

[DOI: 10.20472/IAC.2016.022.036](https://doi.org/10.20472/IAC.2016.022.036)

TUULA MERISUO-STORM

University of Turku, Department of Teacher Education in Rauma, Finland

SIXTH-GRADERS' ABILITY TO UNDERSTAND TEXTBOOK VOCABULARY

Abstract:

My previous study aimed to find out how well primary school pupils are, after six school years, able to derive the meaning of an unknown word from written context when reading a non-fiction text. For this purpose, 158 sixth-graders read a newspaper article about a shipwreck found at the bottom of the Baltic Sea. After reading the text, the pupils were asked to explain what ten words underlined in the text meant in this particular text. The results showed that several pupils had great difficulties in the task. One third of them explained less than half of the words correctly. Only 8% of them explained all the words correctly and 5% of them could not explain any of them.

Still today, the textbooks are for the pupils an important source of new information. Therefore, it was necessary to explore if the vocabulary used in these books contains words that they do not understand. In addition, the aim was to find out if the pupils have learned to derive the meanings of unknown words from the text context. Altogether, 247 sixth-graders took part in the study. About half of them read a chapter about whales in their natural science book and the other half a chapter about Great wall in China in their history book. After that the pupils explained the meanings of ten words underlined in the text. The results show that both textbook chapters contained words that were unfamiliar to many pupils.

In the history book group, one third of the pupils explained less than half of the words correctly. Only 2% of them explained all words correctly and 4% of them could not explain any of them. Although the words in the natural science book seemed to be easier to explain, many pupils had difficulties in understanding them too. In the natural science book group, 22% of the pupils explained less than half of the words correctly. Only 3% of the pupils explained all words correctly and 2% of the pupils could not explain any of them.

When comparing the results with the results of the previous study, it is obvious that for the sixth-graders the text in their textbooks is almost equally difficult to understand than newspaper articles. If the text includes several words that remain incomprehensible to the reader, it is possible that the comprehension of the text and acquiring new information from it is impossible.

Keywords:

Deriving word meaning from context; textbooks; sixth graders

Introduction

According to the Finnish core curriculum (2014), the fundamental task of literacy teaching is to awaken pupils' interest in language, literature and culture. The goal is that pupils learn to read fluently and develop their reading comprehension, communication, and information acquisition skills. The foundation of literacy teaching is a broad conception of text. For the pupils, language is both an object and a tool of learning and thus the basis of all learning. When studying any area in the school curriculum, pupils need good reading skills. For instance, one of the goals of history instruction is to strengthen pupils' ability to comprehend the texts about history and to understand the information that historic environments provide. The pupils are encouraged to make their own interpretations, to compare, to draw conclusions, and to apply acquired information both orally and in writing. Similarly, the instruction of natural science is based on scientific knowledge and accordingly it is important that the pupils learn to understand and critically evaluate the information they acquire from different sources.

For the pupils in primary school, the textbooks seem to be still today a central source of information in content area classes. A considerable part of the time they spend in their classroom 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. Therefore, 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.)

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. The importance of content-area texts increases in the curriculum and they may be used as a primary source of information and required learning. When studying every day several different subjects, pupils need a well-developed word knowledge base of all these content areas. (Hairrell, Simmons, Swanson, Edmonds, Sharon Vaughn & Rupley, 2011; Merisuo-Storm, 2010.) However, for many pupils the density of unfamiliar vocabulary prevents their ability to comprehend the texts they read in different classes. Often these texts of different subjects include low-frequency words that do not appear in other contexts. Thus the pupils do not encounter these words in other contexts and this reduces the multiple exposures the pupils need to internalise word meanings and develop the ownership of the words. Nevertheless, pupils need a thorough understanding of vocabulary because the words may represent important concepts. (Hairrell et al., 2011; Harmon, Hedrick, & Wood, 2005.)

The pupils should learn that familiar words often have other meanings in different contexts. When asked what a word in a text means, they may give an explanation that does not fit in the content of the text at all. Because they have known that meaning of the word for a long time they do not question its correctness. (Merisuo-Storm &

Soininen, 2012.) This means that pupils' vocabulary knowledge is not deep enough. Breadth and depth are two facets of vocabulary knowledge. Therefore, pupils should learn new meanings for familiar words in different content area classes. Many words have both a common meaning and a specialised meaning for a particular subject area. It is important to increase both the number of words in pupils' vocabulary and the extent of word knowledge for these words. Instruction should ensure that pupils have conceptual understanding of content area vocabulary. This is indispensable for success in any subject. (Harmon, Hedrick, & Wood, 2005; Ouellette, 2006.)

Deriving the meaning of a word from text context

As was mentioned above, textbooks include 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. Therefore, pupils should be taught to derive the meanings of unknown words from written context using pieces of information the text provides. The pupils' ability to derive a word meaning improves if they have an opportunity to explain the reasoning behind their own definitions or the correct definitions of the words. Their skills develop also when they hear the teacher and other pupils think aloud during the word explanation process. (Cain 2007; Tomesen & Aarnoutse, 1998.) However, the results of Fukkink's (2005) studies show that primary school pupils use various activities and meet several problems in deriving the meaning of conceptually challenging words from a written context.

There are several factors that can make deriving the meaning of a word difficult. Crucial factors are the complexity and the concreteness of the word. If the word is related to a known concept, it may be easy to understand. However, it is possible that the word refers to unfamiliar concepts. Furthermore, the complexity of the task is also influenced by the nature of the text context. It may provide explicit clues but does not reveal the full meaning of a word. It can even be misleading. (Fukkink, 2005; Goerss, Beck, & McKeown, 1999.) In addition, the distance between the word and its cues has an influence on a pupil's ability to derive the meaning. In expository texts, a reader often has to combine information from several idea units, which are in various places throughout a text passage. The longer the distance between the pieces of information the more difficult the task is. A pupil's weak working memory makes the process even more demanding. (Cain, Oakhill, & Lemmon, 2004.)

Background for the study

The goal of my previous studies has been to find out how well the pupils at second, third, fourth and sixth grade understand the vocabulary used in non-fiction texts aimed for their age group. The results show that these texts include words that are unknown for several pupils. In addition, the pupils could not derive the meanings of the words with the help of the cues that the text context provided. Several pupils had difficulties in explaining the words even if they understood what they mean. Often the problem was that the word has several different meanings in different contexts and the pupils gave the first explanation that came into their mind. They did not consider if the explanation fitted in the content of the text. This may indicate that some pupils did not

comprehend the contents of the text at all. At all grades, the girls succeeded better than the boys in explaining the words.

The second graders' (8-year-olds) skills were assessed with two different tests. The first test measured how well 188 second graders were able to explain ten words underlined in a non-fiction text about big cats. The second test measured 598 pupils' (296 girls, 290 boys) ability to explain ten words in a short article published on the young readers' page of an easy to read newspaper. The tasks proved to be very difficult. It seems that many pupils did not even understand what they were supposed to do. In both tests, the maximum score was 10. In the non-fiction test the mean value was 3.7 (SD 2.4) and 16% of the pupils could not explain a single word correctly. The words in the newspaper article seemed to be even more difficult. In this test, the mean value was 2.5 (SD 2.2) and 23% of the pupils had not explained any of the words correctly. Because in both texts there were some words that have other meanings in different contexts, it was stressed in the instructions that the pupils should write what the words mean in this particular text. However, several pupils gave explanations that did not fit in the contents of the text. Furthermore, some pupils had difficulties in explaining the words even if they understood what they meant. They often gave explanations that included the word that they were supposed to explain. In other words, they explained the word with the same word.

The results at the third (9-year-olds), fourth (10-year-olds), and sixth grade (12-year-olds) were similar. Again, several pupils gave explanations that the words have in another context. It was obvious that many pupils were not able to utilise the cues that the text context provided. The third graders' task was to explain ten words in a text about a rabbit hopping contest and the fourth graders explained ten words underlined in a text about pyramids. The sixth graders read an article about shipwrecks that had been published in a local newspaper. Also in this text there were ten words underlined. In all age-groups, there were pupils who could not explain any of the words correctly. At the third grade, the pupils' aggregated scores varied between 0–10 (mean 5.95, SD 2.0). Only 3% of the pupils had explained all ten words correctly. Also at the fourth grade, the pupils' aggregated scores varied between 0–10 (mean 5.98, SD 2.2) and only 5% of the pupils had explained all words correctly. Still at the sixth grade, 7% of the pupils could not explain any of the words correctly. The pupils' aggregated scores varied between 0–10 (mean 4.90, SD 2.7) and only 6% of the pupils had explained all words correctly. At all grades, the girls succeeded better than the boys in the task. Based on the results of these studies, it was necessary to find out how well the pupils comprehend the textbooks that they use when studying different school subjects.

The study

The goal of the study was to find out 1) how well sixth graders (11–12 year-olds) understand the vocabulary of the chapters in the sixth grade history and natural sciences textbooks; and 2) if there are differences in girls' and boys' ability to explain the words the chapters include. 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 explained the meaning of ten words underlined in the text.

Results

Deriving the meaning of the words and explaining them proved to be a demanding task for many pupils. Sometimes, it was difficult for the pupils to explain words even if they clearly understood what they meant. When explaining words, the pupils were instructed to think how they would explain them to a friend who did not know what the words mean. When considering the results, one must take into account that there are differences between the Finnish and English languages. Consequently, different words may be more difficult or common in one or the other. The words on both questionnaires included four nouns, three verbs, two adjectives, and one particle. The easiest words to explain proved to be the concept “valaiden laulu” [whales’ song] on the natural science group’s questionnaire, as 91% of pupils gave the correct explanation. The word was in the sentence “The whalebone whales’ sound, whale song, is magnificent bellowing”. Most pupils (86%) could also explain the word “vaeltaa” [migrate] in the sentence “Every year they migrate to the warm waters in the equator area”. On the history book questionnaire, the easiest word, which 79% of the pupils explained correctly, was “nuudeli” [noodle] in the sentence “He ate noodles that were later called spaghetti in Italy”, Almost as many pupils (77%) explained the verb “sanella” [dictate] in the sentence “While in prison, he dictated a description about his travels...” correctly.

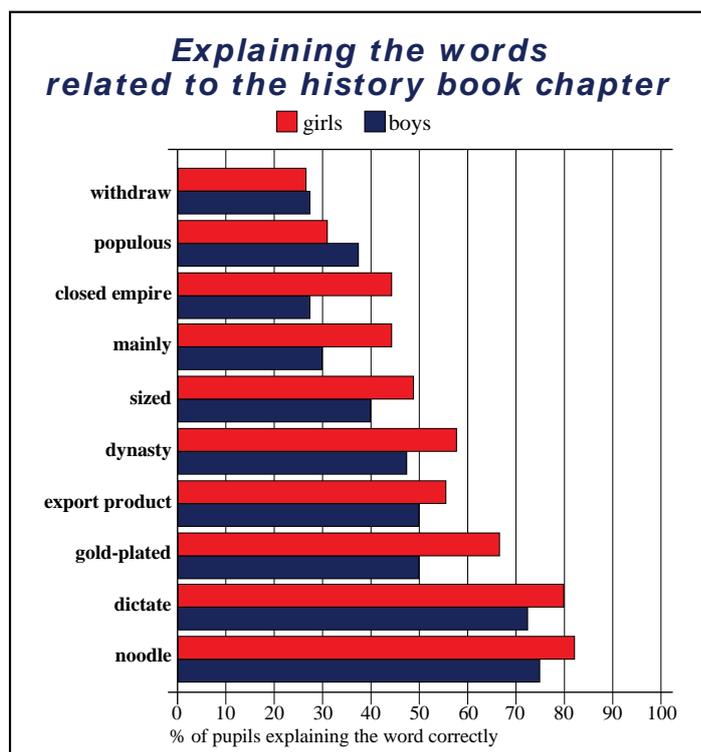
Both textbooks included words that were not familiar to most pupils, and they could not derive their meanings from the context either. However, it is possible that even if the pupils understood a word, they could not always explain it. In the history book text, the most difficult word was the verb “perua” [withdraw] in the sentence “Marco Polo’s friends asked him to withdraw at least his biggest lies about China”. 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’] in the sentence “The peoples on the banks of the Yellow River merged gradually into the most populous nation of today, China”. 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 10th century, gunpowder was mainly used in China for firework displays” was almost as difficult to explain. Only 37% of the pupils succeeded in that task.

In the science book text, the adjective “virtaviivainen” [streamlined] was used to describe the appearance of whales in the sentence “... they are streamlined like the fish”. Less than one fourth (23%) of the pupils could explain that word. The noun “haaremi” [harem] was used to describe the group of female cachalots that a male cachalot has around him, in the sentence “Adult cachalots gather for themselves a harem of about twenty females”. Only 28% of the pupils explained it correctly. In

addition, the particle “jopa” [as much as] proved difficult to explain, a little more than one third of the pupils (37%) explained it correctly. The results suggest 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 several other difficult words. 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 at least half of the pupils and four words could be explained by 50–60 % of the pupils. Only 3% of the pupils explained all the words correctly, while 5% of the pupils could not explain any of them, which could make understanding the chapter as a whole impossible or nearly so for that group. In word explanations, 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 1 shows the pupils’ success in explaining the words related to the history book chapter.

Figure 1: 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 were notably more successful than 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 still had difficulties in understanding them. 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 at least 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, whereas 2% could not explain any of them.

Conclusion

The results of the study are similar to the ones of my previous studies. The texts of history and natural science textbooks include words that were unknown for several pupils. Furthermore, the pupils could not derive the meanings of the words with the help of the cues that the text context provided. Writing the explanations of the words seemed to be difficult for them too. As Hairrell et al. (2011) and Harmon et al. (2005) have found, the textbooks of different subjects include low-frequency words that do not appear in other contexts. While the pupils do not encounter these words in other contexts, they do not internalise word meanings and develop the ownership of the words. The results of my study show that pupils did not pay attention to the possibility that a word may have other meanings than the one that is the most common. This indicates that pupils' vocabulary knowledge is not deep enough. (Harmon et al. 2005; Ouellette, 2006.) Therefore, pupils should learn new meanings for familiar words in different content area classes. Instruction should ensure that pupils have conceptual understanding of content area vocabulary.

In my study, especially the vocabulary in the sixth grade history textbook proved to be too difficult for many pupils. 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 was very difficult, indicating that the pupils had not had enough practice at that skill, because they often chose a meaning for a word that it carries 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.

An explanation for the fact that the girls were significantly more successful than boys in explaining the words in the natural science book may be that they found the text more interesting, just as it is possible that boys are more interested in history than in animals. The interest level of 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 beyond traditional textbooks could help to make learning easier and more interesting.

Reference

- ALLINGTON, R. (2002) You can't Learn Much from Books You Can't Read. *Reading and Writing in the Content Areas*. 2002, Vol. 60, No. 3, 16–19.
- CAIN, K. (2007) Deriving word meanings from context: does explanation facilitate contextual analysis? *Journal of Research in Reading*. 2007, Vol. 30, No. 4, 347–359.

- CAIN, K., OAKHILL, J., & LEMMON, K. (2004) Individual differences in the inference of word meanings from context: The influence of reading comprehension, vocabulary knowledge, and memory capacity. *Journal of Educational Psychology*, 96 (4), 671–681.
- CONDERMAN, G. and ELF, N. (2007) What's in this book? Engaging students through a textbook exploration activity. *Reading & Writing Quarterly: Overcoming Learning Difficulties*. 2007, Vol. 23, No. 1, 111–116.
- FINNISH NATIONAL CORE CURRICULUM (2014). Helsinki: Ministry of Education.
- FUKKINK, R.G. (2005) Deriving word meaning from written context: a process analysis. *Learning and Instruction*, 15 (1), 23–43.
- GOERSS, B.L., BECK, E.L., & MCKEOWN, M.G. (1999) Increasing remedial students' ability to derive word meaning from context. *Reading Psychology*, 20 (2), 151–175.
- GUTHRIE, J.T. & KLAUDA, S.L. (2012) Making textbook reading meaningful. *Educational Leadership*. 2012, Vol. 69, No. 6, 64–68.
- HAIRRELL, A., SIMMONS, D., SWANSON, E., EDMONDS, M., SHARON VAUGHN, S., & RUPLEY, W.H. (2011) Translating Vocabulary Research to Social Studies Instruction: Before, During, and After Text-Reading Strategies. *Intervention in School and Clinic*, 46(4), 204–210.
- HARMON, J.M., HEDRICK, W.B. & WOOD, K.D. (2005) Research on Vocabulary Instruction in the Content Areas: Implications for Struggling Readers. *Reading & Writing Quarterly*, 21(3), 261–280.
- MERISUO-STORM, T. (2010) Primary school students' reading comprehension skills. In *Education in Finland*. Taipei: Taiwan National Institute of Educational Resource and Research.
- MERISUO-STORM, T. and SOININEN, M. (2012) Constructing a research-based program to improve primary school students' reading comprehension skills. *IJCDSE, International Journal for Cross-Disiplinary Subjects in Education*. 2012, Vol. 3, No. 3, 755–762.
- QUELLETTE, G.P. (2006) What's Meaning Got to Do With It: The Role of Vocabulary in Word Reading and Reading Comprehension. *Journal of Educational Psychology*, 98(3), 554–566.
- TOMESSEN, M. and AARNOUTSE, C. (1998). Effect of an instructional programme for deriving word meanings. *Educational Studies*. 1998, Vol. 24, No. 1, 107–128.