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Types of Exercises in Primary School History Textbooks

Rodzaje ćwiczeń w podręcznikach do historii w szkole podstawowej

Keywords:
learning exercise, primary school history textbook, People and Time, primary school, research

Summary: The article deals with an analysis of grade 4 and 5 textbook exercises related to the topic of People and Time according to their type. We categorize the method of content analysis (the type of learning exercise was the specific transformation) and compare the types of learning exercises in the textbooks issued by six publishers. A revision of Bloom's Taxonomy is used for categorizing the learning exercises. The research sample consists of 2101 learning exercises related to history lessons. The results show that the majority of the exercises are related to memory (over 50% of all exercises). Conversely, learning exercises of a higher cognitive difficulty (creative, analytical, or synthetic) only appear sporadically in the textbooks. This trend is similar for the textbooks of all the researched publishers.

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Słowa kluczowe:
ćwiczenia edukacyjne, podręcznik historii w szkole podstawowej, ludzie i czas, szkoła podstawowa, badania

Streszczenie: Artykuł dotyczy analizy ćwiczeń z podręczników klasy 4 i 5 związanych z tematem „Ludzie i czas", według ich rodzaju. Metoda analizy treści została podzielona na kategorie (typem ćwiczenia była konkretna transformacja), a następnie porównano rodzaje ćwiczeń w podręcznikach wydanych przez sześciu wydawców. Uaktualniona wersja taksonomii Blooma stała się podstawą kategoryzacji ćwiczeń edukacyjnych. Próbka badawcza składa się z 2101 ćwiczeń edukacyjnych wykorzystywanych na lekcjach historii. Wyniki pokazują, że większość (ponad 50%) ćwiczeń dotyczy zapamiętywania treści. Ćwiczenia o wyższym stopniu trudności poznawczych (kreatywne, analityczne lub syntetyczne) pojawiają się w podręcznikach sporadycznie. Ten trend widoczny jest w podręcznikach wszystkich badanych wydawców.

Introduction

A textbook learning exercise, as one of the forms of the operational project curriculum (Průcha, 2009, pp. 117–121), can specifically induce a learning situation if the teacher more or less follows it, thereby activating the pupil. This is especially true with learning exercises that serve to connect the learning content in the textbook and the learning activities of the pupil (in addition to the difficulty of the explanatory text to which we have devoted research attention earlier – see Šimik, 2017).

A learning exercise is one of the key building blocks in the educational process because by means of learning exercises, the pupil approaches the educational material, interacts with it and gets closer to fulfilling the educational targets. A learning exercise has potential for activation, making the educational process dynamic and keeping the pupil actively involved. The role of learning exercises in textbooks is important because it also guides the pupil's learning. A learning exercise can be defined as, "[…] every educational situation which is created so that it ensures that the pupil achieves a specific educational target" (Průcha, Walterová & Mareš, 2003, p. 258). Vaculová, Trna and Janík understand the learning exercise as, "a specific group of requirements placed on the pupil's learning" (2008, p. 35).

Methodology

Research Problem. Learning exercises can be researched from several different angles, especially in relation to the teacher (who uses the learning exercises, e.g., Sikorová & Červenková, 2014, p. 75). Stará and Krčmárová (2014, p. 106) discovered that teachers use textbooks as a basic source in preparing lessons and that teachers particularly use textbooks to obtain topics for the pupils' activity. Vránová (2012, p. 30–44) investigated the difficulty of biology textbook exercises. Investigating the character of learning exercises appears to be important because if teachers follow textbooks, then they also introduce the learning exercises into their lessons. Salamonová (2011, p. 54) deals with research on learning exercises in science textbooks. The author discovered that the majority (80–90%) of learning exercises are related to remembering and understanding, where more than two-thirds of these exercises focus on remembering. Martincová (2011, p. 158) found similar results, given that almost 50% of all learning exercises fell into the remembering category and around 40% dealt with understanding. It seems that regardless of the grade, learning exercises focus on lower cognitive operation. In relation to the curriculum reform and the establishment of the General Educational Program for primary school education (hereinafter referred to as GEP), the new textbooks (including science textbooks) were mostly published by large publishing companies in the Czech Republic. The GEP emphasizes the category of the pupils' expected results, so the character of the textbook exercises is primarily based on skills and the application of knowledge. This should potentially also change the ratio of types of learning exercises at the expense of the cognitively easier ones. In the research, we have formulated two research targets:

a) to categorize learning exercises that appear in selected textbooks (or parts of them) for grades 4 and 5, intended for the topic of People and Time in relation to the educational targets according to Bloom's revised taxonomy;
b) to compare the frequency of individual types of learning exercises that appear in the selected science textbooks (or parts of them) for grades 4 and 5, intended for the topic of People and Time among textbooks of the individual publishers.

Research Method. The main research method for finding out the required data was the content analysis of text in selected textbooks. We used Bloom's revised taxonomy of cognitive targets (Krathwohl, 2002, pp. 212–218) for

the categorization of learning exercises because we considered the fact that the learning exercises are related to the educational targets. The dimensions of cognitive processes are suitable for learning exercises because the exercises always require a certain cognitive process on the part of the pupil or a certain level of difficulty which is also related to the pupil's activity.

The quantitative unit of the content analysis was the sentence containing a learning exercise. In order to record the individual learning exercises, we used Microsoft Excel, in which we first performed a transcription of all the learning exercises. Then, we categorized the individual learning exercises according to their type – the type of the learning exercise was the specific transformation of the content analysis. The active verb, which was contained in the given learning exercises was key for classifying the learning exercises into their individual types. A number was assigned to every type of exercise (learning exercise based on: 1 – remembering, 2 – understanding, 3 – application, 4 – analysis, 5 – synthesis, 6 – creation and 99-finding[1]) in order for quantification (nominal measuring) to be possible. We used central tendency rates (arithmetic average, median) and box plots to compare the data. We used the independence test (chi-square) and Pearson's Coefficient of Sequence Correlation for statistically processing the data.

Research Group. The research group was made up of all learning exercises (including questions) from the researched sample of textbooks, that is, those parts related to the history curriculum (topic: People and Time). This included learning exercises graphically separated from interpreted text and learning exercises contained directly in the interpreted (basic) or additional text of the relevant textbooks. Learning exercises were generated from 11 textbooks for grades 4 and 5 history lessons published by six publishers between 2008–2014. We defined 4 criteria for selecting textbooks: a) they had to contain the history curriculum – educational content related to the topic of People and Time; b) they had to be written in accordance with the General Educational Program for primary education in the area of the People and their World; c) the existence of textbooks for the whole second period of education within the scope of People and their World (for grades 4 and 5); d) the presence of a valid approval clause by the Ministry of Education (up to the beginning of 2015).

[1] This category is not part of Bloom's Taxonomy – it was purposefully created with regard to the tangible content of learning exercises – searching for information from external sources.

Research Results. The summary results showing the frequency and the distribution of learning exercises in comparison to the textbooks of all publishers are illustrated in Figure 1.[2] The results show that exercises focused on remembering and understanding prevail in the researched textbooks. Other types of learning exercises only appear seldom or do not appear at all. This shows that history textbooks for primary schools contain learning exercises rather focused on cognitive difficulty.

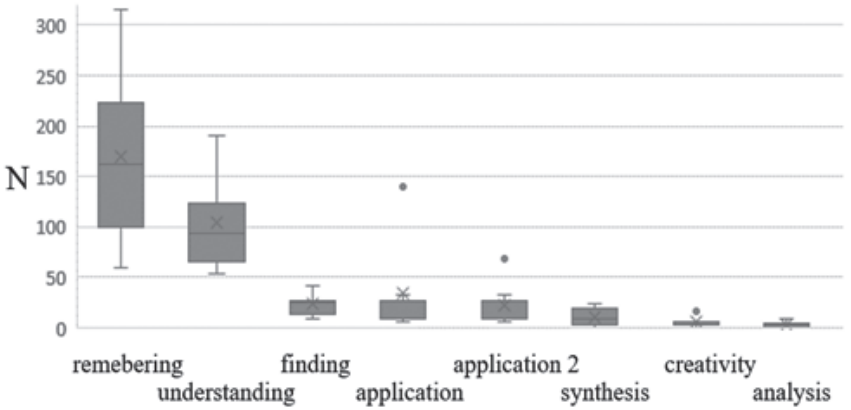

Figure 1.
The distribution of learning exercises according to the type (overall comparison).
Source: the autor's own research.

Here, we can also see relatively significant differences in the frequency of the learning exercises in the textbooks of the individual publishers. It is hereby very easy to compare which types of learning exercises prevail and how the individual frequency of the given types of learning exercises are distributed.

[2] Explanation to figure 1: X = arithmetic average, box contains 50% of the data and is a median (horizontal line) divided into two parts. The bottom part of the box is intended for the lower (first) quartile with a relative frequency of 0.25 and the upper part for the third quartile, which corresponds to the value with a cumulative relative frequency of 0.75. Antennas: illustrate the lowest and the highest value, which is not remotely observed. The dots illustrate the extreme values (values higher than triple the length of the box). Application 2 – without learning exercises on a timeline axis for Nová škola textbooks.

More detailed results, where it is possible to compare the individual publishers with each other are illustrated in figures 2 and 3. The X curve represents the arithmetic average and the horizontal line, separating the box into two halves, is then the median. In this way, it is possible to monitor, which textbook of the specific publisher contains an above-average or below-average number of learning exercises in relation to the specific type.

Learning exercises focused on analysis, creativity or synthesis appear much less often. This shows that learning exercises mostly prompt pupils to remembering and remembering partial information. Frequent learning exercises focused on understanding were noted only in the Prodos textbooks. In terms of their character, only learning exercise units could be classified into the "analysis" category.

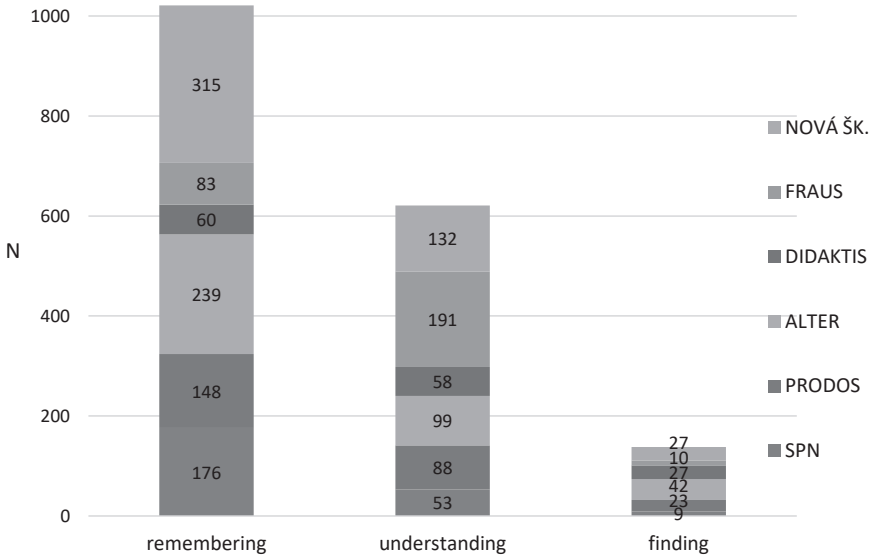

Figure 2.
Comparing the frequency of learning exercises focused on remembering, understanding and finding, according to the publisher.
Source: the autor's own research.

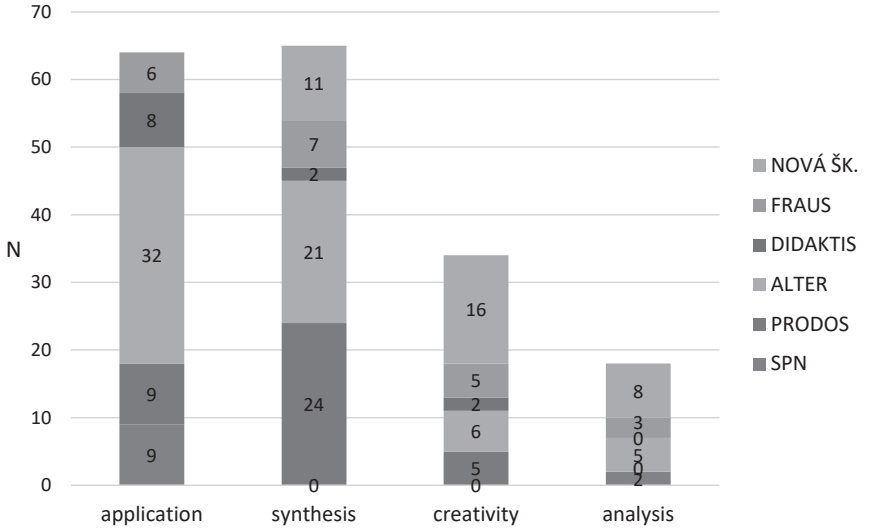

Figure 3.
Comparing the frequency of learning exercises focused on application, synthesis, creativity and analysis, according to the publisher.
Source: the autor's own research.

We compared the differences in the frequency of individual types of learning exercises among the publishers using a statistic chi square test. Here, we found very significant differences (p = 0.000) in all partial types of learning exercises.

We also statistically compared whether and what differences there are in the frequency of the given type of learning exercises in the textbooks of the individual publishers with regard to the median calculated as the average value of all researched textbooks in the given type of learning exercise.[3]

[3] + = significantly higher frequency, - = significantly lower frequency. The number of signs indicates the relevant level of significance; α = 0.001 (three); 0.01 (two) and 0.05 (one).

Table 1.
Comparing the frequency with regard to the median of the textbooks of all the publishers, according to the type of learning exercises

	remembering	understanding	application	analysis	synthesis	creativity	finding
Median	**162**	**94**	**9**	**3**	**9**	**5**	**25**
SPN	0.120	**0.000 (- - -)**	1.000	**0.046 (-)**	**0.000 (- - -)**	**0.002 (- -)**	**0.000 (- - -)**
PRODOS	**0.003 (- -)**	0.381	**0.000 (- - -)**	**0.003 (- -)**	**0.000 (+++)**	1.000	0.572
ALTER	**0.000 (+++)**	0.466	0.637	**0.046 (-)**	**0.000 (+++)**	0.527	**0.000 (+++)**
DIDAKTIS	**0.000 (- - -)**	**0.000 (- - -)**	0.157	0.317	0.001	0.058	0.572
FRAUS	**0.000 (- - -)**	**0.000 (+++)**	**0.000 (- - -)**	**0.000 (+++)**	0.346	1.000	**0.000 (- - -)**
NOVÁ ŠKOLA	**0.000 (+++)**	**0.000 (+++)**	1.000	0.317	0.346	**0.000 (+++)**	0.572

Source: the autor's own research.

The easiest types of learning exercises (median 162) that lead to remembering are most frequently represented in textbooks of almost all the researched publishers except Fraus, where the dominating category making up the learning exercises develops the pupil's understanding. In the textbooks of the five remaining publishers, the understanding category is the second most frequently represented (median 94). Learning exercises of an application character (9)[4] are almost three times less frequently represented in the investigated textbooks. Learning exercises focused on analysis are represented only sporadically, and in no textbook of the researched publishers does the number exceed ten (median 3), which, given the total amount, represents less than 1% (0.85%) of all the learning exercises. We found out that more learning exercises focused on synthesis (median 9) than on analysis, although there are more significant differences among the individual publishers. However, in the context of the frequency of all learning exercises, exercises focused on synthesis only made up a very small part (approx. 3%). Also, learning exercises supporting the pupil's creativity, which are considered the highest type of learning exercise in terms of cognitive difficulty, were represented in very low numbers (median 5) in our sample of textbooks for the topic of People and Time. While even this category proved a high variability of data (0–16 learning exercises per publisher), the total number of creative learning exercises made up only less than 2% of all learning exercises. Apart from the above-mentioned categories, we specifically

[4] We do not include exercises where the pupil should identify a specific history event on a timeline into the application exercises. This was the domain for Nová škola textbooks. The results would be greatly influenced by the extreme value – see Figure 3 application vs. application 2. With regard to their frequency, these exercises are becoming rather mechanic.

allocated the "finding" category, or learning exercises that would lead the pupil to search for information. With regard to the last four types of learning exercises, their frequency is relatively high (6.5%, or 138 of all exercises), with numbers ranging from 10 to 42 in the textbooks of the individual publishers, which also clearly represents a high degree of variability.

A comparison according to the structure of the learning exercises in the textbooks of the individual publishers is illustrated in the Table 2.[5]

Table 2.
Comparing the relative frequency of partial types of learning exercises according to the individual publishers

Publisher	1	2	3	4	5	6	7
SPN	R (70%)	U (21%)	F (4%) / App (4%)		**Ans (1%)**	S (0%) / C (0%)	
Nová škola	R (49%)	**App (22%)**	U (20%)	F (4%)	**C (2%)**	S (2%)	Ans (1%)
Alter	R (55%)	U (22%)	F (9%)	App (7%)	S (5%)	C (1%)	Ans (1%)
Didaktis	R (38%)	U (37%)	**F (17%)**	App (5%)	S (1%) / C (1%)		Ans (0%)
Prodos	R (50%)	U (30%)	**S (8%)**	F (8%)	App (3%)	C (1%)	Ans (0%)
Fraus	**U (63%)**	R (27%)	F (3%)	S (2%)	App (2%)	C (2%)	Ans (1%)

Source: the autor's own research.

If we compare the relative representation of individual types of learning exercises overall, it can be expressed using the following scheme:

remembering (53%) – understanding (30%) – finding (8%) – application (3%) – synthesis (3%) – creativity (2%) – analysis (1%)

This scheme illustrates the distribution of learning exercises according to their frequency for all publishers – from the highest to the lowest.

An interesting view of the results appears when we compare the **relative numbers of individual types of learning exercises** (the sum of relative frequencies for one publisher is always 100%).

[5] 1 – appear most frequently, 7 – appear least frequently; R = remembering, U = understanding, F = finding, App = application, Ans = Analysis, S = Synthesis, C = Creativity.

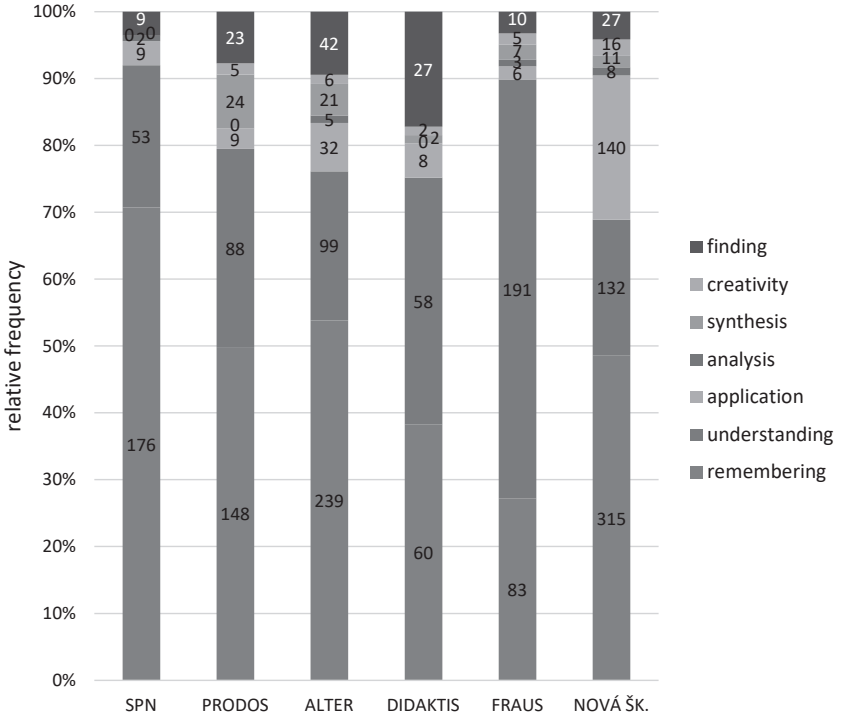

Figure 4.
Comparing the relative frequency of learning exercises within textbooks of the given publisher.
Source: the autor's own research.

This comparison eliminates the influence of the absolute values, so we obtain a more accurate comparison of how the individual types of learning exercises in textbooks of the individual publishers are distributed. From Figure 4, it is clear that learning exercises that prompt the pupil to remember prevail in almost all of the textbooks of the researched publishers. If we take the extent of the core value, then the learning exercises that lead pupils to recollect are about 50% of all learning exercises. Comprehension exercises make up about 30% of all exercises for the given publisher. Fraus (almost 63%) is included in the overall average and this publisher has a very high frequency of these types of learning exercises. Other types of learning exercises are not represented as frequently (only in 10–20% of the examples). The results show that learning exercises of a higher cognitive difficulty are seldom found in history textbooks for the

topic of People and Time, especially if they deal with analysis (i.e., exercises focused on telling something, structuring, attributing), where the relative frequency for all textbooks of the researched publishers ranged in single digit percentages or they weren't represented at all (Prodos, Didaktis). Learning exercises that develop the pupil's creativity are similarly poorly represented (not represented at all in SPN textbooks, while in other textbooks, they only make up a maximum of 4%).

It is relatively easy to observe that the overall structure (distribution among the individual types) of learning exercises is (very) similar in all textbooks of the examined publishers. We also verified this fact statistically using Pearson's correlation of coefficients (Table 3). The values of the Pearson coefficient exceed 0.800 in most of the cases, which is considered to be a high correlation.

Table 3.
Comparing the structure of the learning exercises (according to the individual publishers) – Pearson's Correlation Test

r (Pearson)	SPN	PRODOS	ALTER	DIDAKTIS	FRAUS	NOVÁ ŠKOLA
SPN	X	0.965	0.982	0.863	0.669	0.909
PRODOS		X	0.971	0.917	0.746	0.853
ALTER			X	0.886	0.679	0.916
DIDAKTIS				X	0.728	0.797
FRAUS					X	0.609
NOVÁ ŠKOLA						X

Source: the autor's own research.

Discussion and Conclusion

The results of the research show that there is a tendency to use easier learning exercises in the researched textbooks, particularly, learning exercises focused on memory (50%). If we compare the overall individual types of learning exercises according to their median, then "the average" textbook most frequently contains learning exercises focused on memory (N = 162; 52%). We discovered by correlation analysis that the structure of the textbooks regarding the distribution of exercises according to their types is very similar in the

textbooks of all the publishers (r values usually exceed 0.800). The biggest differences are seen in Fraus textbooks, thanks to a larger number of learning exercises focused on understanding/comprehension. The results correspond with other research, for example, Salamonová (2011, pp. 60–61) or Martincová (2011, p. 155). Our previous research of learning exercises in science textbooks (Šimik, 2014, p. 108) showed that learning exercises focused on knowledge made up 46% of all learning exercises (understanding/comprehension only 15%). In this context, science textbooks (their history section) show a higher percentage of exercises focused on understanding/comprehension (on average 30% – see comparison with Figure 4) even though this is at the expense of cognitively more difficult exercises (application, analysis, synthesis). The reason may be a higher extent of abstract history in the curriculum. The absence of learning exercises of a higher cognitive difficulty, which, as a rule of thumb relate to work with historical sources is explained by the fact that original historical sources (or their copies) only appear very rarely in the textbooks, so the teachers do not have any experience with them (for example, research by Demiricioglu, 2010, pp. 71–80). Klapko (2006, p. 46) states that teachers who are starting out work with textbooks more frequently. If they do not have a workbook available, it is likely that they primarily take exercises from textbooks. We have found out that learning exercises in the history part of science textbooks mainly focus on supporting memory learning. They also partially focus on understanding exercises. The trend in textbooks clearly seems to be toward lower cognitive difficulty at the expense of learning exercises focused on creativity, application or evaluation, regardless of the publisher. It is clear that learning exercises focused on recollection/memory are important and essential for higher types of learning exercises. However, we find their ratio in relation to analytic-synthetic or creative exercises to be problematic (approximately 50:1).

Learning exercises are a very effective means of verifying the fulfillment of the defined learning targets. The question of the interconnectivity of the learning exercises and the GEP arises. In other words, what are the expected results? Such results should be achievable and measurable (Jeřábek & Tupý, 2017, p. 14). Knecht and Lokajíčková (2013, p. 169) discovered that the most important criteria for Czech teachers in selecting textbooks is the presence of the approval of the Ministry of Education and not, for example, the quality of the learning exercises and their interconnectivity with the targets of the GEP. These targets (expected results) are mostly activities that oftentimes require

application, analysis, creativity or searching for information. We agree with Klapko (2006, p. 50) that pupils need room for their own opinion, for their subjective interpretation to perceive the world, and the requirement to defend their own claims, and thus for example, the importance of learning exercises focused on evaluation and synthesis. However, these types of learning exercises were only found very rarely in the researched textbooks.

This raises the question of the coherence of the learning exercises with the targets defined by the GEP, although, with the introduction of the new curriculum reform, publishers took the opportunity to create new textbooks relatively quickly, declaring that they were written in accordance with the GEP. Yet, in terms of learning exercises, based on our findings regarding the structure of the learning exercises according to their types, we see the new textbooks as problematic because the exercises are usually related to (remembering) knowledge of terms and facts. This trend is the same for the textbooks of all the researched publishers. Only Fraus textbooks place the most emphasis on learning exercises focused on understanding as opposed to simply remembering.

Although the target of the newly created didactic text (which also means the target of the new textbooks) should take into consideration the concept of acquiring new knowledge and adopting adequate attitudes and values (see Klapko, 2006, p. 50), the focus of learning exercises in the history part of the current primary school science textbooks does not correspond much with this trend (of active learning). There is a relatively considerable lack of learning exercises of a higher cognitive difficulty that would develop the pupil's ability to analyze, evaluate or create.

For the future, we recommend that authors of primary school history textbooks include more learning exercises of a higher cognitive difficulty so that the overall distribution of exercises is more balanced. The formulation of expected results (which are of an active character) to which the individual learning exercises should be directly linked, may be inspirational. A more frequent inclusion of original history sources into the text of the textbooks should also be helpful. These sources have the potential to lead the pupil to think, compare, evaluate or stimulate their own creativity.

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