DIFFERENCES IN THE SELECTION AND PROCESSING OF ELECTRONIC AND PRINTED TEXTS FROM THE PERSPECTIVE OF CZECH SECONDARY SCHOOL STUDENTS

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Abstract: In the context of ongoing digitisation and robotisation processes, there is an increasing necessity for comprehending texts in electronic formats, which prompts a re-evaluation of the concept of reading literacy. This study aimed to investigate the current reading preferences of 614 secondary school pupils, focusing on their choices concerning text types and genres that facilitate the acquisition of new knowledge. Additionally, the research sought to elucidate the strategies employed by pupils to comprehend unknown vocabulary and the methods utilised for verifying the accuracy of the information read. A particular focus was placed on exploring whether variations in the strategies for understanding unfamiliar words and verification methods are associated with pupils' preferences for specific text formats. The questionnaire survey findings indicate that 75% of participants preferred reading printed books, with science fiction and fantasy genres as the primary sources for acquiring new knowledge, chosen by 34.2% of respondents. Over half of the pupils (51.3%) reported that their approach to understanding unfamiliar words involves inferring meaning from the context of the surrounding text. When verifying their comprehension of the material read, 63% of respondents indicated a reliance on the strategy of repeated reading. Interestingly, the study did not reveal a significant correlation between pupils' preferences for electronic versus printed texts and their chosen strategy for understanding unknown vocabulary. However, it was revealed that pupils' preferences for text formats exhibit statistically significant differences concerning the methods employed to assess their comprehension of the information studied.

Keywords: e-reader, reading literacy, understanding words and information, strategies and ways of working with text

1 Introduction

In everyday life, including personal, school, and work, the need to be functionally literate, flexible, creative, communicative, and open to changes in searching, processing, and evaluating information in printed and electronic texts is growing.
In the international PISA educational outcomes surveys, reading literacy is defined as "pupils' capacity to understand, use, evaluate, reflect on, and engage with texts to achieve one's goals; develop one's knowledge and potential; and participate in society." (NCES, 2024-113). The fundamental reading processes in these surveys are information retrieval, comprehension, assessment, and reasoning.

"Reading competency is a combination of knowledge and skills that allow a person to select, understand, organise information provided in sound and letter form, and successfully use it for public and personal purposes." (Toshtemirova, 2019, p. 362).

Průcha et al. (2009, p. 42) conceptualise reading literacy as an active engagement of readers with texts encountered in everyday life. They position reading literacy as a critical component of functional literacy, comprising a complex array of "knowledge and skills that empower individuals to navigate the written texts they encounter in their daily existence." The interaction with diverse textual forms necessitates cultivating specific reading strategies and skills, enabling individuals to emerge as proficient readers. The authors characterize reading skills from the level of mechanical reading to understanding the read information, emphasizing the importance of reading strategies: searching, processing, comparing the information contained in the text, reproducing the content of the text, etc. These reading strategies are described as intentional procedures that are activated during engagements with text. Similarly, Barry (2002, p. 132) articulates reading strategies as "intentional, focused procedures that regulate and enhance the reader's endeavours to decode text, comprehend vocabulary, and construct meaning from the written material."

The PIRLS (Progress in International Reading Literacy Study) international survey, which has been employing both electronic and written methodologies to assess the reading literacy of nine-year-old primary school pupils since 2021, emphasises the functional dimensions of reading, particularly concerning the comprehension of diverse text types and the application of information obtained from various reading activities (Mullis et al., 2023). Reading literacy is conceptually categorised into purposeful reading and reading focused on procedures and strategies that facilitate reading comprehension. In the PIRLS survey conducted in 2021, pupils' reading competencies were evaluated based on two distinct purposes: a) reading for literary experience, involving engagement with literary texts characterised by artistic expression, and b) reading to acquire and utilise information, encompassing the interpretation of informational texts. The texts read can also be viewed in terms of their reader appeal and reader attractiveness. The PIRLS 2021 research worked with literary texts, informational texts and informational e-texts. The "literary texts" category featured complete traditional or contemporary narratives. In contrast, the "informational texts" category comprised coherent or disjointed informational texts that integrated elements of ethnography, science, biography, history, practical information, or everyday life concepts.

Čechová et al. (2008, p. 98) propose a taxonomy of functional styles encompassing six text types: 1. simply informative, 2. journalistic, 3. professional, 4. administrative, 5. artistic, and 6. rhetorical. Presently, it is feasible to delineate at least three classifications of texts: printed, electronic, and hybrid. Printed texts are regarded as traditional mediums, whereas electronic and hybrid texts are recognised by contemporary society as representative of 21st-century textual forms and the future of reading. Karlík et al. (2002, p. 450) define electronic texting as "a non-linear way of organising text in computer processing of optical and audio information." Within the educational domain, educational texts are categorised into artistic and non-artistic classifications.

Readers can be systematically categorised primarily based on the frequency of books read over a specified period, distinguishing between readers and non-readers. Trávníček (2008) establishes four reader categories grounded in the dichotomy of reader versus non-reader, further delineated according to annual book consumption and reading frequency: 1. non-reader (defined as an individual who does not engage in book reading, completing 0 books in one year), 2. sporadic reader (an irregular participant in reading who may read between 1 to 6 books per annum, either randomly or with specific intent), 3. regular reader (characterised as a systematic reader who engages with 7 to 12 books per year out of an intrinsic interest in the content or for knowledge acquisition and pleasure), and 4. frequent reader (identified as an individual who avidly participates in reading for both knowledge and pleasure, typically reading 13 or more books annually).

A recent study investigating the reading preferences of secondary school pupils regarding various text types revealed significant insights concerning non-fiction reading habits. The research conducted by Vicherková et al. (2024) indicated that pupils predominantly engage with educational professional electronic texts both during their academic pursuits and leisure time. The findings showed that 412 (69.36%) respondents utilise smartphones for reading electronic texts. Printed books are regarded as traditional texts and enjoy greater popularity among secondary school readers than electronic books. In terms of accessibility, flexibility, innovation, and complexity, Czech pupils demonstrate a preference for electronic and hybrid texts for their reading. However, they allocate less time to these formats than printed educational materials. The primary focus of

secondary school pupils' reading interests is on current social events, with 30.30% of respondents indicating this preference, followed by fantasy and fiction at 24.58%. Alarmingly, the interest in scientific topics and cultural texts was notably low, attracting only 5.56% of responses. Among non-fiction texts, pupils predominantly favour electronic forms of scientific and professional literature during academic and recreational reading sessions.

While pupils express a general disinterest in administrative texts, they acknowledge the importance of such materials in everyday life. The authors characterise readers of printed materials as traditional and conservative, viewing them as apprehensive about integrating digital technologies into their learning, professional environments, or leisure activities. Conversely, individuals who engage with digital texts are inclined to utilise digital technologies in various capacities, including academic study, work, and problem-solving activities.

Moreover, Hejsek (2015) emphasised the necessity of developing effective reading strategies and competencies and underscored the importance of adept engagement with diverse text types. Procházková (2006, p. 12) identified individual preferences as a crucial factor influencing pupils' reading motivation and their perceptions regarding reading difficulty and volume. She asserted, "It is important to provide pupils with various types of texts, not only in terms of their difficulty and prevalence but also about their individual preferences." Zápotočná (2013, p. 114) further highlighted the need to implement strategies that enhance reading comprehension within secondary education. In a complementary vein, Krashen (2002, p. 39) proposed a dual approach to fostering pupils' reading literacy, encompassing reading comprehension strategies and developing phonological correspondence skills.

In addition, Bresó-Grancha et al. (2022) examined university pupils' reading performance concerning printed and digital texts, focusing on the contextualisation of reading through two distinct processes: reading comprehension (RCT) and lexical decision making (LDT) following the reading of a specified narrative. Their findings revealed that university pupils tended to read printed texts slower than their digital counterparts, with no statistically significant variations observed in RCT accuracy. Furthermore, the task appeared to demand greater cognitive resources when engaging with printed media for individuals exhibiting poorer reading comprehension. In contrast, those displaying superior performance exhibited a more traditional reading pattern in the digital RCT context.

In examining the influence of text comprehension on the secondary school pupil community—encompassing factors such as motivation to read, reading environment, and preferences concerning text types—we draw upon insights derived from prior research, notably conducted on a sample of university pupils. A qualitative case study by Fitriana (2018) focused on learning strategies, explicitly reading strategies, utilised by 22 university pupils enrolled in Business Administration. This study employed a multi-faceted methodology comprising interviews, questionnaire surveys, and documentary analysis to gather pertinent data. The data analysis involved data reduction, data display, and conclusion drawing. Fitriana (2018) notably investigated the reading strategies adopted by pupils with varying levels of English proficiency, revealing that most participants struggled to fully comprehend texts characterised by lengthy paragraphs and a plethora of unfamiliar vocabulary. The findings underscored that effective reading comprehension necessitates extensive background knowledge and is significantly influenced by factors including reading motivation, language proficiency, reading interest, text type, and the reading environment.

Furthermore, Elleman and Oslund (2019) synthesised a decade of theoretical and empirical research addressing reading comprehension among American adolescents and highlighted stagnation in cognitive performance. They advocated for sustained collaboration among researchers, educators, and

policymakers to enhance reading proficiency. Similarly, recent findings indicated that one-third (226, 34%) of secondary vocational school pupils preferred engaging with traditional textbook formats in engineering-focused courses. Additionally, it was noted that pupils utilising social networks in these subjects tended to enhance their technical engineering vocabulary by engaging more frequently with texts on social networks when compared to their peers who did not utilise these platforms (Vicherková, 2020, p. 85).

Research directed at digital reading and reading strategy performance, encompassing a sample of 211,899 adolescent pupils across 31 countries, highlighted the challenges faced by a technology-driven 21st-century society, particularly the increasing prevalence of digital reading. This study illuminated the contributions of metacognitive reading strategies and the reader's self-concept to overall digital reading performance. Conversely, it identified the opportunities and support provided by educational institutions in facilitating reading and interaction with ICT resources, alongside pupils' socio-economic status, as significant yet lower-order factors influencing reading motivation (Xueliang et al., 2024). Additionally, Merga and Mat Roni (2017) discovered that children aged 8 to 12 generally did not use electronic devices, such as Kindles, iPads, computers, or mobile phones, despite frequent reading of books. Access to mobile phones was linked to decreased reading frequency, with findings indicating that reading habits were less intensive among children exposed to a broader array of devices. Lastly, Kutlutürk (2020) explored the typology of readers, focusing on the application of metacognitive and cognitive strategies employed while reading English texts within a sample of 27 pupils (aged 18–22) enrolled in evening studies at Malatya University in Turkey.

2 Research Methodology

The goal formulated in this way was decomposed into research questions, which are always stated before presenting the relevant empirical findings. The research method was an author's questionnaire, which contained more items, mostly closed, than those used for this study. The research sample consisted of 614 respondents from three regions of the Czech Republic (i.e. the Moravian-Silesian, Olomouc, and Zlín regions). Data collection took place between March 2024 and September 2024.

3 Results

Research Question (hereinafter referred to as R.Q.) 1: What are the current preferences of secondary school readers regarding the types of texts? The investigation yielded the following findings: a substantial majority, comprising 461 individuals (75.08%), preferred reading printed books, while only 153 respondents (24.92%) preferred electronic texts. Among the respondents, 233 individuals (37.95%) identified the ability to carry multiple books within a single electronic device as a significant advantage of reading electronic texts. Additionally, 121 respondents (19.71%) cited easier access to a global range of literature as a noteworthy benefit of e-books. Another 120 respondents (19.54%) recognised the facilitation of information retrieval when engaging with electronic texts as an advantage. Furthermore, 72 respondents (11.73%) pointed to environmental benefits related to reduced paper consumption as a positive aspect of e-book usage. Notably alarming was the finding that 39 individuals (6.35%) reported they do not engage in reading electronic texts, indicating an inability or unwillingness to perceive this absence as either an advantage or disadvantage of reading. Lastly, 29 respondents (4.72%) identified the capability to adjust the font size in electronic texts as a technically oriented advantage.

R.Q. 2: What are genre preferences in reading materials to acquire new knowledge? The survey reveals significant insights. Data indicates that 210 respondents (34.20%) prioritise science fiction and fantasy genres, whereas a notable portion, 175 respondents (28.50%), prefer professional literature (non-fiction) as their primary resource for knowledge acquisition.

Additionally, 114 respondents (18.57%) identify classical fiction as an essential source for enhancing knowledge and 87 (14.17%) individuals have this opinion about biographical literature. A noteworthy fifth of the participants, comprising 28 respondents (4.56%), reported a lack of preference for any genre due to a disinterest in reading. Furthermore, 234 participants (38%) emphasised personal interest in the subject matter as the foremost priority when selecting printed books for knowledge enhancement. Another third, 168 respondents (27.36%), prioritised the quality of informational content in their reading selections. In contrast, nearly a third, 164 respondents (26.71%), highlighted the clarity of information as a crucial factor in their reading endeavours. Only 26 respondents (4.23%) identified the visual aspects of the text as a significant priority, and merely 22 respondents (3.58%) considered the text's structural organisation as the key determinant in their reading choices for knowledge acquisition.

R.Q. 3: What strategies do pupils employ to comprehend unknown words? The survey yielded the following findings: 315 respondents (51.30%) indicated that inferring the meaning of words from the surrounding context within a sentence is the principal strategy for understanding unknown words in a text. Additionally, 282 respondents (45.93%) identified utilising online resources to search for word meanings as the primary reading strategy for grasping unfamiliar concepts and vocabulary.

R.Q. 4: What methods of verifying comprehended information do pupils employ? The findings of this research question are as follows. To ascertain their understanding of the material read, a majority of 315 respondents (51.30%) reported utilising questions that prompt reflection on the meaning of the text. One-third of the respondents (36.64%), equivalent to 225 individuals, indicated that they pose questions aimed at comprehending the text through the lens of drawing connections between the information presented and their own experiences. In contrast, only 74 respondents (12.05%) inquired about the reading material in search of evidence or arguments grounded in the text's meaning. The targeted strategies employed for verifying comprehension, as reported by 389 respondents (63%), predominantly include repeated reading, wherein individuals revisit the text during the reading process—additionally, one-third of the respondents (196, 31.92%) identified keyword searching as a prevalent strategy. An intriguing observation is that 29 pupils (4.72%) acknowledged not verifying information while reading. Regarding alternative strategies for enhancing text comprehension, 164 respondents (26.71%) indicated increasing their reading frequency, while 159 respondents (25.90%) noted engaging in discussions about the text with classmates. Furthermore, 140 respondents (22.80%) reported taking notes to facilitate their understanding. Approximately one-sixth of the respondents (106, or 17.26%) indicated that they create visual representations to aid in memorisation and comprehension of the material. Another notable finding is that 45 respondents (7.33%) stated they refrain from using additional strategies to enhance their understanding of the text.

R.Q. 5 Are differences in strategies leading to understanding unknown words related to pupils' preference for the type of texts they read?
The research hypothesis H1, assuming that the preference of the type of text read (i.e. printed or electronic) will be related to applying a strategy leading to the understanding of unknown words, was tested using the Pearson chi-square test. The source data and the test result are presented in Table 1.

Tab 1. Detected and expected frequencies to H1

Pearson´s chi-square = 1,445283	degree of freedom = 2
significance *p*= 0,485468	

Q E1	Q H3 - I search for the meaning of words on the Internet	Q H3 - I try to guess the meaning of words from the context of the sentence	Q H3 – I do not read	Line totals
I prefer printed texts	206(211,73)	241(236,51)	14(12,76)	461
I prefer electronic texts	76(70,27)	74(78,49)	3(4,24)	153
Colum totals	282	315	17	614

Hypothesis H1 was not affirmed at the 0.05 significance level. The findings from the hypothesis testing did not demonstrate a statistically significant relationship between pupils' preferences for electronic versus printed texts and their chosen strategies for understanding unfamiliar vocabulary. Consequently, the text presentation format unaffected the selection of strategies for comprehending unknown words. Instead, it may be attributable to other factors, predominantly cognitive.

R.Q. 6 Are differences in the methods of verifying the level of understanding of the information read by pupils related to the preference of the type of texts read by pupils?
The research hypothesis H2, assuming that the preference for the type of text read (i.e. printed or electronic) would be related to the application of the method of verifying the level of understanding of the read information, was also tested using the Pearson chi-square test (see Table 2).

Tab 2. Detected and expected frequencies to H2

Pearson´s chi-square = 6,27424		degree of freedom = 2	
significance *p*= 0,043408			

Q E1	Q H5 - I go back while reading	Q H5 - I look for key (most important) words while reading	Q H5 - I do not read, I do not verify	Line totals
I prefer printed texts	305(292,07)	136(147,16)	20(21,77)	461
I prefer electronic texts	84(96,93)	60(48,84)	9(7,23)	153
Column totals	389	196	29	614

Hypothesis H2 was affirmed at the 0.05 significance level. The data indicated that pupils who preferred printed text exhibited a greater frequency and variety in their methods to assess their reading comprehension than their peers who favoured electronic text. Consequently, this result demonstrates a statistically significant difference between these two groups' approaches to evaluating their understanding of the information in their respective reading formats.

4 Discussion and conclusions

A questionnaire survey with 614 pupils demonstrated that most respondents (75%) prefer reading printed books, while only a quarter (25%) favour electronic text. This finding aligns closely with the research conducted by Merga and Mat Roni (2017). Regarding genres utilised for acquiring new knowledge, pupils predominantly engage with science fiction and fantasy literature (34.2%), followed by professional texts (28.5%). Furthermore, more than half of the pupils (51.3%) reported that their strategy for deciphering unknown words involves inferring meanings from the context of the sentence. Secondary school pupils most frequently employ the method of repeated reading to enhance their comprehension of the material (63% of respondents), whereas nearly a third (31%) utilise keyword searches to extract relevant information. Additional strategies include discussing the text with peers (26% of respondents) and continuous notetaking, which aids 22% of the pupils in their comprehension efforts. A

smaller segment of the population (17%) resorts to visual aids, such as creating images, to enhance their recall and understanding of the information presented. Conversely, a minority (7%) indicates that they do not employ any strategies for text comprehension. The analysis found no statistically significant correlation between pupils' preferences for electronic or printed texts and their chosen strategies for understanding unfamiliar words. However, a distinction was noted in the methods employed to verify comprehension, correlating with the text format, a finding consistent with Fitrian's research (2018), highlighting discrepancies in text comprehension linked to the text type. It was further revealed that many pupils struggle to grasp the complete meaning of texts characterised by long paragraphs and numerous unfamiliar words, indicating that reading comprehension necessitates a more profound foundation of knowledge and is influenced by various factors, including reading motivation, language competence, interest in reading, type of text, and the reading environment. Similar research in this area is needed to improve the challenge of comparing this study's findings related to genre preferences, strategies for comprehending unfamiliar words, and verification methods. Additionally, the sample composition, confined to three regions of the Czech Republic, represents a limiting factor in this investigation, attributed to research funding from the university instead of a grant agency.

With the ongoing advancement of digital technologies that facilitate text access, alongside the increasing expectations of a digitally adept Generation Z (individuals born between 1996 and 2010), research must evaluate the educational efficacy of various information sources and strategies for assimilating and verifying comprehension. The authors of this study, echoing the sentiments of other scholars, assert that the level of reading literacy fundamentally impacts educational outcomes across various competencies and subjects delineated in contemporary educational curricula. The authors plan to address this pertinent issue in forthcoming research endeavours.

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