THE MOST FREQUENT TYPES OF TASKS IN CZECH BIOLOGY TEXTBOOKS

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Abstract: *This article is concerned with tasks evaluation in biology textbooks. Twenty five textbooks of the Fortuna, Fraus, Jinan, Prodos, Scientia and SPN publishing houses were analysed. This study was concentrated on the number, difficulty and diversity of tasks in each textbook. The difficulty of tasks was classified according to Tollingerová. Tasks of simple cognitive level were the most frequent ones.*

Key words: *Biology textbooks, learning tasks, types of tasks, task evaluation*

Abstrakt: *Článek soustřeďuje poznatky o rozboru úkolů v učebnicích přírodopisu. Předmětem hodnocení bylo dvacet pět učebnic přírodopisu nakladatelství Fortuna, Fraus, Jinan, Prodos, Scientia a SPN. Hodnocení bylo zaměřeno na počet, náročnost a pestrost úloh. Obtížnost úkolů byla klasifikována podle taxonomie Tollingerové. V učebnicích přírodopisu se nejčastěji vyskytovaly úkoly vyžadující k řešení jednoduché myšlenkové operace.*

Klíčová slova: *Učebnice přírodopisu, učební úlohy, typy úkolů, hodnocení úkolů*

Introduction

Learning tasks play a significant role in the learning process. Through them teachers gain an overview of efficiency of teaching and fulfilment of defined teaching objectives. Tasks are also an important instrument to test pupils' knowledge. Further they serve practising, improving and sorting knowledge and skills (Průcha – Walterová – Mareš 1995). In current modern teaching it is necessary to use such sets of tasks that develop various aspects of pupils' cogitation. However research shows that the natural science textbooks contain easy and similar tasks (Trna – Trnová 1998, Čtrnáctová 1997).

Material and methods

The tasks analysis was carried out in twenty five biology textbooks of six publishers (Fortuna 1997, 1999, 2002, Fraus 2003, 2005, 2006, 2007, Jinan

1998, 2000, 2001, Prodos 1997, 1998, 1999, 2000, Scientia 1999, 2000, 2001, 2003, SPN 1998, 1999, 2004). The complete lines of biology textbooks for the 6th – 9th grades of primary schools were concerned.

Learning tasks can be evaluated and sorted in various ways, as mentioned e.g. by Mareš (1980), Ušáková (1994), Tollingerová (in Kalhous – Obst 2002). In this article taxonomy of Tollingerová was used to evaluate tasks because it is the most detailed one. In this classification, 27 types of tasks which are ranked in five groups according to their increasing difficulty are stated. The easiest types of tasks are in the 1st group (tasks for memory reproduction of knowledge); the most complicated tasks are ranked in the 5th group (tasks for creative thinking). In each natural science textbook a classification of tasks into types and groups was carried out. These results were expressed in percentage.

The variety of tasks was measured by tasks variability index (Iv). Iv = number of task types/ number of tasks. This index takes the values from 0 to 1. The more the index value approximates 1, the more varied the set of tasks is, it means that tasks solution requires various thought operations.

Results

A review of number, difficulty, variety and location of tasks in each individual textbook was gained by tasks analysis. Comparing these data showed that some types of tasks occured in the textbooks very often and some very sporadically or not at all. For most of the evaluated textbooks the task location was the same in the explanatory part of subject matter or at the end of a theme unit (textbooks of Fortuna, Fraus, Jinan, Prodos, SPN). Only in the textbooks of Scientia the tasks are situated at the end of the textbook.

Quantitatively some types of tasks prevailed in the biology textbooks. Tasks for reproduction of data and terms, e.g.:

"How is the chordates' nervous system termed?"

"Which organelle ensures cell respiration?"

Tasks for enumeration of facts, e.g.:

"Name water animals."

"Which types of needle-leaved trees do you know?"

High number of tasks for fact correlation was found, e.g.:

"Explain the difference of vegetable and animal cells structures."

Tasks for creative thinking, problem tasks and tasks for practical application occurred very sporadically.

The variety of tasks expressed by the variability index was similar in all the textbooks. Low values of variability indexes were caused by a high number of tasks in one textbook.

In the textbooks of the **Fortuna** publishing house, tasks are found in the explanatory text. Their number was very high in some textbooks – e.g. 502 tasks (the 9th grade textbook), 784 tasks (the 6th grade textbook). There were tasks of 14–16 types. Most often, tasks of five types appeared – recognition and reproduction of facts, enumeration, description, comparing facts, facts interaction (see Table 1). The variety of tasks expressed by the variability index varied from the value of 0.02 to 0.05.

In the textbooks of the **Fraus** publishing house, tasks were found in the text and at the ends of thematic units. The number of tasks in one textbook varied from 247 (the 6th grade textbook) to 413 (the 8th grade textbook). Within this there were up to 18 different types of tasks. Four types of tasks (see Table 1) appeared most often. The value of tasks variability index varied from 0.04 to 0.06.

In the textbooks of the **Jinan** publishing house, tasks were found in texts of individual chapters. In one textbook the number of tasks was high – e.g. 604 tasks (the 7th grade textbook), 644 tasks (the 9th grade textbook). Up to 18 types of tasks were found in the textbooks of this publishing house but quantitatively tasks of five types prevailed (see Table 1). In all four textbooks the value of tasks variability index was similar – 0.03.

Tasks in the textbooks of the **Prodos** publishing house were situated in the text and at the ends of chapters. Their number was high in the 6th and 7th grades textbooks (about 630 tasks), low in the 8th and 9th grades textbooks (about 150 tasks). The tasks were divided into 5 to 14 types. Tasks of four types were the most frequent (see Table 1). The value of the tasks variability index varied from 0.02 to 0.04.

In the **Scientia** publishing house textbooks, tasks were situated at the end of the textbooks. The number of tasks in one textbook was, compared to other publishing houses, low (e.g. 112 in the 6th grade textbook). Tasks were divided into 13 – 18 types, four types of them quantitatively prevailed. The tasks variability index was the highest (up to 0.12) in the textbooks of this publishing house

In the textbooks of the **SPN** publishing house, tasks were found in the text and at the ends of thematic units. The number of tasks in one textbook varied from 182 (the 8th grade textbook) to 514 (the 7th grade textbook). The most frequent were tasks of four types – reproduction of facts, enumeration and de-

scription facts, comparing facts, facts interaction (see Table 1). The variety of tasks expressed by the variability index varied from the value of 0.03 to 0.07.

Table 1
The most frequent types of tasks in biology textbooks

publishing house	grade	number of tasks	number of task types	index of variability	most frequent types of tasks			
					memory of facts	name and description of facts	comparison of facts	relation among facts
FORTUNA	6th	784	16	0.02	66.7%	6.9%	11.8%	5.1%
	7th part 1	422	14	0.03	60.7%	6.9%	10.7%	4.0%
	7th part 2	300	15	0.05	58.3%	9.7%	14.0%	3.0%
	8th	496	16	0.03	59.5%	5.6%	7.2%	8.7%
	9th	502	15	0.03	58.9%	11.9%	8.2%	5.0%
FRAUS	6th	247	16	0.06	37.6%	15.0%	15.8%	18.6%
	7th	329	17	0.05	39.2%	17.6%	16.4%	16.4%
	8th	413	18	0.04	45.0%	15.0%	12.8%	11.4%
	9th	385	18	0.05	41.2%	15.8%	16.0%	12.3%
JINAN	6th	393	17	0.04	34.6%	21.4%	14.7%	6.6%
	7th	604	17	0.03	43.4%	21.7%	8.3%	3.3%
	8th	559	17	0.03	49.0%	22.2%	10.2%	6.8%
	9th	644	18	0.03	44.5%	20.7%	11.3%	5.4%
PRODOS	6th	627	13	0.02	73.5%	2.9%	4.9%	9.8%
	7th	624	14	0.02	77.7%	2.6%	2.6%	6.1%
	8th	156	7	0.04	79.5%	1.9%	7.7%	5.8%
	9th	129	5	0.04	79.1%	0%	7.0%	0%
SCIENTIA	6th	112	13	0.12	13.4%	20.5%	10.7%	13.4%
	7th	288	16	0.06	18.7%	23.6%	17.4%	10.1%
	8th	321	18	0.06	11.5%	19.3%	11.8%	22.1%
	9th	205	17	0.08	7.3%	25.4%	5.8%	16.6%
SPN	6th	268	16	0.06	46.3%	16.0%	10.4%	11.9%
	7th	514	16	0.03	55.4%	22.4%	8.6%	8.0%
	8th	182	13	0.07	54.9%	23.1%	3.8%	2.2%
	9th	207	12	0.06	50.2%	11.1%	12.6%	4.3%

Conclusion

This article contains findings about evaluation of the tasks difficulty in 25 biology textbooks. The results indicate that task categories are similar in all the studied textbooks. The most common are memory tasks and the number of creative tasks is very low. The diversity of tasks is different in the studied textbooks.

Literature

ČTRNÁCTOVÁ, H. Jak tvořit chemické učební úlohy (1). *Biologie-Chemie-Zeměpis*, 1997, year 5, no. 5, pp. 222–226.

KALHOUS, Z. – OBST, O. *Školní didaktika*. Praha: Portál, 2002. 447 pp.

MAREŠ, J. Fridmanova teorie učebních úloh. *Pedagogika*, 1980, year 30, no. 5, pp. 595–610.

PRŮCHA, J. – WALTEROVÁ, E. – MAREŠ, J. Pedagogický slovník. Praha: Portál, 1995. 164 pp.

TRNA, J. – TRNOVÁ, E. Inovace role přírodovědné úlohy jako vzdělávacího prostředku. In *Cesty k tvořivé škole*. Brno: Masarykova Univerzita, 1998, pp. 387–390.

UŠÁKOVÁ, K.Typy úloh v učive z biológie. *Technológia vzdelávania*, 1994, year 2, no. 5, pp. 2–4 in attachment .

Evaluated textbooks

CÍLEK, V. – MATĚJKA, D. et al. *Přírodopis IV*. Praha: Scientia, 2000. 146 pp.

ČABRADOVÁ, V. – HASCH, F. et al. *Přírodopis 6*. Plzeň: Fraus, 2003. 120 pp.

ČABRADOVÁ, V. - HASCH, F. et al. *Přírodopis 7*. Plzeň: Fraus, 2005. 128 pp.

ČERNÍK, V. et al. *Přírodopis 1*. Praha: SPN, 1999. 104 pp.

ČERNÍK, V. et al. *Přírodopis 2*. Praha: SPN, 1999. 128 pp.

ČERNÍK, V. et al. *Přírodopis 3*. Praha: SPN, 1998. 80 pp.

ČERNÍK, V. et al. *Přírodopis 4*. Praha: SPN, 2004. 88 pp.

DOBRORUKA, L. J. – CÍLEK, V. et al. *Přírodopis I*. Praha: Scientia, 1999. 127 pp.

DOBRORUKA, L. J. – GUTZEROVÁ, N. et al. *Přírodopis II*. Praha: Scientia, 2003. 151 pp.

DOBRORUKA, L. J. – VACKOVÁ, B. et al. *Přírodopis III*. Praha: Scientia, 2001. 159 pp.

JURČÁK, J. – FRONĚK, J. et al. *Přírodopis 6*. Olomouc: Prodos, 1997. 127 pp.

JURČÁK, J. – FRONĚK, J. et al. *Přírodopis 7*. Olomouc: Prodos, 1998. 143 pp.
KANTOREK, J. – JURČÁK, J. et al. *Přírodopis 8*. Olomouc: Prodos, 1999. 127 pp.
KOČÁREK, E. – KOČÁREK, E. *Přírodopis pro 6. ročník*. Praha: Jinan, 1998. 95 pp.
KOČÁREK, E. – KOČÁREK, E. *Přírodopis pro 7. ročník*. Praha: Jinan, 1998. 95 pp.
KOČÁREK, E. – KOČÁREK, E. *Přírodopis pro 8. ročník*. Praha: Jinan, 2000. 94 pp.
KOČÁREK, E. – KOČÁREK, E. *Přírodopis pro 9. ročník*. Praha: Jinan, 2001. 96 pp.
KVASNIČKOVÁ, D. et al. *Ekologický přírodopis pro 6. ročník*. Praha: Fortuna, 1997. 136 pp.
KVASNIČKOVÁ, D. et al. *Ekologický přírodopis pro 7. ročník 1. část*. Praha: Fortuna, 1997. 94 pp.
KVASNIČKOVÁ, D. et al. *Ekologický přírodopis pro 7. ročník 2. část*. Praha: Fortuna, 1999. 77 pp.
KVASNIČKOVÁ, D. et al. *Ekologický přírodopis pro 8. ročník*. Praha: Fortuna, 1999. 128 pp.
KVASNIČKOVÁ, D. et al. *Ekologický přírodopis pro 9. ročník*. Praha: Fortuna, 2002. 111 pp.
ŠVECOVÁ, M. – MATĚJKA, D. *Přírodopis 9.* Plzeň: Fraus, 2007. 128 pp.
VANĚČKOVÁ, I. – SKÝBOVÁ, J. et al. *Přírodopis 8*. Plzeň: Fraus, 2006. 128 pp.
ZAPLETAL, J. – JANOŠKA, M. et al. *Přírodopis 9*. Olomouc: Prodos, 2000. 95 pp.

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