

Developing Reading Literacy in the Teaching Of Geography¹

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Abstract: The subject of reading literacy is a current and frequently discussed topic of the 21st century, and not only in Slovakia. Contact with information presented in a written form necessarily belongs to various areas of everyday human life. From the results of international studies, it is clear that the younger generation of school-age children does not even attain the average level in this skill. The school environment plays the most important role in terms of developing the reading literacy of pupils and all its aspects. The main aim of the present research was to find out and compare the level of reading literacy achieved by pupils of primary and secondary schools with the help of a geographically-oriented text. The research involved 70 pupils at the ISCED 2 and ISCED 3A levels of education. The methods of complex tasks and a cloze test were used. The results of the research confirmed, among other things, that the level of literacy is related to the age and sex of pupils. In the article we also present methodological suggestions suitable for the development of reading literacy and its testing using geographically-oriented texts.

Key words: reading literacy, teaching of geography, PISA, PIRLS

Theoretical basis of reading literacy

In practically all areas of our lives we meet with the demand for the full and effective use of a written text as a source of knowledge - in the school environment, in the workplace, and in leisure activities. It is the school environment, irre-

placeable in the process of developing this skill, which attracts the attention of the general public to the greatest extent. Pupils are regularly tested in international studies (PISA, PIRLS) and compared to pupils from other countries within different education systems. In Slovakia - according to the results of these studies - it is nowadays generally accepted

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that a Slovak pupil reaches only a sub-average reading literacy level within the OECD countries (Miklovičová et al., 2017). Since the first data on the reading literacy level of our pupils was obtained, our education system has undergone various changes, including efforts to implement the goals of developing reading literacy within the everyday school reality. However, these individual steps are, in most cases, limited to a few learning areas, while there is still considerable potential for the inclusion of tasks with such an orientation into the curriculum of all subjects with a cognitive focus (Mulicáková & Ustohalová, 2015). Without the ability to read, pupils have limitations in terms of the depth and breadth of the scientific knowledge they can gain and hence in their scientific literacy (Fang & Wei, 2010).

In the present research we therefore focused on testing the level of reading literacy in a sample of 70 elementary and high school pupils. We also present appropriate methods and tasks for its development and testing under the specific conditions of teaching geography. Our intention is to point out that the school subject Geography offers numerous opportunities to orient teaching towards working with a text and actively using the information it contains. At present, the concept of literacy can be found in various contexts and areas of everyday life (Gavora, 2006). In publications (e.g. Harris & Hodges, 1995) we find different historical, cultural, and geographical

interpretations which show that literacy involves a wide range of individual abilities, knowledge, and skills and their functional use (Zápotočná, 2012). However, no matter what connotations literacy is associated with, it is impossible to overlook its socio-cultural aspect (Gavora, 2006). It represents a phenomenon in which cultural and social standards and conventions are mirrored (Humajová & Klačanská, 2007). We can distinguish several models, e.g. early literacy, basic, functional, complex, mathematical, and scientific (Maršák & Janoušková, 2006; Faltýn et al., 2011), as well as reading literacy.

The notion of reading literacy was brought to the attention of people in the 21st century through OECD-led international studies - a PISA assessment study aimed at pupils aged 15 and up to the mandatory schooling age and a PIRLS study targeting 9- and 10-year-old students. Both studies were influenced by the concepts of functional literacy (Harris & Hodges, 1995). While the PISA international study works with reading literacy as one of several other areas that are studied, the PIRLS study focuses on it directly (Galádová et al., 2013).

In its current form, reading literacy is, by definition, very close to functional literacy. In essence, in the effective and active use of literacy in society, they significantly overlap. Its definition can be found in various publications (e.g. Humajová & Klačanská, 2007; Húsková & Hlušková, 2013), but it is most clearly

defined in the PISA and PIRLS studies. PISA's reading literacy is characterized as *"a complex set of reading skills needed to work effectively with the text"* (Heldová, Kováčová, & Galádová, 2013, p. 5). According to the PIRLS study, reading literacy is characterized as 'an ability to understand and use the written language forms which society requires and/or which have value for an individual' (Campbell et al., 2001, p. 3).

In our research we focused on one aspect of reading literacy – a pupil's ability to understand a written text (Lapitka, 2005). The processes of understanding are related to how the learner advances in creating the meaning of a written text. According to Koršňáková (2010), text comprehension processes reflect multiple levels of mental strategies, from the lowest level (finding and obtaining information), through the higher level (integration and interpretation), to the most demanding text-based understanding processes (thinking and evaluation).

Reading literacy in the Innovated State Educational Programme of the subject Geography

In the past, the development of reading literacy was considered to be primarily a domain of the school subject of Slovak language and literature. At present, however, the problem of comprehension of a written text is much more com-

plex (Zmach et al., 2007), and reading literacy is a prerequisite for the use of scientific knowledge (Vasilová & Prokša, 2013). The effort and requirement to use text work is currently implied in the curricula of both science and social studies subjects, including Geography. The issue of effective work with textbooks should become the centre of interest for the whole pedagogical public and should be given more attention in the process of the preparation of future teachers, and not only those of Slovak language and literature (Kababíková, 2015; Húsková, 2012).

The goal of school geography is to understand and recognize the world and the landscape in its full complexity (Karolčík et al., 2015), in which reading literacy in obtaining relevant geographic information is a necessary condition. Nowadays, the amount of information is growing dynamically along with the resources that are available, and therefore a pupil has to know how to process, critically evaluate, select, and subsequently use it in the real world (Obrancová et al., 2004). According to Kašiarová, the subject of geography is typical in that it works with many types of information; pupils have to 'be able to use and interpret maps of different kinds, to work with literature as a source of knowledge (textbooks, professional and popular scientific journals) – correctly understand what they have read, and process and interpret scientific knowledge. The initial development of reading

and interpreting images, photographs, charts, tables, cross-sections, schemes, and diagrams is one of the basic means of expression of geography' (2013, p. 14). In this way, a pupil is supposed to have the opportunity to get in touch with different types of sources of information and tasks focused on the development of reading as well as graphic and cartographic literacy.

Within the ISEP of lower secondary education in the school subject Geography, the ability to understand a written text and to use the information contained therein is indirectly present in its objectives:

- pupils are able to search for, compare, assess the truthfulness of, and evaluate available information about the country from various sources of information (iŠVPa, 2014).

Within the ISEP of higher secondary education in the school subject Geography the ability to understand a written text and the use of the information contained therein is present more significantly. In the objectives we find the following learning requirements:

- pupils are able to correctly and accurately interpret country information in different forms (charts, tables, diagrams, photographs, films, etc.);
- pupils are able to find, compare, assess the truthfulness of, and evaluate available information about countries from various sources of information (iŠVPb, 2014).

In the performance standard, we find several pupil performance requirements that directly or indirectly include both comprehension of a written text and the use of the information contained therein or place the emphasis on working with tables or charts:

- pupils know/are able to search for and interpret statistical data and important facts from trusted sources of information;
- pupils know/are able to correctly interpret the data on climatic characteristics presented in various graphical and text formats (tables, diagrams, charts, climate diagrams, thematic maps);
- pupils know/are able to correctly interpret the statistical data and economic indicators of the economic performance of individual states of the world and its regions;
- pupils know/are able to identify the 15 most populated cities in the world, locate them on a map, and determine their presence in a particular region (iŠVPb, 2014).

Chosen methods of reading literacy development in Geography

At present, there is a relatively large number of publications dealing with the characterization and selection of effective teaching methods. Our intention

was to select and briefly consider those with which it is possible to develop the reading literacy of pupils in terms of the school subject Geography. The basis for each of these methods is a text, either in a continuous or unrelated form. A pupil should work exclusively with the information contained therein and none of the methods should primarily require the use of knowledge that has already been acquired.

One of the most commonly used methods is a specific type of learning task – complex tasks (Vasilová & Prokša, 2013), specifically multi-component tasks (Černocký et al., 2011). The essence of the method is a worksheet with an introductory text and various types of tasks which require understanding of the given texts. A keyword method develops students' skills to identify and work with the key concepts of a text. Pupils improve their ability to understand a scientific text and to distinguish between what is more and less important (Čapek, 2015). There are several ways to implement this method. Pupils can identify keywords and write them down or highlight keywords from several words that have already been given. An effective way to verify text comprehension is to reproduce a text. When it comes to free reproduction, the task is to select information from the text, sort it out, and transform the text in some way. A text summary method in various forms (conceptual map, table, schema, syllabus, or annotation) requires the skill of being able to

sort out information. The asking of questions by pupils themselves develops their thinking and motivates them to continue working. The most effective questions are survey questions focusing specifically on one or several elements within the text (Gavora & Šrajerová, 2009; Fisher, 2011; Bartošová, 2015). Other effective didactic methods include working with texts using I.N.S.E.R.T. – Interactive Note System for Effective Learning (Haraus, 2011) and cloze tests – working with a continuous but incomplete text which contains omitted words at predetermined intervals. The pupils' task is to fill in these spaces with appropriate words in order to preserve the stylistic and semantic features of the text (Gavora & Šrajerová, 2009). In addition to the above-mentioned methods, several metacognitive reading strategies can also be applied in Geography in schools (Tomengová, 2011).

Individual methods of working with texts should be closely linked to methods aimed at critical assessment of the credibility of information and its resources. The ability to search for and critically evaluate information is an integral part of reading literacy.

Methods of research

A research study aiming at verifying the level of reading literacy was conducted in May and June 2018 in three different grades – in the fifth and eighth grades of an elementary school and the second

year of a four-grade high school in Banská Bystrica. The testing took place at three intervals, each time within one lesson of Geography. In the fifth grade, 25 pupils participated in the research, of whom 12 were boys and 13 girls, in the eighth grade there were 24 pupils including 11 boys and 13 girls, and, finally, in the second grade of a high school 21 students participated, with only six boys and 15 girls. Altogether, 70 pupils (41 girls and 29 boys) participated in the research. Each time, testing took place within one lesson of Geography. With respect to the specifics of the three samples, we created three versions of a worksheet on the topic of the United Kingdom of Great Britain and Northern Ireland - named 'The United Kingdom on the Palm of Your Hand'. The task of the pupils was to apply the ability to understand the text through complex tasks (Vasilová & Proskša, 2013) aimed at different levels of mental strategies (Húsková & Hlušíková, 2013).

An extract from text 1, "A Visit to London", included in the worksheet 'The United Kingdom on the Palm of Your Hand' for the pupils of the second grade at a four-grade high school:

Although this island country seems to be quite remote from our small Central European one when looking at the map of Europe, the flight to the capital city of England, and indeed the UK, did not last more than three hours.

The European metropolis welcomed us with typical British weather - rain and dense fog. The plane had few problems landing there, but let's be honest, who would like to experience the technical difficulties of a train in a tunnel from France? Upon our arrival at the hotel, we heard the news of the problems in the Eurotunnel earlier that morning. Passengers had to stay there four times longer than the usual 35 minutes and imagine that everyone was 40 metres below the ground! Luckily, we chose the plane...

... At first glance, it was clear that the Queen was not in the city at the time of our visit - the flag of the United Kingdom was not waving above Buckingham Palace. The Union Jack was created by bringing together the flags of all three member states - namely England, Scotland and Northern Ireland. The locals told me that it happened in 1801, almost 100 years after the creation of the United Kingdom. It is a combination of countries with a number of specific features, strong national awareness of their inhabitants and partial autonomy, which, in some parts of the country, however, people still do not consider sufficient.

An extract from the tasks accompanying text 1, tasks "A Visit to London", included in the 'United Kingdom on the Palm of Your Hand' worksheet for the pupils of the second grade at a four-grade high school:

On the basis of the information in the text, decide whether these statements are true (T) or false (F). Correct the false statements.

- a) Kristián prefers the train as a means of transport to the United Kingdom.
- b) The passengers on a train from France arrived in England with more than a two-hour delay.
- c) A certain percentage of the population of the United Kingdom is not satisfied with the level of self-government in their countries.

On the basis of the information from the text, answer the following questions.

- a) In which city did Kristián land with his family on the day of his arrival in the United Kingdom?
- b) How, when looking at Buckingham Palace, did Kristián know that the queen was not inside?
- c) What is the name of the flag of the United Kingdom?
- d) In which century was the United Kingdom formed?

Apart from semantic understanding, another form of reading literacy that we verified was syntactic understanding of the text as a whole. Therefore, we included the method of what is called a cloze test (Taylor, 1953; Gavora & Šrajerová, 2009) into the worksheet; this tests the understanding of both levels at the same time. The worksheet was created in such

a way that a pupil could answer the tasks and fill in the missing words in the cloze test only if he/she understood the context, the meanings of most words, the meaning of the given sentence, and the topic. On the basis of the average relative success of solving individual partial tasks, we identified those that were problematic for the pupils. Subsequently, using qualitative analysis, we attempted to analyse these partial tasks and analyse the pupils' solutions.

An extract from the cloze test "A Visit to Scotland" included in the 'United Kingdom on the Palm of Your Hand' worksheet for the pupils of the second grade at a four-grade high school:

Our first stop was the city of Glasgow. _____, when it comes to the population, the third largest city of the United Kingdom _____ much more than at first glance _____ artefacts of the Industrial Revolution. Becoming a modern _____ city, it belongs among the world's largest financial centres. During our stay there, one of the most traditional football _____ was played between the clubs Celtic _____ Rangers and we were able to experience the exceptional _____ throughout the whole city.

To determine the complexity of the texts in the three versions of the worksheets, we chose the following formula for the

Table 1. The levels of reading literacy used in the research

The level of RL fifth-grade PS	The lowest number of points on an RL scale	The level of RL eighth-grade PS and second-grade HS	The lowest number of points on an RL scale
1	20	1b	12
2	25	1a	16
3	29	2	20
4	32	3	24
		4	28
		5	32
		6	36

Explanatory notes: RL - reading literacy, PS - primary school, HS - high school

complexity of the texts (Průcha, 2013) from a wide range of indicators. We calculated the textual complexity of the text T by the relation $T = TS + TP$, where TS represents the syntactic and TP the semantic difficulty of the text. The syntactic difficulty of the text, TS, is calculated by the formula $TS = 0,1 \cdot V \cdot \bar{U}$, where V represents the average number of words in a sentence and \bar{U} represents the average length of the sentence sections (the proportion of the total number of words and the total number of words, except for indeterminate verb forms in the text). The nature of the semantic difficulty of the text is the rate of occurrence of the following five categories of terms in the text: P1 - common terms, P2 - technical terms, P3 - factual terms, P4 - numerical data, P5 - repetitive terms (Chráska, 2007). To calculate the semantic difficulty of the text, we used the following formula:

$$T_P = 100 \cdot \frac{P}{N} \cdot \frac{P_1 + 3P_2 + 2P_3 + 2P_4 + P_5}{N}$$

where P is the total number of terms represented in the text and N is the total number of words that are in the text. The resulting T values range from 1 to 100 - minimum to maximum complexity of a text, but standardized norms indicating the level of difficulty in relation to age have not been developed yet.

On the basis of the total number of points achieved on the individual tasks and cloze test, we divided the pupils into several levels of reading literacy to compare their success in our test with the results of Slovak pupils in international PISA and PIRLS studies. In determining the point range of the levels of reading literacy we created, we were influenced by the score scales of international studies (0 to 1000 points), calculating the percentage values of the boundary num-

Table 2. The rate of complexity of texts used on the worksheet and the average success rate of the respondents (N = 70) by sex and age

Sample		T _s	T _p	T	Success rate - boys (%)	Success rate - girls (%)	Overall success rate (%)
fifth-grade PS	text 1	7.57	17.72	25.29	57.06	67.00	62.12
	cloze test	13.56	15.82	29.38	27.52	33.09	30.42
eighth-grade PS	text 1	21.76	21.55	43.31	80.24	76.47	78.18
	cloze test	13.52	17.06	30.58	50.42	55.00	52.91
second-grade HS	text 1	28.13	21.60	49.73	73.53	80.41	78.41
	cloze test	23.58	16.32	39.90	50.00	65.24	60.91

Explanatory notes: T_s - the rate of syntactic complexity, T_p - the rate of semantic complexity, T - the overall rate of text complexity, PS - primary school, HS - high school

ber of points for each level of literacy by the OECD. These were then applied after slight adjustments to the final score scale used in our research (0 to 50 points). The success of the pupils in the fifth year of elementary schools was classified according to the levels shown in Table 1 and we compared them with the results of PIRLS 2016. The success of the pupils in the eighth year of elementary schools and second year of high schools was classified according to the levels shown in Table 1 and we compared them with the PISA 2015 results.

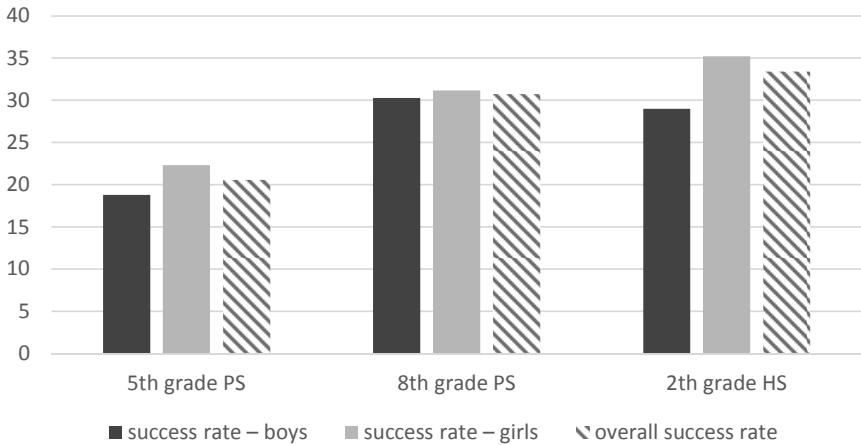
Results

The pupils' results from the reading comprehension tasks of our geographically-oriented text, along with the specific rates of the syntactic and

semantic complexity of the texts on the worksheet - adjusted for each of the three age groups - are shown in Table 2. The results are elaborated in more detail in the other subchapters.

The assessment of the reading literacy level achieved on the basis of pupils' sex and age

When the overall average pupil scores in individual years are compared (Table 2, Graph 1), it is evident that the success rate achieved in solving the problems of understanding the text increased depending on the age of the respondents. In the fifth grade of a primary school, the pupils (10/11 years) achieved an average score of 20.6 points (a 41.2% success rate). The pupils in the eighth grade of a primary



Graph 1. The average scores of the respondents (N = 70) by sex and age

school (13/14 years) achieved an average score of 30.75 points (a 61.5% success rate). The pupils in the second grade of a high school (16/17 years) achieved an even better average score of 33.43 points (a 66.7% success rate). The highest score achieved in individual years increased in direct proportion to the age; in the fifth grade it was 33 points, in the eighth grade 38, and in the second grade 42 points (out of 50). On the basis of the results of the research, we can also say that the girls achieved better results than the boys in all grades (Graph 1). The girls were also the pupils with the best results in all grades (33 points in the fifth grade, 38 points in the eighth grade, and 42 points at high school).

As the cause of these findings, we can

identify several factors that could have affected the results. As Gavora and Šrajerová (2009) also state, it is generally possible to assume that with increasing age, the pupils' experience with texts increases and their ability to actively and efficiently use the information they find is enhanced. It can also be assumed that girls nowadays have a closer relationship with reading than boys, and they are more exposed to written texts on their own initiative, not only in school conditions. The biological factor of the earlier adolescence of girls in terms of cognitive development also played a significant role.

On the basis of the results of tasks focusing on the comprehension of a text, we can conclude that the pupils did not

have any problems with writing the right answer if the required information was explicitly stated in the text. There was a lower success rate with the tasks in which the pupils had to deduce information from the text, or had to think of a text from a wider perspective. From the results of the cloze test, it is clear that the pupils gained the most points only from specific parts of speech, such as pronouns, prepositions, and conjunctions. Their proper positioning in the text primarily requires the understanding of sentence structure and not necessarily the context of a text. With other parts of speech, such as adjectives and nouns, verbs, and proverbs, we observed a success rate of less than 30%. Younger pupils were less successful in completing the text with appropriate words, but more creative (greater variability of the words used) than older pupils.

Discussion

On the basis of our experience and the results of our research into reading literacy, we agree with Húsková and Hlušiková's (2013) claim that in today's society, it is necessary to teach young people to work with information effectively so that they are able to select, evaluate, and use it appropriately. In the school subject Geography, one of the basic sources of knowledge should be, among other things, texts in different forms. However, their understanding is a prerequisite.

Nowadays, when we are looking for up-to-date data on the level of reading literacy of Slovak pupils which we could use to compare with the results of our research, the latest international PISA 2015 and PIRLS 2016 studies are the most relevant. On the basis of the above-mentioned average pupil scores in our test, by applying the percentage values of the boundary number of points for each level of reading literacy in PISA and PIRLS to our score scale, we are able to rank individual grades into the reading literacy levels that we derived from the original levels of written text comprehension in the PISA and PIRLS studies. On the one hand, the pupils in the fifth grade are ranked in Level 1 of reading literacy (according to PIRLS), which, compared to the fourth-grade pupils in the PIRLS sample (achieving the second level of reading literacy in 2016, NÚCEM, 2016), was a decrease in the success rate. On the other hand, the pupils in the eighth grade are ranked in Level 4 of reading literacy and the pupils in the second grade of high school even in Level 5 of reading literacy (according to PISA). In both cases, it would be an increase in the success rate, as the predominantly fifteen-year-old PISA testing sample reached results in the range of Level 4 of reading literacy in the last cycle, in 2015 (Miklovičová et al., 2017). In this case, however, it is necessary to emphasize that this is only a provisional comparison. The testing which was part of our research and the international studies are different in

many ways. We focused on different age groups and worked with a much smaller sample, the pupils partly worked on different types of tasks under different conditions with a different score scale and, last but not least, our test was less demanding in terms of its size.

A research study which, in comparison to ours, shares many characteristics was conducted by Gavora and Šrajerová in 2009. While focusing exclusively on elementary school pupils, the research was based on working with geographically-oriented texts (excerpts from old textbooks that are no longer used) which were formally modified by the cloze test method (three texts of different difficulty) in order to find out the dependence between the performance of the pupils and the age at which they were at that time, their sex, and the location of the school where the research was carried out. The results achieved correspond to the findings of our research. Pupils in higher grades achieved (with minor variations) a better score; in terms of sex, girls were more successful in all the tests (Gavora & Šrajerová, 2009). PISA 2015 and PIRLS 2016 also confirm the higher success rate of girls (NÚCEM 2016; Miklovičová et al., 2017).

Conclusion

We believe that the school subject Geography has potential for the inclusion of tasks focused on the development of reading literacy into its curriculum. It

is not about learning from the text but about its functional and critical use, either in printed or electronic form. On the basis of the experience from the realization and results of our research, it is possible to state that the comprehension of a text is insufficient, especially in the fifth grade of primary school. This part of the research sample achieved only Level 1 of reading literacy (a 41.2% success rate). Reading literacy is related, among other factors, to the age and sex of pupils. Pupils in higher grades, as well as girls compared to boys, achieved better results in testing. Because of the above-mentioned problems the pupils had with successfully carrying out the reading comprehension tasks, we recommend the regular inclusion of various types of tasks that aim at understanding a text and subsequently applying the information obtained in terms of the subject Geography. In accordance with the objectives of the ISEP, the skill of using different sources of information about the countryside and the world in general and its future application is vital. In the fifth grade we recommend applying tasks with texts of lower complexity, focusing on searching for information, understanding and interpreting information, and searching for keywords. In the higher grades of primary school and high school, we recommend applying tasks with higher textual complexity that aim at inferring information from a text and evaluating the information in the context of the pupils' wider knowledge and experience.

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