

Results and Prospects of Textbook Research in the Czech Republic

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Abstract: The paper presents a survey of studies and research approaches concerning Czech textbooks that have been performed to date. In fact, the first analyses of school textbooks and primers were accomplished during the 1930s by Czech educationists and psychologists (V. Příhoda and others). Recently, this analytical trend has continued, and is being intensively further developed in a number of studies. This is evidenced in a number of monographs and papers published by Czech researchers in several faculties of education, among them at the University of Ostrava. The most remarkable research findings concern the following topics: Parameters of textual components of textbooks; measuring text difficulty for pupils; content representation in textbooks; utilization of textbooks in learning and teaching; selection of textbooks by teachers and schools. However, some new problems have arisen that have as yet not been profoundly studied, among them especially the role of printed textbooks vs. new educational ICT media.

Keywords: textbook research, structural components of textbooks, text difficulty, utilization of textbooks, selection of textbooks, new educational media

The main aim of the paper is to present brief information to colleagues from other countries concerning what has been done in textbook research by Czech researchers. The reason behind it is to show that textbook research has been developed quite intensively to date in the Czech Republic (formerly in Czechoslovakia), and that it has been substantially influenced by research approaches and methods coming from Eastern European as well as Western countries.

Therefore, the paper consists of three parts:

- The first part is a brief look into the history of Czech textbook research. I want to remind you of some approaches and methods applied since the 1920s and 1930s, which might be of some interest even nowadays.
- The second and main part of the paper presents a survey of research studies on Czech textbooks that have been published during the last several years. The survey focuses first of all on the topics of the research and on methodological issues.
- In the last section I intend to offer some proposals concerning the future research on textbooks in conditions of the “electronic age”, and with respect to learning and teaching in schools.

Naturally, the presentation as a whole cannot go into details, due to limited space of presentation, so it can offer only basic information.

1 A look into the history of Czech textbook research

The actual roots of Czech textbook research can be found in the 1920s and 1930s. In that time, educational studies in some European countries and in the USA were developing quite intensively, being focused on empirical studies on children (so-called *pedology* influenced by works of W. Stern and others). Some educationists were interested in research on the development of child speech and its impact for learning and teaching in schools. Václav Příhoda, the founder of educational psychology in Czechoslovakia, after his study at the well known Teachers College (Columbia University, New York) was probably the first one of those dealing with Czech textbook research. Let's briefly explain his approach.

Problem area (1): The relation between children's vocabulary development and the vocabulary of primers and first schoolbooks

The main idea of Příhoda's concept was such that the construction of primers and all other schoolbooks has to take into account the development of children's language. For this purpose, it is necessary to measure, among other things, the size and composition of children's vocabulary, especially at the age when children start their school attendance. Therefore, in his project *Měření slovní zásoby u dětí* (Measurement of Child Vocabulary) Příhoda (1927) analyzed the vocabulary of several primers used in Czech primary schools, and compared the data with the vocabulary of 6 year old children. Of course, he found discrepancies which, however, were even greater in higher ages of children.

It appears today as surprising that the postulate of a necessary correspondence between the development of children's language and the language of textbooks is often not respected even nowadays. The main reason for this is that we have no exact data about the characteristics of child language in particular school ages (i.e. in the population of Czech children).

Problem area (2): Overloading of curricula by the amount of information and the consequences of it for textbook research

Paradoxically, the Czech (Czechoslovakian) research on textbooks gained impulses for its development in the 1970s and 1980s due to the sharp criticism of the curricula of that time. The main criticism was aimed at the fact that the subject matter in basic education (i.e. in primary and lower secondary schools) was so extended and overloaded by details that it became inadequate for pupils. This situation was also apparent in textbooks for particular school subjects – some of them more resembled encyclopaedic handbooks than didactic media. The problem was more serious because no exact evaluations of textbooks were conducted, and the respective methods were not known.

A radical change came after the Czech and Slovak educationists started to become acquainted with new theories on textbooks, and with methods of textbook evaluation that were developed abroad. First of all, the publications dealing with

textbook research by some Soviet and German (GDR, i.e. East Germany) authors were accessible at that time. Perhaps the following important sources should be mentioned:

One of the most influencing contributions to the theory of the textbook was the monograph *Školnyj učebnik (The Schoolbook)* by the Russian author D. D. Zujev (1983; 1985 in its Slovak translation). This book presented a systematic conception of the structure of the textbook with a detailed description of particular structural components and their function. Zujev's concept became the basis for Czech and Slovak works in textbook research.¹

The other main inspiration for us was the works of the Estonian researcher Jaan Mikk, especially his publication *Optimizacija složnosti učebnogo teksta (The Optimization of the Complexity of Educational Text)* (Mikk, 1981). For us, this small book created an impulse for our effort for the exact evaluation of textbook parameters. Mikk constructed various methods and formulae for the measurement of text complexity, which he later even more profoundly elaborated in his monograph *Textbook: Research and Writing* (Mikk, 2000).

A lot of inspiration also came from the former GDR, where textbook research was conducted in the *Zentrum für Schulbuchforschung* (Pädagogische Hochschule, Köthen). The group of researchers (M. Baumann, K. Nestler et al.) performed not only various measurements of textbook parameters, but they also verified experimentally how particular textbook characteristics can affect learning processes in pupils. As a whole, the findings of the German team were presented in the monograph *Lernen aus Texten und Lehrtextgestaltung* (Baumann et al., 1982) which deserves interest even today.

Only after the political changes since 1990 have the works on textbook research published in the West become more accessible for us, e.g. works from the *Georg-Eckert-Institut für internationale Schulbuchforschung* (Braunschweig) or from Scandinavian countries, the USA, and elsewhere. But this is already the present-day situation which I am dealing with now.

2 The research on Czech textbooks at present

Textbook research in the Czech Republic has been developed in three main areas during the last several years:

- Evaluation of parameters of texts in textbooks by means of quantitative methods.
- Studies on how textbooks are used in real processes of teaching at schools.
- Selection procedures of textbooks applied by schools and teachers.

At present, the most important studies in textbook research are conducted and published by two universities: at the Institute for Research of School Education,

¹ By the way: This monograph was later positively appreciated by E.B. Johnsen (1993) in his critical overview of international scene in textbook research: "As basic systematic research, Zujev's book is unparalleled in the West." (p. 76)

94 Faculty of Education, Masaryk University, Brno (Maňák & Klapko, 2006; Maňák & Knecht, 2007; Janík et al., 2007, and other works) and at the Faculty of Education, Ostrava University (Červenková, 2010; Sikorová, 2004; Sikorová, 2010).

Besides, some other studies on textbook research were produced by individual authors at other places, not, however, as team projects. I will briefly describe the most relevant works, with a focus on problems under investigation, and the methods applied.

2.1 Measurement of educational texts

The prevailing part of the Czech research on textbooks has been focused on evaluations of text parameters. It rests on the concept that every textbook is an educational medium, with its own specific properties which

- (1) can be identified,
- (2) can be evaluated by means of quantitative measures,
- (3) one can develop predictions about what probable effects might be elicited in learning & teaching by certain characteristics of texts (this approach was developed and applied by Průcha, 1987, 1998, 2006).

Various empirical studies on Czech textbooks have been focused to the following problem:

Problem area (3): Do the new textbooks for Czech pupils possess such didactic properties which can secure their potential positive effects in pupils' learning? The starting point here is a model of structural components that should be reflected in any correct textbook (Figure 1)

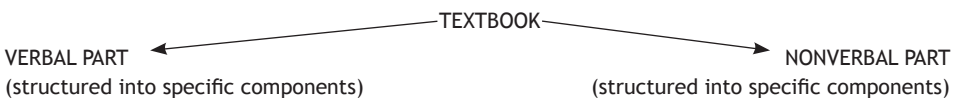


Figure 1 Structural components of the textbook

Both main parts have a certain number of components (36 altogether) which are different, as to their special functions:

- function of *exposing* the subject matter (e.g. explanatory text, summary of the new subject matter, etc.),
- function of *regulating* the learning (e.g. questions and tasks for pupils, etc.),
- function of *orientation* in a textbook (e.g. distribution of lessons, etc.).

Based on the calculation of the occurrence of particular functional components, the coefficients of the respective functions can be measured as for any textbook (Průcha, 1998). Therefore, the so-called *didactic potentiality* (in Czech terms *didaktická vybavenost*) of a textbook can be evaluated. This procedure has been conducted with a number of Czech textbooks for different subjects and grades of the

lower-secondary and upper-secondary school. The general finding is that textbooks differ significantly in the rate of didactic potentiality, not only as to various grades of school, but also in textbooks for the same grade. For example, Czech history textbooks reveal, as a rule, a lower mean rate of didactic potentiality ($E = 36\text{--}44\%$) than biology textbooks ($E = 69\text{--}75\%$) (data in Průcha, 2006; Jůvová, 2007).

Another example is the comparative analysis of some of the most frequently used mathematical textbooks in the Czech Republic ($N = 10$) and in England ($N = 9$). Though the average value of didactic potentiality in both samples of textbooks was rather similar (around $E = 55\%$) textbooks in England reveal a slightly higher coefficient of orientation in the text (Šlégrová, 2009).

Besides, the didactic potentiality of textbooks has also been evaluated by other procedures, such as the analysis of scientific concepts in textbooks. This has been applied e.g. by Knecht (2007) who measured the occurrence of scientific terms representing social geography in a sample of twelve Czech geography textbooks. The author found great differences in utilization of the respective terms, as well as of other text parameters, causing the variability of didactic potentiality among the textbooks.

Problem area (4): What are the causes of an inadequate difficulty of a didactic text for pupils? How can the difficulty of a text be decreased?

The crucial question linked with all textbooks is whether their text is accommodated adequately as to the cognitive and linguistic abilities of pupils of different ages. As is already well-known, in textbook research, there are a number of methods and formulae serving for the measurement of text difficulty. They were developed and applied by Mikk (1981, 2000), Harrison (1982), and many others. The substance of the methods is a quantitative evaluation of some linguistic and/or nonverbal elements of texts.

In this framework, a similar method was developed in the research of Czech textbooks, called formula (T):

$$T = T(s) + T(p),$$

where $T(s)$ is syntactic complexity of the text, $T(p)$ is semantic complexity.

The values of $T(s)$ and $T(p)$ should be calculated from several text characteristics, as e.g. length and complexity of sentences, occurrence of scientific terms, etc. (details of the method and instructions of its application are described in Průcha, 1987, 1998, 2006).

During recent years, about two hundred Czech and also Slovak textbooks of different subjects and school grades have been measured for text complexity, applying formula (T) (some recent findings are published in Maňák and Klapko, 2006; Maňák and Knecht, 2007; Janík et al., 2008; Hodis, 2009, and elsewhere). Generally, it appears that

- in most textbooks, text difficulty for pupils is caused rather through the semantic components (esp. an abundant occurrence of scientific terms) and less through the syntactic components,

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- correlation between an average complexity of various textbooks and the age (grade) of pupils is rather low (Pearson $r = < 0.30$) which means that textbooks' authors are not sensitive enough to respecting the true cognitive capacity and linguistic competence of children.

As a whole, measure (*T*) can be used as a relatively objective instrument for the assessment of text complexity in textbooks. Its validity was approved, among others, by experiments with large samples of German pupils, accomplished by Nestler (1976). In a similar way, it was carried out by Mikk (2000) for his measures of text complexity.

Problem area (5): How are textbooks utilized in actual learning & teaching? What are the activities of pupils and teachers with textbooks?

Certainly, empirical findings concerning various characteristics of textbooks have a high value as such. They can be used e.g. for corrections of newly constructed textbooks in the stage before they are published. On the other hand, it is as important to explain how textbooks function in actual learning & teaching processes in schools. In some previous studies, it was found that teachers utilize textbooks first of all as a basis for their planning of the subject-matter that should be presented in particular lessons. Therefore, it seems desirable to find out what pupils and teachers are actually doing with textbooks in classrooms. In Czech textbook research, such investigations were performed mainly at Ostrava University, by Sikorová (2010) and Červenková (2010).

In her research, Sikorová (2010) observed 52 teachers in 155 lessons of the 8th grade in 10 basic schools (lower secondary stage). Besides, she performed interviews with teachers and administered questionnaires to teachers. The main findings indicate that

- almost all teachers use textbooks as the resource of the subject-matter and resource of tasks for pupils,
- textbooks and other educational texts were used in 86% of lessons,
- generally, teachers' utilization of textbooks in lessons differs substantially due to the type of subject and individual teacher's style of teaching.

The same sample of lessons was analyzed by Červenková (2010) with respect to pupils' activities with textbooks. The research was based on various methods: class observation; interviews with pupils; questionnaires for pupils. The main findings are as follows:

- Textbooks and other text materials are used quite extensively by pupils: Traditional textbooks were used in 76% of all lessons. Other text materials (workbooks, worksheets, readers, maps, etc.) were used in 38% of the entire time of instruction.
- Pupils learn from textbooks most often during the stage of presentation of new topics, and during exercises and recapitulation.

- The majority of pupils do not periodically learn at home from textbooks. Most teachers do not explain how to work with a textbook at home.

Some important findings concerning the role of textbooks in classroom learning & teaching have also been gained from other types of research: Namely *video studies* that enable the recording of all activities by teachers and pupils, including activities with textbooks and other text materials. For example, several video studies conducted by researchers at Masaryk University in Brno (Janík et al., 2007) show that in subjects such as physics, the use of textbooks is rather limited.

Problem area (6): How are textbooks selected by schools and teachers? What are the criteria used in this selection?

A new phenomenon in the Czech Republic since 1990 is that several different textbooks exist for each school subject, whereas before 1990 there was always one obligatory textbook for a particular subject. It means that, at present, schools and teachers can influence education in schools just by selecting a particular textbook from a number of those offered in the textbook market. Publishing the textbooks produces a big profit for the publishers and, consequently, the offer of textbooks to schools is rather extensive.

Sikorova (2004) describes her research focused on the selection procedures used by teachers who select textbooks for their pupils. The research sample was represented by 784 primary, lower secondary, and higher secondary teachers in the Ostrava region. The methods applied were questionnaires for teachers and individual interviews with teachers. Therefore, the researcher gained data on ways by which 2590 textbooks were selected by teachers. The main findings are as follows:

- Teachers reveal that they have quite a large opportunity to participate in textbook selection.
- The prevailing procedure used in textbook selection was teachers' collective decision-making in a particular subject department.
- Among external factors influencing the textbook selection is, first of all, approval by the Ministry of Education; the economic situation of a school also plays a role.
- Most of teachers would welcome some kind of help from experts in textbook evaluation.

Also important is the finding that teachers obtain information about textbooks first of all from the publishers' advertising offers. Such information is, of course, often distorted, due to the commercial interests of publishers, so that teachers have to select textbooks without having at their disposal any evaluation of textbooks by researchers.

This is, in a brief survey, the state-of-the-art of Czech textbook research. Naturally, though the situation concerning the research looks relatively positive, new tasks are emerging.

3 New topics and tasks for further research

Czech textbook research must be extended as for themes, subjects under investigation, and must be also co-ordinated. The necessary tasks can be briefly expressed as follows:

- The research should cover not only textbooks and their various characteristics, but it has to also include learners in its scope. It means to make confrontations between objective parameters of textbooks and the *linguistic competencies* of learners. Therefore, it seems necessary to also develop more intensively studies explaining what the ways and factors of educational text *comprehension* are (cf. studies by Mikk, 2000; Gavora, 1991, and others).
- It seems useful to get some knowledge about what the real *effects* of learning from textbooks are. It means to explain what knowledge the pupils actually acquire from textbooks. A good example here could be the study by Knecht and Lokajíčková (2013), trying to find how much the new geography textbooks create opportunities for the acquisition of competencies by learners which are required by Framework Educational Programme for Basic Education.
- As for teachers, it seems useful to explain not only how often teachers utilize textbooks in their lessons, but also how they *modify and communicate* the subject-matter content to pupils in comparison with the subject-matter presented in textbooks.
- A less than easily solved task is to explain the place and function of traditional printed textbooks in relation to a number of *new ICT media*. The main question is how textbooks should be accommodated in this competition in order to remain a vital educational medium.
- Besides, it is necessary to establish a *Centre for Textbook Research* in the Czech Republic, similar to those working in some other countries. One of its tasks should be to co-ordinate investigations on textbooks that are at present conducted almost without any co-ordination.

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