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Ways of Using Textbooks and Digital Resources by Teachers and Students in the Lower Secondary Schools

Abstract

The paper presents a research study on using teaching resources at lower secondary schools in the Moravian-Silesian Region. With regard to the massive inclusion of digital resources and learning materials of an electronic nature, the research aimed to find out which educational resources are used in teaching and how. The methods of use were deduced based on the activities the teachers induce in the lessons through these resources. A qualitatively oriented research design was used, based on in-depth semi-structured interviews with 15 lower secondary school teachers who had different lengths of experience and taught different subjects. It was found that all teachers still used the core textbook but supplemented it with other printed or digital textual resources. It was possible to describe how the teachers worked with textbooks and digital resources and capture specific styles in which they initiated instructional activities with printed and digital texts.

Keywords: *teaching resources, educational media, digital resources, textbooks*

Introduction

Research on educational resources is mainly focused on the issue of textbooks as a basic printed product used in teaching. This research aimed to clarify how textbooks and other learning resources are used.

Research studies that deal with the use of textbooks are oriented towards their procedural side. They can be divided into several parts. From a quantitative point of view, these are investigations of the length and frequency of using textbooks in the direct work of teachers and students. The authors agree on the high level of textbook use in the classes (Peacock & Gates, 2000; Mullis et al., 2012). Other, especially qualitative studies, describe the textbooks' purpose and reveal which factors determine their inclusion in teaching (Rusek et al., 2020). The results indicate that novice teachers with up to five years of experience rely more significantly on the textbook as a source of relevant information and use it as a guide for methodically designing their lessons (Horsley & Walker, 2006). The massive use of the textbook also predicts the possibility of a direct influence on the student's learning, which is examined through the lens of the effectiveness of learning from the text. However, research results differ on this issue (cf. Pepin & Haggarty, 2001; Carpenter et al., 2006; Fan et al., 2013; van Steenbrugge et al., 2013; van den Ham & Heinze, 2018).

The use of digital resources in teaching has only been investigated in greater detail during the last decade. Many studies try to compare methods of learning from printed vs electronic text. Antić (2014) argues that there are no differences in learning outcomes from different types of resources but that learning effects are subject to how the teachers perceive specific learning resources and how they relate to them (Antić in Ivic, 2019).

Research Problem

The contribution presents a partial element of the research, which focuses on the use of printed and digital educational resources and on how these resources are applied in teaching. The broader research aims to describe the textbook's role in teaching at lower secondary schools. For this purpose, it is first necessary to find out what teaching resources are currently used in schools across subjects and how they are used in the lessons.

Research Focus

The answers to two main research questions were sought: "What educational printed and digital resources are used at lower secondary schools?" and "What methods of using educational resources can be identified in the teaching activities of teachers?". The questions were chosen based on an analysis of international research findings and the results of the authors' previous investigations in educational resource usage.

Research Methodology

General Research Background

According to new findings on the penetration of digital resources into teaching, the research aimed at finding what educational printed and digital resources are used in the lower secondary schools and to map whether there are differences in the methods of their use by the teachers. A qualitative research design was adopted (Corbin & Strauss, 2008; Cohen et al., 2013).

Research Sample

The research group consisted of 15 teachers, 9 women and 6 men, with a length of experience from two to forty-two years. The research population was selected purposefully based on maximum sample variability (Cohen et al., 2013). The aim was to obtain the statements of teachers with different lengths of experience (beginners and experts), from different schools, teaching different subjects, and with different approaches to teaching. The following table provides an overview of the respondents.

Table 1.   Sample of respondents

Name	Length of experience (in years)	Approval	Subjects taught	Interview length (in min.)
Klára	15	Czech language, music education, ICT	Czech language, music education, ICT	59
Lucka	2	art education, health education	art education, health education	61
Martina	42	mathematics, physics	mathematics, physics, financial literacy	77
Michal	3	English language, history	English language, history	60
Tomáš	10	biology, chemistry	biology, chemistry, physical education, work activities, ICT	41
Jana	24	Czech language, Russian language	Czech language, English	58
Markéta	18	chemistry, natural history	chemistry, English, science	49

Name	Length of experience (in years)	Approval	Subjects taught	Interview length (in min.)
Hana	15	biology, chemistry, English language	English language	58
Eva	25	natural history, chemistry	natural history, chemistry	56
Zuzana	19	Czech language, civic education	geography, natural history, work activities	41
Alice	32	mathematics	mathematics	88
Patrik	12	biology, physical education	biology, physical education, English language, music education	49
Jirka	14	history, civic education	history, civic education, geography	50
Honza	12	history, geography	history, geography, civic education	43
Robert	13	civic education, physical education	civic education, history, work activities	67

Instrument and Procedures

The primary research method was in-depth semi-structured interviews with 15 teachers conducted in the lower secondary schools where the participants taught at the time of data collection. The interviews lasted from 41 to 88 minutes.

The in-depth interviews were based on open and semi-closed questions. The order of the questions was flexibly changed based on the respondents' statements at the time in question. The interviews were conducted on specific examples of teaching resources used by individual respondents. Part of the researchers' work was the analysis of the cited sources, i.e., detailed familiarisation with the content and structure of individual educational materials. The starting point for the construction of the interview was knowledge of the theory of educational media and experience from the authors' from the authors' previous research on the same topic.

Data Analysis

First, two researchers independently worked on the open coding of the first interview. Based on joint discussions of the research team, primary codes were identified. The Atlas.ti program was used to codify the data. Subsequently, all interviews obtained were sorted, categorised, and the data were analysed using

open coding. A follow-up step was the typological analysis (Ayres & Knaf, 2008; Cohen et al., 2013), which helped to interpret the research findings. These are subsequently presented and supplemented by authentic representative statements of the participants.

Research Results

Hybridisation – a fundamental characteristic of the used sources

In order to be able to answer the question of how teachers work with learning resources, we first had to map which specific learning resources the teachers use. Identifying resources helped describe what the teachers used to implement in their lessons. Special attention was paid to **textbooks**. Patrik: "Well, the most important thing is the textbook, I use a textbook from the Fraus publishing house (a constructivist-oriented resource – authors' note), we have been working with this textbook for many years, so I am extremely satisfied with it". Jana, Eva, Zuzana, Hana, and Klara responded similarly to the opening question, and they also first mentioned the use of printed textbooks in their classes. In summary, it can be said that the teachers used a wide range of textbooks – from different publishers and authors- regarding the subjects taught.

In addition to the main textbook, other teaching resources were also used. Worksheets and workbooks were used to a great extent, which usually formed a complementary series to the main textbook. Other printed resources used were related to the subject taught. These were, for example, magazines, atlases, and texts from various sources. The respondents agreed that they used everything that was so-called "suitable for their teaching", or in which they saw the potential for their own teaching. At the same time, the origin of the source itself was not that important to them.

Research also focused on using digital resources as a modern teacher's tool (Majewska, 2018). It can be stated that, in terms of content and didactic aspects, it was possible to capture a much more diverse range of types of these resources than in the case of just printed resources. The recorded digital resources were also diverse in terms of the medium with which they were technically implemented in the teaching. Tomáš: "Basically, these are SMART presentations, plus presentations in PowerPoint". Jana: "Smart board. I have made some of the 'dumky' (digital learning materials – authors' note) in Smart board". Other specific digital resources that the teachers used were presentation programmes. These were often linked to the

use of digital learning materials. Through the presentation technique, the teachers also worked with digital worksheets. In our research, Klára represented teachers who preferred educational programmes and applications: "I create electronic exercises myself, so I use a lot of different materials, a lot of online tools, many websites, e.g., Learning apps or Socrative and Kahoot". The Internet application Socrative was also widely represented. The GeoGebra teaching programme used by the mathematics teacher was branch-specific.

Robert and Eva preferred another learning resource. Robert: "Well, I mostly work with the Internet; it's freely available". Eva: "In chemistry, we go to YouTube videos or try 'Googling'". Furthermore, teachers used different websites. These served as a source of information (e.g., www.moderni-dejiny.cz, www.pravidla.cz), methodological procedures (e.g., veskole.cz, dumy.cz), video examples (e.g., www.youtube.com), pictures or examples for practice (e.g., www.wocabee.app, www.islcollective.com). It was important to note which technologies the digital learning resources are applied to. The use of digital learning materials took place through an interactive whiteboard, a data projector, a tablet, and occasionally through mobile phones.

In summary, the teachers used a wide range of teaching resources. The basis was the traditional printed textbook, which teachers supplemented with other resources.

Resource mixing and hybridisation were typical features of using learning resources (Lister et al., 2009). Teachers combined traditional and modern resources, print and digital resources. The differences were mainly in the frequency of their use by specific teachers.

The ways and methods of using resources show the same patterns

Of the printed sources, traditional textbooks dominated (only one respondent uses a combination of printed and digital textbooks). Almost all of the teachers primarily included the textbook in their teaching, but they differed in the ways of using it. Klara and Robert consider the textbook to be a basic resource. Klara: "That textbook is crucial for me, especially at the beginning, when we start a new curriculum. We explain it with the textbook". Patrik works in the same way with the new curriculum: "We usually read an introduction to that chapter from the textbook, if there is information that can be developed". For these teachers, the texts in the textbooks provided support when introducing the topic. Other teachers tried to present the new curriculum using the textbook. We would identify ways of working with new content as *modifications of the explanatory text*. This activity

with the textbook was usually supplemented by a simultaneous interpretation by the teacher.

If the teachers' goal was to explain specific topics and they used the textbook as the main source of content, they tried to select essential or motivating ideas from the teaching text. There were also teachers (Zuzana and Honza) who, when preparing for lessons, did not work with the thematic units contained in the textbook but only focused on specific knowledge (definitions, terms, graphs) in detail. Based on the textbook, they then prepared notes, which they dictated to the students. However, if the given topic was not covered in the textbook according to their ideas, they used other resources for teaching. The respondents stated that the students have the textbook *open during their lessons so they can consult it at any time*. They tend to have it available even when they are not working with it directly at the given moment.

Printed textbooks were also used to practice the subject matter. Depending on the nature of their subject, teachers *used questions in the textbooks or practised examples*. Alice: "Let's talk about the lesson when the lesson starts. There, I see room for working with the textbook, either individually, in pairs, or a group". Alice uses the textbook in several organisational forms, not only individually. From the point of view of *organisational forms*, the teachers worked with the textbook as part of collective, group, and individualised teaching.

However, the teachers did not only work with the textual component of the textbook. Image-based material was also important. Tomáš had the students redraw the pictures from the textbook in their exercise books: "I mainly work with the pictures in natural history. They have to understand that it's not important how beautifully they draw the picture in the exercise book, but what they actually write there, what's there. Students used visual components to describe and identify concepts, to compare material, and explain schemes".

The analysis of the obtained data showed that the ways and methods of using the textbook were related to the purposes and intentions of the teacher. Two polarised styles of use were identified based on the teachers' methods of working with the textbook during activities with a textual and visual component. The first presents work methods based on the students' receptive and reproductive skills. It is related to the transmissive concept of the teacher's teaching, which is also reflected in the methods of working with learning resources. The second includes more cognitively demanding procedures based on searching, creative thinking and developing existing knowledge corresponding to constructivist approaches to teaching and creating opportunities for further learning.

Digital resources overcome the limits of printed ones, and complement them appropriately

Most of our participants had access to the interactive whiteboard. Jana: "When we have already discussed something, and I want to practice it differently, I include, for example, these things that students drag, assign, or perhaps even cross out what does not belong there". The forms of students' work with the interactive whiteboard depended on the possibilities that this digital source provides. We captured two main ways. The first work method is based on sorting and matching words in the text, words to pictures, names, and so on. We noticed that not all teachers knew how to use these interactive elements. The second method was based only on visualisation. The interactive whiteboard served as a screen on which the teacher projected materials for the students.

Educational videos were also used to demonstrate and present the phenomena. Tablets were used for practising or for searching for information. Markéta was an enthusiast of using digital resources in teaching, and represented the teachers who considered digital resources as a helper, facilitating their work: "Without explaining anything to them, I prepared an online exercise in the so-called 'Quizlet', and there I let them argue about it, let them remember something, and only in the next hour did I start to explain to them what they were learning, and what it would do for us". Michal worked similarly with the 'Kahoot' application. The applications enabled the individual work of the students and ensured that the students received immediate feedback. If the student was unsuccessful, he could repeat the task. These ways of working made it easier for teachers to fulfil some educational goals and saved them time. For the students, it was a matter of diversifying the lesson. The participants described this work as being very motivating for the students.

Discussion

The most frequently used resource in teaching is the printed textbook. Despite the huge increase in digital resources, current research in the use of educational resources proves that teachers and students use the traditional textbook to a large extent, i.e., often and with high frequency (DeCesare, 2007; Horsley & Sikorová, 2014). It turns out that teachers consider the textbook to be an important element in implementing their own teaching, but they already use it to a great extent when planning lessons. Also, the textbook is considered the central textual teaching aid in Czech schools. At the same time, other resources (and their carriers) are

used in teaching. These are printed and digital materials that can be didactically processed for student learning but can also serve other purposes – e.g., to make teaching more attractive, combine theory with practice, bring variety to lessons, and simplify the curriculum. It can be expected that these processes can influence the role of textbooks in teaching.

Conclusion

All of the participants combined both printed and digital resources. From printed materials, they considered the textbook to be the foundation. The textbook was used to varying degrees and in different ways: to select points of interest, to modify the interpretation, to assign learning tasks within the whole-class, group, and individual work, to read the text silently and aloud, for extracts, or as a resource that is unintentionally available to students during lessons. Only one teacher used a digital textbook. Other common printed sources that supplemented the basic textbook included workbooks, newspapers & magazines, atlases, works of fiction, dictionaries, and custom text materials. Digital learning resources mainly included interactive whiteboards, data projectors, computers, and tablets. Digital resources were more diverse than printed in terms of content and didactic aspects. Texts were presented via digital resources that visualised the content or helped develop students' thinking, e.g., by searching for information, comparing, and inferring.

The ways or methods of using resources were closely related to the purposes and intentions of the teacher. Another factor that plays a key role is what digital resources can do and enable. The methods of use also varied according to the field of study and attitudes towards these resources. We have identified two basic styles of working with resources, i.e., long-term methods of using resources by our participants. The main characteristic of both styles was *hybridisation*. The first style represented passive work with resources based on the receptive and reproductive skills of the students. The essence of this style was information gain. We named the style the "*passive method of working with resources*". The second style was based on the students' active work with the resources and primarily required a deeper understanding. We called it the "*active method for students to work with resources*". The teacher selected printed and digital resources that enabled the students' activity. Both styles are valid for both print and digital uses. In further research, it is necessary to focus on the active way students work with resources and the specifics of using digital resources by the teachers themselves.

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