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Methodology and Methods of Research on Textbooks and Educational Media – Introduction

(Translated into English by Sylvia Schütze)

Textbooks are very complex entities; the (few) existing textbook theories reveal this convincingly (cp. Stein 2003; Höhne 2003; Lässig 2010).

Hence, it is not only obvious, but mandatory both that the epistemological interests and research questions with regard to textbooks are manifold in the interested disciplines and that a multitude of disciplines engages in textbook research – the latter fortunately with a tendency to rise, having in mind, for example, that in the recent past also linguistics has discovered its co-responsibility regarding textbook research.

Textbooks are analyzed for very different reasons and aspects – historical ones and those relevant to the present: by cultural and social sciences, for instance, with regard to their immanent cultural subtext or the represented knowledge respectively; by civic education, for example, with regard to explicit and implicit concepts of friends and enemies; by linguistics, for instance, with regard to the syntactic-semantic interposition of stereotypes; by subject disciplines especially with regard to the correctness of the contents; by media didactics, for example, with regard to the role of the textbook as part of a media compound; by general didactics, for instance, with regard to structure and organization, the composition of verbal and visual elements, the design of assignments, the addressing of the students, and last but not least with regard to the use of textbooks in class and the achieved learning results; by subject-specific didactics – as mediators between subject disciplines and general didactics –, for example, with regard to the domain specific adequate “articulation” (i.e., especially alignment, structure, sequencing) of the contents in the textbook and to its use in the specialized class; by school pedagogics, for instance, with regard to the role of the textbook in the context of a theory of school development (e.g., “grammar of schooling”), and by general education, for example, with regard to the relevant explicit or implicit concept of the child/youth or – more generally – the student.

Only the junction of the different (part) disciplinary perspectives comes up to the complexity of the textbook as an entity (cp. on this also Wiater 2003 and Fuchs 2011); research on textbooks, if it will not prove to be reduced in one direction or another, is reliant on interdisciplinary discussions at international conferences and workshops and on interdisciplinary research cooperation.

Against this background it is obvious that research on textbooks, if it will be adequate to the subject, has to be conducted *multi-methodologically* (cp. on this also Matthes 2014). That means that hermeneutical, ideology-critical, contextualizing content-analytical

approaches, approaches analyzing language and visuals, discourse analyses, statistical surveys, and meta-analyses belong to textbook research as well as written questionnaires, interviews, group discussions, class observations, evaluations, and further methodological specifications. However, it has to be pointed to the fact, that in the field of research on textbooks use and impact oriented studies have been neglected so far; thus the corresponding methods are also underrepresented (cp. on this also Doll et. al. 2012).

Besides, it is important to realize what the particular methods can provide and what they cannot; the combination of different methods – against the background of different epistemological interests – is desirable in principal, but from a research pragmatic point of view it is not always or only partly practicable. The necessity of an exchange of views and of cooperation has its justification in that once again.

The last annual conference of the International Society for Historical and Systematic Research on Textbooks and Educational Media, which engaged in methodological issues, was built on the conviction that it is futile and hardly constructive to deal with methods for the sake of methods, because dealing with ways without knowing the whereabouts is no rational attitude and thus no appropriate research perspective. That is why the book at hand is entitled “Methodology and Methods of Research on Textbooks and Educational Media”. On the one hand, there are articles, which mainly deal with theoretical and research methodological questions, and on the other hand contributions, which focus in fact on their particular method, but not without outlining their relevant epistemological interests and their theory-based questions.

The Contributions

The contributions of this volume choose different approaches to questions of methodology and methods of educational media research. The division into the chapters “General Approaches and Reflections”, “Approaches Analyzing Contents and Contexts”, “Approaches Analyzing Language and Visuals”, and “Approaches Analyzing Use and Impact” can only follow heuristic categories, as the transitions are often smooth – e.g., between methodological reflections and concrete content analysis in the articles of *Stefan Schmit* and *Verena Stürmer* or between linguistic analysis and effectiveness research in the contribution of *Jan Iluk* –, and multiple assignments would be possible.

General Approaches and Reflections

This part comprises contributions, which mainly focus reflections on research design and on methodology, rather than on the development and/or application of concrete methods. The beginning is made by an attempt to grasp and to systematize all aspects referring to textbook research by *Kira Mahamud*. This article is followed by the development of a heuristic matrix for textbook analysis by *Stefan Schmit* and the stock-taking of research approaches by *Hansjörg Biener*. *Carsten Heinze* deals generally with the question how the “pedagogization of knowledge orders” in textbooks can be studied. *Athanasios Stogiannidis* and *Nikos Koutsoupias* present methodological reflections with regard to a didactical analysis, *Carl-Christian* with regard to the ideological bias of texts. Finally, there is a meta-analysis regarding textbook research in subject-didactic journals by *Péter Bagoly-Simó*.

At the beginning of this part, *Kira Mahamud* gives a multifaceted survey of methodological approaches for multi-perspective textbook analyses, reflecting on “Contexts, Textual Units, and Representativeness”. Using the example of her own research she conveys an exemplary, but nevertheless generalizable overview of essential and indispensable research approaches. To this end, she differentiates between perspectives “from the outside” and “from the inside”: On the one hand, it is about contextualization – with regard to production, use, and impact – and on the other hand, it is about the textbook itself as macro-text with multimodal units, their relevant special languages, and the discourses and narratives within. Thus, *Mahamud* opens a wide spectrum of inter- and intra-textual research aspects and issues. In view of this task, she finally asks how representativeness can be reached – with regard to the contextualizing sources as well as with regard to the research corpus itself.

Looking for a sound model for the analysis of educational media, *Stefan Schmit* presents a heuristic concept for a basic design for textbook research; this is a structural model, which specifies and links many aspects relevant for the process of research. In doing so, *Schmit* goes both into the choice and the compilation of research units and into possible research methods. He introduces the design exemplarily with regard to a concrete research question: the potential adequacy of textbooks as learning materials for students on the one hand and for teachers on the other. The “research units” textbooks are supplemented by context materials like curricula and information about the conception of the textbooks. *Schmit* asks, for example, for the aptitude of the textbook contents for the pupils’ knowledge consolidation (e.g., by means of assignments) and for the enhancement of the teachers’ professional knowledge (with regard to content, content-didactics, and pedagogics).

In order to take stock of his own research activities and to found new ones, *Hansjörg Biener* focuses – with regard to his own textbook analyses – the question how and according to which criteria textbook researchers may get down to a so-called “main unit” of textbooks to examine. After a conceptual clarification of “main unit” in the sense of “quality criterion” he deals with the aspects “choice of federal states”, “linking to curricula”, “temporal determination”, and “choice of school subjects”. For this purpose, he firstly names tasks to clarify, comments then on his own, but definitely transferable learning paths, and draws conclusions, not without expressing an urgent appeal for an institutionalization of the collection of all textbooks.

Carsten Heinze deals with the question how the “pedagogization of knowledge orders” can be grasped methodologically; he chooses a twofold methodological approach by means of which the meaning-constituting context of textbooks can be covered on the one hand and the textbook-immanent logic – being part of the constitution and reconstruction of discursive formations – on the other. For that matter, the concept of “grammar of schooling” serves him to elaborate the functional context of textbooks. *Heinze* explicates the method with regard to a study of primers from the time of National Socialism; in this investigation, the most important interpretation patterns of the primers shall be determined as well as their relations to discourses and to non-discursive practices.

Carl-Christian Fey looks into the issue how an analysis of the ideological bias of educational media can be epistemologically founded. In view of the critique of the ideology-critical orientation of the textbook research published so far, *Fey* presents a criteria raster – based on concepts of discourse analysis – which he has developed in the context of the

research project “Free Educational Media from the Internet” and which allows for a corpus-immanent identification of the normative-discursive positioning of texts. Using the example of educational media from the internet referring to “Sustainability / Sustainable Development”, Fey shows how ideological bias can be detected in educational media via aspects like “co- and subthemes”, “elisions”, “conceptualizations”, “subjectifying”, “naturalizations”, etc.

Athanasios Stogiannidis and *Nikos Koutsoupas* present an approach for didactical textbook analysis, which they have developed themselves. In an interdisciplinary cooperation, the pedagogue and the information scientist utilize established statistical measurement methods – factorial correspondence analysis and hierarchical classification analysis – for text analysis, the so-called *Geometric Didactic Analysis*. After coding specific elements of the text, for example, verbs in assignments, with regard to didactical dimensions – like forms of knowledge, representation forms of knowledge, learning levels – those research units can be related by means of special software, without a precedent formulation of hypotheses; finally, the ascertained characteristic values are visualized. The authors reflect on the chances and the peculiarities of this approach.

How a survey of textbook research can be obtained, is shown by *Péter Bagoly-Simó*, presenting a meta-analysis of geography-didactical textbook research. On the basis of two English and two German journals for geography didactics he examines for a period of five decades the amount of articles referring to textbook research, the amount of the analyzed samples of textbooks, and the methods applied. Following a mixed-methods approach, he subjects the total of 102 research articles from 1960 to 2013 to a qualitative, computer-aided content analysis and can thus show both trends and continuities within the relevant research communities and differences between the studies in German and in English journals.

Approaches Analyzing Contents and Contexts

The second part of the volume comprises contributions, which examine the research subject textbook resp. educational media by means of a contextualizing content analysis. None of the research approaches presented goes without context references. Thereby, the spectrum of the degree of contextualization ranges from very comprehensive approaches like the ones by *Verena Stürmer* and the research group initiated by *Wendelin Sroka*, via those, which narrow the context consciously down with regard to their research problem – *Jan van Wiele*, e.g., to subject disciplinary discourses, *Karl Porges* to societal discourses and curricula, *Anna Sauer* and *Katrin Sommer* to relevant curricula and orders –, to merely hermeneutic approaches like those by *Christine Michler* and *Elisabeth Erdmann*, which focus on text analysis, nevertheless considering particular subject-related didactical demands and principles.

Verena Stürmer presents the method of historical-contextualizing content analysis, combining qualitative research approaches (content analysis, historical and thematic discourse analysis) and the study of the historical context of the development and conditionality of textbooks, also accounting written and oral sources. Firstly, *Stürmer* undertakes a meta-theoretical positioning of her research question – “Concepts of Childhood in Primers of the SOZ/GDR” – and describes stocks of knowledge about children and childhood as historically conditioned social constructions, which become apparent, among others, in texts (language, visualizations). *Stürmer* shows the potential for analy-

sis of her mixed-methods approach exemplarily with regard to the striking extraordinary designing of the country-bred child in the so-called “country primers” between 1959 and 1965; the reason for this can only be found by the comprehension of the socialist agrarian reform in those years (historical context) and the aligned special educational objectives regarding the rural population (subject-related didactical instructions).

Wendelin Sroka presents conceptual considerations regarding the history of educational media project FiDeS (Plurilingual Primers German-Slavic). The project team, consisting of German, Croatian and Polish researchers, has addressed the task to make those textbooks, which have so far been totally neglected from a systematic point of view, accessible and to examine them. Besides of covering and describing them in a commented bibliography, the texts themselves shall be analyzed from a historical point of view, regarding their characteristics, designs, language-didactical conceptions, and contents; furthermore, their contexts of development and use, the authors and editors, and the language and educational political frameworks shall be examined. Thereby the project proves to be connectable to current educational theoretical considerations regarding the connection between education, language, and acquisition of speech, e.g., in view of migration political questions.

Jan van Wiele examines the theses that history textbooks depend on the official historiography with regard to trends and judgments. He defines the history of education(al media) as part of a “cultural history of education”, the examination of which requires a multi-perspective, interdisciplinary and international approach, which looks at the co- and contexts of the educational medium from as many angles as possible. For that matter, the textbook is considered a valuable source for the disclosure of bigger (educational) structures and mentalities. *Van Wiele* takes this approach with regard to the depiction of Amerindians in catholic Canadian (church) historiographies and the relevant school textbooks from 1870 to 1950. The developments of the official historiography can be identified as history “writ small” in the textbooks. Furthermore, the examination of *what* has been elementarized can – according to the author – contribute to the disclosure of societal mentalities.

Karl Porges presents selected results of a content analysis with regard to the depiction of evolutionary biological contents in biology textbooks for the 8th degree in the SOZ/GDR up to 1959. Biology as branch of sciences and biology didactics serve as reference systems. *Porges* shortly outlines the reception history of evolutionary biology in society and school; for his study, he then analyzes the relevant curricula as well as all biology textbooks which were published in the period mentioned above. The evaluation of the textbooks is conducted qualitatively by means of a category-oriented content analysis. The author shows that changes in the societal prioritization resulted in shifts of accentuations in curricula and textbooks, and that the textbooks were “the most concrete codification of the curricula”, as it was intended by the educational administration.

Anja Sauer and *Katrin Sommer* examine the question, whether chemistry textbooks include materials scientific contents and in which structure elements of the books (according to Sujew) they are presented. Although materials scientific contents can be outstandingly appropriate to teach technology relevant knowledge and competences (application orientation of natural scientific lessons), the curricula, which were examined by the authors with regard to materials scientific contents, offer indications indeed, but no concrete implementation instructions. By means of a qualitative content analysis, the

authors explore in what way and to what extent the topic has still found its way into textbooks. Besides, they evaluate in which textual and extra-textual structural elements the topic overridingly appears. Finally they deduce demands regarding future chemistry textbooks from their results.

Christine Michler analyzes textbooks for Italian lessons in upper secondary schools with regard to the question whether they seize important areas of competence, which are postulated by modern foreign language didactics, and whether they allow for the acquisition of the relevant competences, respectively. For that matter, she focuses by means of a hermeneutic text analysis on the following areas: the comprehension of a grammatical phenomenon, which is a special problem for German-speaking pupils, the acquisition of learning strategies, and the consideration of multilingual aspects, which play right an important role in learning a third foreign language, especially because of similarities and interferences. Finally, *Michler* resumes strengths and weaknesses of the reviewed textbooks and points to improvement potentials.

Elisabeth Erdmann examines by means of a hermeneutic text analysis, whether emotions can be proved in selected history textbooks from 1850 to 2012 and, if so, what kind of. On the basis of a corpus, which is especially comprehensive for the period until 1918, she goes into the question whether the language used in the textbooks conveys emotions, whether the depiction is one-sided and emotional or multi-perspective, whether the presentation within the historical context is accurate or emotionally biased, and whether an (emotional) identification proposal is offered to the readers. An extra chapter deals with the relationship between pictures and emotions.

Approaches Analyzing Language and Visuals

A further chapter presents contributions, which deal primarily with linguistic and visual-analytic approaches of educational media analysis. The chapter starts with an article from *Bente Aamotsbakken*, pleading for a combination of text linguistics and multimodal analysis. While *Tomáš Janko* and *Petr Knecht* are primarily engaged in the analysis of visualizations, and *Karolína Pešková* undertakes such an analysis with regard to cultural geographic visualizations in textbooks for German as a foreign language, *Christine Ott* focuses on the potential of the linguistic method. At last, *Silvie R. Kučerová*, *Kateřina Novotná*, *Jan Hátle* and *Jan D. Bláha* explicate a method, which allows describing, how “mental maps” can develop in students from verbal and visual representations in geography textbooks.

Bente Aamotsbakken advocates for combining text linguistics and multimodal analysis in the examination of textbooks, if *all* verbal and visual elements of “texts” shall be covered adequately. While linguistics addresses the different levels of the text (from the single character up to the text as a whole), multimodal analysis encompasses the relationship between the verbal and other elements of the depiction. On the basis of two textbook double pages *Aamotsbakken* reveals which different competences are necessary for “reading” – a challenge, which has become even bigger regarding digital media. She advises textbook authors of paying special attention to the fitting of the different elements.

Tomáš Janko and *Petr Knecht* present a research instrument for the evaluation of visuals in (geography) textbooks, which they have developed especially for the analysis of types and characteristics of visual elements. Based on cognitive psychology, especially regard-

ing the different reception of verbal and visual representations in their relevant modalities, the authors have deductively elaborated a system of categories for the analysis of visualizations. It asks about types of visualization, degrees of abstractness, text-relatedness, and caption aptness. Furthermore, the authors describe the process of adapting the system of categories to the textbooks that should be analyzed de facto, in order to ensure validity and reliability. In further studies, the instrument shall serve, for example, to answer the question, how visualizations should be such to support teaching and learning processes in an optimal way.

Karolína Pešková explicates a method for the quantitative content analysis of cultural geographic visualizations in textbooks for German as a foreign language. Against the background of research results about the importance of visualizations for learning processes, she gives a description of the demands on visuals for cultural geographic lessons with regard to content (teaching a perspective on the culture, i.e., “visual understanding”). Subsequently, she presents a survey of types and (didactic) functions of visualizations, on the basis of which she has deductively developed a differentiated system of categories and then inductively improved according to experiences during the coding process. By means of this method, textbooks for German as a foreign language from German and Czech publishing houses are examined with regard to the contents of the visualizations and to their functions. Finally, *Pešková* discusses advantages and disadvantages of the approach and makes proposals for the further use of the instrument.

Christine Ott points out, what kinds of research questions regarding educational media can be answered by means of linguistic methods. Based on the relationship between the constitution of knowledge and reality and of language she describes exemplarily two approaches by means of which linguistics can contribute to the revealing of secondary constructions of knowledge and to argumentation analysis. She demonstrates the former with regard to gender conceptions in mathematics textbooks; it includes not only the detection of person reference forms, but asks, for example, on the proposition level for the position in sequences, for attributions, and for predominantly associated verbs (e.g., agent, patient). The potential of argumentation analysis is illustrated by *Ott* with regard to argumentation patterns referring to the topic “migration” in textbooks for civics; by means of the linguistic method implicit conclusions can be detected, for example.

Silvie R. Kučerová, Kateřina Novotná, Jan Hátle and Jan D. Bláha present the research instrument “Geographical Names Frequency Map”, which has been developed by them. They act on the cognition psychologically founded assumption that the presentation of contents (here: geographical names) induces specific mental representations, i.e., that the verbal, visual and spatial positioning and frequency of names generate specific “mental maps”. The accentuation, marginalization, or even omission of names – understood as social-cultural constructs – contribute considerably to the inner conception of a region. On the basis of an analysis of the use and the positioning of names in the depiction of North-Western-Bohemia in local studies textbooks from different political eras the authors show exemplarily, what kind of highly different conceptions of the same region can be conveyed.

Approaches Analyzing Use and Impact

Use and impact oriented approaches – often neglected in textbook research, mainly for research practical reasons – constitute the fourth part of this volume. Subsequent to a

survey of methods of educational media use research by *Dominik Neumann*, three use and impact oriented research projects are presented, the authors of which describe the methods applied in detail – the evaluation of videotaped lessons by *Tomáš Janík*, *Veronika Najvarová* and *Miroslav Janík*, the evaluation of exercises done on the basis of textbooks by *Jan Iluk*, and the evaluation of questionnaires with regard to textbook reading by means of latent class analysis by *Wassilios Baros* and *Eva Wilke*.

Dominik Neumann gives a survey of different methods of educational media use research. Referring to an outline of the question why use research is done so rarely and what kind of methodological challenges are connected with it, Neumann presents questioning, observation, and content analysis as well as not-reactive investigation methods with regard to their relevant potentials, their strengths, and their weaknesses; furthermore, he gives examples from textbook research in order to illustrate the approaches and to demonstrate possible insights, among them the interview study done by himself in the context of the project “Free Educational Media from the Internet”. As so-called best-practice-study *Neumann* highlights an approach which combines questioning, observation, and content analysis and merges the results by methods triangulation.

Tomáš Janík, *Veronika Najvarová* and *Miroslav Janík* present the results of a video-based use analysis, which was undertaken on a big material basis of videotaped lessons in the subjects physics, geography, and English. The transcriptions of the lessons were coded by means of a system of categories, referring to the use of didactical media, and were subsequently evaluated. The research team was interested in the question, which media were used to which temporal extent, in the relationship between the use of modern and of traditional media, and in the differences of media use related to subjects. The results show considerable differences and point to desiderata in the provision of media as well as in further research.

Jan Iluk presents both a contribution to the linguistic analysis of textbooks (terminological and syntactical level of difficulty) – allocating him to the previous part of the volume, too – and a description of experimental use and effectiveness research with regard to textbooks. Firstly, he depicts research results with regard to the fitting of textbooks and the respectively destined educational levels of students and explicates formulas, which have been developed for relevant measurements. Subsequently, on the basis of three teaching experiments, in which students learned from original textbooks and from consciously simplified or complicated versions of the same text, *Iluk* demonstrates the relationship of text constitution and knowledge acquisition.

Wassilios Baros and *Eva Wilke* go into the question, which perspectives are provided by latent class analysis for content analytical evaluations in the field of educational media impact research. The authors show the potentials of this approach using the example of the reception of schoolbook texts about the European Union by Greek and German students. Within the framework of an internationally comparing empirical survey both the appropriateness of textbooks for teaching this subject and the students’ potential critical literacy are analyzed by means of an evaluation of written questionnaires about the textbook contents. Via latent class analysis, sets of characteristics in the data can be quantitatively merged to so-called latent reader classes; thus identified “class-typical” texts can then be analyzed more deeply by means of reconstructive approaches.

Discussion

The volume is closed by a contribution in which *Peter Menck* puts up general remarks for discussion, regarding the situation, the subject matter, and the methodology of textbook research. The starting point of his considerations is discontent with the current state of research. Besides an accurate terminological differentiation between terms like “method”, “methodology”, “approach”, “technique”, etc., he is concerned with a conceptual clarification of the research subject matter, the textbook, as a medium of teaching. Subsequently, *Menck* both illustrates the single steps of an ideal research process in general and gives advices for textbook research in particular. The article will invite to reflections on the state and the perspectives of textbook research and will stimulate further contributions.

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