the text. They were not able to use pictures as a source of information either. Parker and Hurry (2007) argue that a problem is that direct oral questioning seems to be the dominant strategy for teaching reading comprehension. Often this kind of directive questioning produces predictable correct answers. More infrequent are teachers' questions that assist pupil to develop more elaborated ideas. Even if the range of teachers' questions is wide and appropriate pupils' role may be too passive. Furthermore, my previous studies (2010) have shown that when reading non-fiction text the sixth graders have great difficulties in determining what the main ideas in a text are. Trivial details in the text may catch a young reader's attention instead. It would be important to teach how to locate them when reading. That would make understanding the textbooks easier.

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