

University of Tartu
Faculty of Social Sciences
Institute of Education
Curriculum: Educational Technology

Kārlis Caune

IMPROVING CHILDREN'S COMPREHENSION AND ATTITUDE TOWARDS
READING BY USING TECHNOLOGY

MA thesis

Supervisor: Irene-Angelica Chounta, PhD
Senior Researcher, Institute of Education
University of Tartu

Tartu, 2020

Table of contents

Table of contents	2
Abstract	3
1. Introduction	4
1.1. <i>Aim of the thesis</i>	4
1.2. <i>Brief overview of important aspects of the thesis</i>	4
1.3. <i>Motivation for research</i>	6
2. Theoretical background	8
2.1. <i>Reading in formal education</i>	8
2.2. <i>Reading digitally</i>	11
2.3. <i>Reading motivation</i>	13
3. Methodology	17
3.1. <i>Method of Study</i>	17
3.2. <i>Reading Activities</i>	20
3.3. <i>Study Materials</i>	22
3.3.1. <i>Questionnaire</i>	22
3.3.2. <i>Texts for Reading</i>	22
4. Results	27
4.1. <i>Students' overall attitude towards reading</i>	27
4.2. <i>Students' performance on reading activities</i>	30
4.2.1. <i>Descriptive Analysis</i>	30
4.2.2. <i>Conditions comparison</i>	36
5. Discussion	37
5.1. <i>Motivation of completing tasks</i>	37
5.2. <i>Measuring growth of vocabulary</i>	38
5.3. <i>Choice of levels of complexity</i>	39
5.4. <i>Practical implications</i>	40
6. Conclusion	42
Acknowledgements	43
<i>Author's declaration</i>	43
References	44

Abstract

Improving children's comprehension and attitude towards reading by using technology

Reading is one of the fundamental aspects of formal education. It is present in nearly all subjects and the ability to read and comprehend is detrimental to the overall success of any given student. As educational institutions are shifting towards the demands of the 21st century, namely – digitalisation, this study investigates the impact of digitalisation on children's reading comprehension and attitude towards reading. In particular, this thesis aims to explore whether the digitalisation of reading leads to a) better reading comprehension, and b) engaged and motivated reading practices. To this end, we conducted a study to test two aspects of reading comprehension. Aspect 1: whether learners in the “digital” condition group achieved a higher reading comprehension than those in the “paper” condition group; Aspect 2: whether the learners' interest in reading as such changed depending on their condition group. The results of the study show little correlation with respect to reading comprehensions between the two condition groups, while they provide insight on children's attitude and motivation towards reading. The findings also indicate the importance of ownership and goal setting for such long-term tasks, when the aim is to improve reading comprehension skills learning English as a secondary language.

Keywords: Reading motivation; Reading comprehension; Reading format; Digitalisation

1. Introduction

1.1. Aim of the thesis

The importance of reading is an indisputable claim within formal education. Yet the shift in education, meeting the demands of digital natives – expansion of screen time, gamification, and general digitalisation of materials is an ever-pressing issue both. Does the digitalisation of reading lead to better reading comprehension, does it lead to more engaged and motivated reading? How does the digitalisation of reading materials influence classroom practices and students experience? These questions are usually left as something to consider for individual teachers in their classroom. As if to say that yes, we acknowledge that reading is important, and yes, moving towards digitalisation is an ongoing process, but how faculty members tackle this is up to them. It is a challenge that we all are a part of, during the digital revolution in education. Collins and Halverson (2018) put forward the thesis that „*The central challenge is whether our current schools will be able to adapt and incorporate the new power of technology-driven learning for the next generation of public schooling.*“ So should we adapt this fundamental skill as well, and if so to what extent?

The current thesis aims to answer the question **whether students reading digitally leads to better reading results within a given timeframe, and whether reading format has an impact on students' overall attitude towards reading?**

As we try to strike a balance between tradition and digitalisation, the direct impact on reading ability and children's motivation in the classroom environment by using ICT has not been extensively studied. This thesis tackles both aspects mentioned: 1) children's overall reading comprehension abilities when compared within their condition as well as in comparison with the other condition group; 2) participants' motivation and attitude towards reading, reading digitally and whether they believe the form matters at all.

1.2. Brief overview of important aspects of the thesis

This thesis builds upon four fundamental concepts: reading motivation, reading comprehension, reading format and digitalization of education. We elaborate on these concepts within the context of improving reading comprehension in two condition groups - paper and digital, and the influence on participants' motivation and attitude towards reading, reading digitally and whether they believe the form matters at all.

Motivation or self-efficacy, as Albert Bandura (1977) called it, is a complex term, combining the ideas of what coping mechanisms will a person use, to what extent, and how will it be sustained, in order to achieve something. Motivation is said to be consisting of four sources: experience, persuasion, psychological state and performance (Wiggfield & Eccles, 1992). In the context of this study, motivation is paired with reading and completing tasks related to the reading material.

As participants had to take part in the study, it was important to understand whether they are motivated to participate and how far does their motivation reach, in the context of completing tasks given. Whether the participants have self-motivated or not, whether external motivators play a significant role in their performances. The study took place in a formal education environment, which often links motivation with external motivators – grades, positive marks in journals, certificates for various achievements. While taking part in the study the participants were promised no such external recognition, instead it was stressed that this is a task to improve their reading comprehension and that alone.

Although reading comprehension has had a variety of theories and models presented imagining the cognitive processes, more recently Perfetti and Stafura (2014) identify specific elements, breaking down the reading process as a matter of decoding, word identification, meaning retrieval, sentence building, and using the person's prior knowledge in a variety of ways. This knowledge is used to decode the written texts using orthographic and phonological knowledge, and in interactive ways using general knowledge and deducing the meaning of the sentences from the context, using general life knowledge.

In the context of the current study reading comprehension was measured by students reading texts of various levels, according to the Common European Framework of Reference and completing tasks related to the text at a specific level. The more correct answers a participant submitted, the higher the reading comprehension level is considered to be.

Reading format, in the context of this study is the difference between two condition groups – paper and digital. The paper condition group read the texts provided to them on A4 sheets of paper, with an image or plain text, a task to the specific text being added below the text provided. The digital condition group read texts through Google Forms, where a text would appear, similarly either as an image or plain text with the task which needed to be completed below the text. In both cases the full text and task was made available for both condition groups. Texts of the next complexity level being printed on the other side of the sheet, or on a

separate sheet for the paper condition group, while the digital condition group saw the next text, when they would proceed to the next section. The texts were available only on paper or on a computer, with no other reader format made available for the participants, meaning that no e-readers e.g. kindle were an option.

Digitalisation in an educational context means the rise of availability of the Internet and information technology tools in a classroom. The process of digitalisation means a shift from primarily teaching using paperback books and analogue tools e.g. chalkboard, to using mobile devices, wireless technologies, computers, smartphones and other devices. These devices did not have to be primarily intended for use in an educational context, however, with the availability of specific websites, applications and the overall demand that teachers should make use of information technologies, tools were appropriated and used in the educational institutions as well (Tække & Paulsen, 2017).

For the current study, digitalisation was used as a matter of turning the tasks that students usually face in an analogue format, on paper, into a digital space, with the same materials and tasks available using Google Forms. The two condition groups in the study represent digital and analogous studying. Here it must be noted, that for both condition groups, the approach was not new, nor were the tools they had to use. Both condition groups had their additional reading lessons held in a familiar environment, and the digital condition group used computers, which are otherwise used during their information technology, English as secondary language, geography and other subject lessons. It was asked, that only the hardware available in the classroom is used, as to make sure that in both condition groups participants see the whole text straight away, acknowledging that it may not be possible on a smartphone screen.

1.3. Motivation for research

The current study is based on the fact that over time more and more financing has been allocated towards digitalisation of the education system. Since the launch of the "Digital Poland" (Polska Cyfrowa) programme within the regional development programme for the time frame 2014-2020, many programmes have been launched by the Ministry of Education in cooperation with the Ministry of Digitalisation, such as Program Operacyjny Wiedza, Edukacja, Rozwój (Operational Programme Knowledge, Education, Development) or the creation of a television education channel under the programme Digitalizacja Polskiej Szkoły Telewizyjnej i Filmowej z Archiwum TVP (Digitalisation of Polish School of Television and

Cinema from archives of TVP), with these two projects alone having been allocated more than 60 million Polish Zlotys (15 million Euro) of public funds.

During the study year 2019-2020 the Polish Ministry of Digitalisation launched two new initiatives "Zdalna Szkoła" (E-School) and "Zdalna Szkoła+", providing schools with the possibility to apply for hardware so that students could learn using computers, in each round allocating 187 and 180 million Zlotys (nearly 92 million Euro) (Ministerstwo Cyfryzacji, 2020). Actions like this send a very clear message, that institutions should move towards digitalisation and that it will be a priority of the future. In this context, the school administrations and staff are under pressure not just apply and use the hardware when necessary, but rather to use it as much as possible.

This research was meant to evaluate the impact of these digitalisation processes on the development of learners' skills and knowledge. Attempting to analyse whether the digital approach is better than analogue learning and if so, to what extent. Whether children are truly more motivated to learn digitally, as it often seems to be, as they and parents demand more and more digitally available materials, implementation of IT related skills into the curriculum and the gamification of educational processes.

As the author is an educator teaching both information technology and English as a secondary language, this thesis aimed to assess the current approach towards studying, with possible implications for the future not only in own work, but also as something that can be proof to other educators, administration, learners, parents and any other interested parties.

2. Theoretical background

2.1. Reading in formal education

Reading has been put as one of the cornerstones of formal education. The ability to read and to do it well directly determines a person's possible success or lack thereof, within the education system. As some researchers have argued, that the development of reading is parallel to the development of humans, it could be argued, that the development of reading tasks in education has been parallel to the overall development of tools used in education.

Luque-Agullo and Gonzalez Fernandez argued in 2012, that "the use of newspapers in the classroom concerns the role of language learning in Europe." (Luque-Agullo & Gonzalez Fernandez, 2012; p.477) as that is in line with the Common European Framework for language, which states that learners "can read with ease virtually all forms of the written language, including abstract, structurally or linguistically complex texts such as manuals, specialised articles and literary works." (Council of Europe) Therefore it has been clearly set by officials, that not just general reading ability and understanding the texts is important, but that a learner should be able to understand specialised language as well. Thus, we have a clear frame for the complexity.

Another aspect which can be taken into consideration is the speed at which learners read. Some suggest, that the importance of reading speed to successful reading is neatly portrayed in the two contrasting circles of the weak reader and the good reader (Nuttall, 1996, p. 127) From Nuttall's perspective it could be argued that a student, in order to be successful in his educational career has to be able to read, contextualize, and also do it quickly. However, more recent studies do not suggest a high correlation between speed and comprehension. "In the current study the correlation between percentage of comprehension questions answered correctly Passage Comprehension scores was not significant for 4th-grade students." (Skinner et al., 2009; p.1045) Due to these more recent findings, speed was not made of essence whilst conducting this research. Considering that precision was made more important, and the evaluation of learners' comprehension, it was not of essence for them to read the texts quickly.

Furthermore, the Organisation for Economic Cooperation and Development (OECD) defines the term "reading literacy" as used in PISA includes a wide range of cognitive competencies, from basic decoding, to knowledge of words, grammar and larger linguistic and textual

structures and features, to knowledge about the world. (OECD, 2016) This in no way references that speed of reading is important. Furthermore, Perfetti suggests that “There is neither compatibility nor interesting contrast between lexical quality and rapid naming if rapid naming is completely general rather than about words. It is possible that rapid naming of words is a by-product of lexical quality, just as verbal efficiency is.” (Perfetti, 2007; p.379) Considering the changes in opinion since Nuttall's publication in 1996, it could be argued that speed as such is important only if the restrictions of a single lesson are considered. Any learner needing to read and analyse a specific text with a time constraint.

Analysing PISA results, among countries participating in OECD's PISA evaluations, one of the key elements measured is the children's reading literacy. Out of the ten territories with the highest results five are from European states – Estonia (#1 – 523); Finland (#2 – 520 pts); Ireland (#4 – 518); Poland (#6 – 512), and Sweden (#8 – 506). (OECD, 2019) However, the overall results are quite stagnant, and do not propose a significant upwards trend. On one hand it could be argued that it is a great result. As Brozo describes “PISA seeks to measure how well young adults, approaching the end of compulsory schooling, are prepared to meet the challenges of today's “knowledge societies.” The assessment is forward looking, focusing on young people's ability to use their knowledge and skills to meet real-life challenges rather than merely on the extent to which they have mastered a specific school curriculum” (Brozo et al., 2007; p. 305) Therefore it could be concluded, that the European countries as such are doing quite well in the evaluations. However, results in such countries as Slovakia, Hungary, Denmark, Portugal and others have not significantly changed during the last decade. Whilst results in Finland, the Netherlands, Italy and Sweden have even decreased. (Pisa, 2020)

These results lead to questions in many areas – why are the results so stagnant, why so few countries have significantly improved their results and why some country scores keep dropping? In this situation we may turn our attention to Estonia and its results. The country has made significant improvements in this area, improving their average mean score from 501 points in 2006, to 523 in 2018. Comparing it to the other Baltic States of Latvia, which has remained at 479 points in the 12-year timeframe, while Lithuania's mean result is 476 points – the lowest of the three countries. Estonia, in the most recent results, has also surpassed their northern neighbour Finland, which have fallen from the result of 547 to 520 in this period. In 2012 Uusen and Mürsepp concluded in their report that “[...]it is time to start broadening and modernizing the selection of reading materials and to make teaching Estonian more pragmatic. Since individual students' interests may vary considerably, it is wise to let students

choose their own reading materials whenever possible and provide them with a wide selection of texts.” (Uusen & Määrsepp, 2012; p.1802) If attitudes like this would be implemented in the education system, in order to provide more flexibility for students and perhaps even different reading formats, other countries could gain or regain their scores as well, as it seemingly has worked in Estonia.

Reading has been made as one of the central elements of educational systems as such. As formal education is assumed to have evolved in tandem with the evolution of modern written modes of meaning, in the developing fields of science, technology and social administration. (Halliday & Martin, 1993) Based on that, it can be argued, that better reading ability should lead to one's better academic performance in the formal education environment. In order to distinguish levels of achievement, we can refer to a model proposed by Rose – that distinguishes five general stages in this underlying reading curriculum. Each stage prepares successful students with the skills they will need in succeeding stages. But what students are evaluated on is skills that they have or have not acquired in each preceding stage. Rose (2007) argues that for success in school, it is essential that children are reading independently with comprehension and engagement by the end of junior primary, because the next curriculum stage in upper primary is geared to developing skills in learning from reading. Based on this model, Rose splits the education system into five stages: before school, junior primary, upper primary, secondary, and tertiary. He argues that skills gained on any said level is a prerequisite for success in the following one.

Currently the situation is impacted not only by whether a child has the opportunity to go to a school. In the current state of the world, access to education does not mean only access to the infrastructure and educators, it suddenly means access to online education. Rose, in his 2007 model calls back Bernstein's argument from 1996, that educational curriculums depend on those agents who hold power in any country. This is otherwise described by Lamnias. The contemporary pedagogic device intends to regulate the available classes of knowledge (thinkable/unthinkable), in order to construct and transmit the convenient school knowledge. (Lamnias, 2006; p.28) According to this interpretation, the link is relatively straight forward. Those in power set priorities which are then reflected in the educational discourse. This would mean that the better a learner manages this information, the better one could proceed in the next educational level. In the current situation, however, the situation is no longer so straight forward. Educators have no direct access to the learners and there are complications beyond

asking them to read materials from the study books. As not only schools, but also libraries being closed in a large part of countries learners and educators have limited possibilities.

Brown noted in 2001 that "Educators often comment on the changes in reading, study and writing habits that they observe in the current generation of students who have grown up with Game-Boys and TV. For today's student, the typewriter, carbon paper and white-out are writing tools found in a museum. Given the ubiquity of desktops and laptops, of online public access catalogues and campus networks that provide e-journals and e-books, researching and writing a paper has become a different experience." (Brown, 2001; p.395) As this analysis was released in 2001, one can only imagine how much further are current learners from the reading habits of those analysed 19 years ago.

This can be seen not just in education, but in society as such. As the research was conducted in Poland, the key actor in reading habit analysis is The Polish National Library which, in their yearly review of reading tendencies note, that during 2019 60.9% of those participating had not read a single book nor partially, nor in its entirety. 18.4% of respondents answered, that they read one book. At the same time, from those who had read a book in its entirety or at least partially 34% had done it using e-reading services. (Biblioteka Narodowa, 2020)

2.2. Reading digitally

Although Brown noted that "new forms of reading [i.e. e-reading services] will gradually become as natural as the different activities we now take for granted, such as searching an online catalogue, watching a cassette video or surfing the Web." (Brown, 2001; p.399) These new forms may not be instantly accessible for all. The education system in a country as large as Poland with 14'335 primary and 8567 secondary schools (including vocational education) according to the Centre for Economic Information (Centralny Ośrodek Informacji Gospodarczej) the amount of institutions, employees, students, and any other actors who would need to possess the necessary tools to take part in digitally based education and thus digitally based education is enormous.

Considering the circumstances in the world at this moment, many educational oversight institutions have made a push through investment, to assure that processes may happen digitally. Yet, in prior circumstances, a more recent research by Fortunaty and Vincent, in their analysis noting that "Reading on screen has stimulated fewer positive comments and this probably because this is the weak point of the digitalisation of the entire writing process" (Fortunaty & Vincent, 2014; p.48) Furthermore their research states that ".. reading/writing on

paper seems to be a much more multi-sensorial experience than reading/writing on screen keyboard. Even the paper itself is able to convey a multisensorial experience. On the whole, the emotional and sensorial experience on reading/writing on paper is much stronger than the digital one. From our research it emerged that handwriting on paper involves more of the body than the electronic typing on keyboards.” (p.49) The issue with this research is that although it considered both reading and writing, there were no conclusions deducted solely on the digital reading aspects. Their research participants have also entered the tertiary education stage and their knowledge and skills may not be comparable to those learners completing primary education.

Others, who have analysed reading digitally versus on paper have come up with a variety of conclusions. For example, Margolin notes that “[when reading digitally] The participants who felt they were experiencing a greater workload, such as those reading on a computer, also scored lower on measures of comprehension.” However, this research was conducted focusing on e-readers. Further on Margolin points out that “Studies examining comprehension between paper texts and e-reader texts do not reach the same conclusions, nor do they use equivalent methods to measure reading comprehension. Two studies found that text presentation (paper or e-reader) did not affect reading comprehension;” (Margolin et al., 2013; p.8) In this research situation, some of the issues mentioned by Margolin and her colleagues were tried to be eliminated. All learners participating conducted their reading tasks in a familiar environment – classrooms, where they have been studying for numerous years, with no time pressure, nor pressure of being graded. Those who read digitally used identical computers, which they use also during other lessons. Through this the research was aimed in a way to provide a maximal amount of comfort and confidence, that the participants know what to do.

In 2001 Mayes, Sims and Koonce conducted two experiments to determine whether video display terminals resulted in lower results in terms of reading times, comprehension of the information, and mental workload. Their experiments implied that reading on screens was slower than reading from paper. (Mayes et al., 2001; p.377) The counter argument to this could be stated that speed could be more a matter of comprehension rather than the format in which the learners read. Speed, without comprehension does not necessarily imply progress. Therefore, the aim of this research was to ask all readers to start from the lowest level – A1, in order to try and analyse whether overall progress can be achieved in terms of comprehension, not in terms of reading speed.

Furthermore, in their response to the above-mentioned research Noyes and Garland note "Our results indicated that mean reading times for a single page of text did not differ between computer and paper-based presentational formats. The findings of our study suggest that if the material used is matched, for typeface, font size, polarity and general clarity (resolution), then reading speed (as measured by time) does not differ significantly between these two media" (Noyes & Garland, 2003 p.418) Because of this, both groups read the material using the same presentational format. Both of the groups in this study read identical texts, the same questions, with the same presentational format, with the lone difference that learners from the "paper" group had to flip pages, while "digital" group had to click to proceed to the next text.

2.3. Reading motivation

All the above-mentioned factors – overall attitude towards reading within the formal education system, reading format, amount of time and other environmental circumstances, psychological aspects, like stress and pressure, tools that are used – all are important. However, one additional aspect is key for reading – motivation.

Guthrie and others in their 2007 research state that "[the study] verifies that these general motivation variables significantly predicted growth in reading comprehension in these conditions" (Guthrie et al., 2007; p.302) Simply put implying, that the more motivated the learner is to read, the higher will be the growth of comprehension. Furthermore, their research shows that out of all the variables – general motivation accounts for the largest impact – accounting for 71% of the variance, followed by situated motivation composite – accounting for 9%. They also do note that there is a difference in motivation, concerning the type of texts being read. "... motivation for reading information books predicted an increase in general motivation, but motivation for reading narrative books did not predict the increase in general motivation. Thus, understanding the text genre as a source of multiplicity in reading motivation is useful for understanding the growth of reading motivation." (Guthrie et al., 2007; p.305)

An important aspect of motivation can be competing with others, for example, your peers. In Komiyama's research in 2013, she concluded that "... students who seem to be highly motivated when they compete with peers in second language reading classes may, in fact, not be so motivated to read in second language to acquire new knowledge. These students would benefit from extra teacher support in finding interesting reading topics for an extensive reading assignment or in working collaboratively with their peers in class. The current study

contributes to developing a better understanding of various ways in which adult EAP readers are motivated to read.” (Komiyama, 2013; p.166) This motivation variable is of importance in the context of this study, as competition among peers was not encouraged. Learners' progress was discussed with them individually when they wished to do so, which meant that learners did not have a reference point to compare each other's progress, unless they shared the results among themselves. However, during the interventions it was encouraged that the tasks should be completed for the sake of improving their reading ability and solely for that purpose.

It is important to note, that numerous research reports highlight that enjoyment of reading is directly linked to children's literacy abilities. For example, as „Literacy interest, home literacy environment and emergent literacy skills in pre-schoolers” (Gregory & Carroll, 2018) Thus suggesting – children who enjoy reading may have a literacy ability increase of up to 25%. A large part of the research focuses around the so-called Home Literacy Environment, linking these abilities to the socio-economic status of the family and various other factors. The home literacy argument thus would link back to Rose's model, as it would directly link to the first stage – before school. However, it may be argued, that if there is an institution, that can „make or break” the enjoyment for reading, then it is school. Some associate reading at school, with the mandatory tasks, „classic” books, that we are assigned. Others may associate it with a place where they were able to take part in an activity they enjoy.

Beyond their already present level of skill and their Home Literacy Environment, an obvious factor is the content of the text at hand. As Schwabe and McElvany point out in their 2015 research “An interesting result in this context is that boys' reading comprehension depends largely on the text content, whereas girls' achievement is hardly influenced by this factor. Taking into account that actual reading achievement is affected by interest- related factors such as text content, meeting the interests of boys by, for example, providing suitable reading materials becomes even more important.” (Schwabe & McElvany, 2015; p.228) As much as one can agree with their findings, it has to be taken into consideration that the interests of the group are not always noticeable. In mixed-gender groups, although all learners are classmates, their interests and general motivation differs vastly, therefore it proved to be an uphill battle trying to cater to their interests and hobbies.

Based on this background information, there were several points that were left unanswered in three separate aspects: Reading in formal education; Reading digitally; Reading motivation. As such this research tried to study the following points from each of these aspects.

Reading in formal education:

- What growth do additional reading lessons provide;
- Whether the groups have differences in growth, that could correlate to the format;
- Do learners acknowledge growth themselves;
- Do learners consider reading a valuable educational and life skill;

Reading digitally:

- Whether learners prefer to read on paper or digitally;
- Whether they believe one format has an advantage over the other;
- Do they prefer one or the other for studies or leisure or both;
- Does availability of digital reading materials mean, that they would like to read more;

Reading motivation:

- Are these learners motivated to read;
- Is their motivation impacted by the reading format;
- What are the outside factors impacting their motivation i.e. – home reading environment, receiving a grade etc.
- Whether a format choice impacts their motivation.

Based on Rose's assumed model, the children taking part in this research would correspond to the "upper primary" education stage, as they are in their final year of primary school education. The study was conducted throughout one study year – September through March, in Kolobrzeg, Poland. Work was conducted in a Private school "Morska Kraina".

In general, often results are inconclusive, when observing children's reading abilities being impacted by reading electronically, and could not be used as a clear indicator, whether use of educational websites such as, for example, Newsela, Read Theory, and others, increase the children's reading literacy. However, surveys with students did indicate that by combining reading with "screen-time" and adding the interactive elements their overall interest in reading had increased. In the researchers prior work, when summoning feedback pupils stated such things as – "These lessons helped me a little bit"; "Yes, I enjoy reading in such a way and I read there also at home"; "I like that I started at class five, but now can manage class 8 texts easily". The Latvian Standardised Exam results showed a slight increase in the children's reading literacy. From 76% in 2016, to 81% and 84% in 2017 and 2018

respectively. One could argue that due to the overall attitude towards reading being raised, and importance set on it, it led to higher results, however, further research is necessary.

Such was the pretext in order to start this study research process. The fact that plans were interrupted by the global COVID-19 pandemic, although disruptive, has only highlighted the issue at hand – is reading digitally as impactful as reading on paper? Currently, the vast majority of countries in Europe have halted the work of educational institutions on-site. Students and teachers have had to change their working habits and reading digitally is less of an option, and more of a need.

3. Methodology

In order to investigate how the form in which children read affects their reading abilities, we carried out an exploratory study at the "Morska Kraina" school in Kolobrzeg, Poland. The methodology used in the research was experimental research and hypothesis testing followed by a survey to explore students' perceptions. The experimental part of the study, consisting of interventions in the form of additional reading lessons were meant to collect quantitative data, which was used to analyse the overall development of participant's reading comprehension throughout the research. The survey method was chosen to collect qualitative data and explore the participant's attitude towards reading, their motivation, home reading environment and the interventions that had taken place. The combination of these two methods allowed us to not only collect qualitative and quantitative data, but also seek any relations between the two aspects.

It is believed that the methods chosen were the most appropriate to do research on the stated question. If the key aspect would be the students' impression, then a field survey would suffice. Due to the time limit, it cannot be carried out as a longitudinal study. In terms of general limitations, it must be noted that due to decisions made by the school's administration, grouping of participants was not random, as they were split alphabetically. As it was permitted by the administration to carry out the research during regularly allocated lesson times, there was no possibility to request students to carry the reading tasks outside of their scheduled lesson plan. This in turn meant that if anyone was absent, there was no possibility to require them to do tasks others have already completed, in a controlled environment under the researcher's supervision.

3.1. Method of Study

The population used for this research were primary school (year 8) students. A total of 17 students are studying in the class. All the students are living in the city or the surrounding rural areas. The age of the students (at the beginning of the research) ranges from 13 years 1 month, to 14 years 3 months old the class has 8 girls and 9 boys, providing relatively equal groups gender-wise. Prior to starting the research, consent was gained from the school's administration for its conduction. According to the consent forms that are signed by all parents prior to the beginning of each study year, it is permitted for students' works to be used in a research capacity.

A non-probability sample method was used to select participants for this research, as the point of the research was to target a specific group of students, at a specific stage of their education. The population for the study was selected by convenience sampling, which as described by Dörnyei (2007) is the most common type of sampling in studies where the only criterion according to is the convenience of the researcher. The main reason for this sampling was that participants were accessible for the study.

The class was split into two groups, by the administration of the school, with no input from the researcher's side. The class is split into groups, based on their number in the journal – hence alphabetically. The first 9 children are placed into group one, and the remaining 8 into group two. Without considering which children are in the group, group 1 was assigned to use paper versions of the text (control condition), while group 2 – digital versions (experimental condition).

The choice of the participants was made based on convenience (that is, we chose as participants students who were available and eager to participate in the study). As it is the institution where the researcher works and has worked with these children for one year prior, it was convenient to recruit them for the research purposes, with the permission of the school's administration and through consent forms signed by their parents. An agreement, prior to the start of research, was made with the administration of the school, for such research to take place.

The students were initially informed that twice a month they will have a reading lesson, to try and improve their reading skills. They were told that they will not be graded on the tasks, that they are meant for self-improvement, are supposed to be done individually, and that no negative consequences will occur, if they answer wrong. Due to a variety of reasons, namely school events, changes in the teaching staff, classroom availability and student's comments, the initial schedule was adjusted. Overall seven reading lessons were conducted – one in September, November, December, January and February, whilst two in October. In December, after a discussion with the students about their overall thoughts on the process, it was agreed that one reading lesson would be held monthly, moving forward.

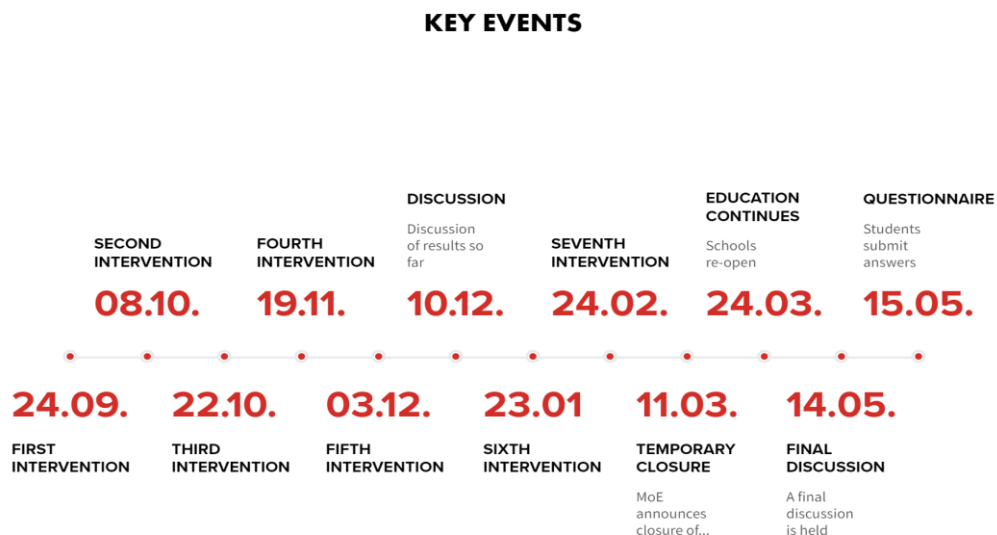
Although students evaluated the additional reading lessons positively the idea that there had been too many of them was echoed by several, which is the reason for the change. With the agreement in place, with a specific amount of lessons to be done, the students' attitude was positive. Participants also stated that they wish to be informed more frequently about their

results, as it “Helped them find more sense in the tasks.” And this request was also fulfilled during the remainder of the time.

The first reading lesson was carried out on September 29th, 2019; last on February 24th, 2020. A final discussion about the reading lessons was held on May 14th, 2020. A total of seven reading interventions were carried out, each lasting 45 minutes. During that final discussion students had the possibility to share their views and opinion about these lessons and the tasks that needed to be done. After this, each student received their personal results, in a form of a table, showing how well they had done. The final task for the participants was a questionnaire about to measure their overall attitude towards the process.

The key events of the research process can be arranged in different groups. (see Figure 1) There were a total of seven interventions, five in the year 2019: September 24, October 8, October 22, November 19, and December 3, and two in 2020: January 23 and February 24. Two discussions were held about the students’ progress, on December 10, and a final discussion on May 14, 2020. Other key events during the research was temporary closure of educational institutions on March 11, and March 24, when schools reopened, but only for distant learning. March 24, therefore, is also the day, when it was decided to not hold any further interventions. Finally, on May 15, the results of the questionnaire were finalised.

Figure 1 - key events of the research process.



Throughout the study, the only issues with the specific population was their absence when reading attempts have been scheduled. Across the whole study 8 participants missed at least one of the interventions due to absence. For participants missed one intervention, two missed them twice, one participant was absent once and once had a user error rendering the answers invalid, finally, one participant was absent twice and once rendered their answers invalid by error. The user errors in both situations happened in the digital group, where the student closed the browser without submitting the answers. No other errors were noted during the research study.

3.2. Reading Activities

The study was conducted using the experimental approach, the condition being whether the student reads on paper, or digitally. For the group of students, who read digitally, the texts were prepared using Google Forms – each of the texts was placed in a separate section, in order to have them focused on the task in front of them. Upon opening the text, children would need to input their name, for data to be assignable to a particular student. The learners would first see the text in the level A1, either as plain text, or an image with text that needs to be analysed.

Each text is accompanied by five questions. Across all the tasks, a variety of answer types were summoned from the readers. All of the types the learners were familiar with, as they were based on types of exercises, that are requested from them during regular schoolwork. Exercise types include:

<i>Exercise type</i>	<i>Frequency used</i>	<i>Percentage of all tasks</i>
Open ended questions	14	40
Finding specific information in the text	9	25.7
Choose the headline	5	14.3
True or false	3	8.6
Multiple choice	2	5.7
Finish the sentence	2	5.7

The specific task types and their frequency was determined by two factors: 1) The specific questions or exercise type was among the recommendations for the specific material; 2) The majority of tasks are such, to minimize the possibility for students to either cheat off others or to guess the answer. This could be considered more possible mainly with *true or false* and *multiple-choice* exercises, which composed only 14.3% of all tasks. This was chosen as a precaution in order to minimise the risks of students attempting to cheat during the exercises.

All questions were mandatory to answer. In case time was up, and some of the questions were left unanswered, they were instructed to: 1) place a strike next to the question, in situations where they had reached the specific level, but did not know the answer, or ran out of time; 2) write "n/a" in case there was no more time for the assignment, and the student had not reached the specific level. This was done, in order to distinguish, whether the specific level was reached or not.

The students would read during the additional lessons, as described above. The method allows to explore the relation between the two groups, considering the variable set for them. Similar to the digital students, "paper" students would receive the exercises in a way, so that they could focus on the single task at hand. Text of a particular level with the questions about it were printed on the same side of the paper.

Furthermore, the study had been originally planned with 15 interventions - one in September, two in the months of October, November, December, January, February, March and April. Due to scheduling clashes or other unforeseen circumstances, seven interventions had been carried out until February 24. Beyond that, the study was cut short by two reading attempts, due to the Covid-19 crisis.

Therefore, a total of seven additional reading lessons were conducted, as on-site educational processes were stopped by the Polish Ministry of Education. On March 11, 2020 an official decision was made to "Temporarily limit the functionality of educational institutions in response to COVID-19" (pol.- Rozporządzenie Ministra Edukacji Narodowej z dnia 11 marca 2020 r. w sprawie czasowego ograniczenia funkcjonowania jednostek systemu oświaty w związku z zapobieganiem, przeciwdziałaniem i zwalczaniem COVID-19) (Prezes Rady Ministrów) Due to the temporary closure of all educational facilities by the Ministry of Education on March 11, it was decided that no more interventions will be carried out.

It must be noted that the study was meant to analyse the student's overall knowledge and reading comprehension ability improvements, therefore the texts cover a variety of topics. This was also purposefully chosen, as although research was being conducted, the key aim was to focus on the children's reading ability improvement, as such, a variety of topics in the researcher's opinion could have led to a larger variety of new vocabulary for the students.

During the period, through the additional lessons, a total of 315 minutes was spent on reading the materials made available, whilst another 90, in order to discuss their progress. Bell in his 2001 article measured the speed of English as a secondary language learner reading speeds,

which noted that the mean average was 78.45 words per minute. (Bell, 2001) As the students in this research also obtained English as a secondary language, it can be presumed that the reading speeds would be similar. Thus, it can be argued that on average each student read approximately 21'181.5 words, which is the equivalent to a short novel. Therefore, it can be argued, that by taking part in the research, the students have read more short stories and texts, than their average compatriots have.

Beyond analysing student's reading comprehension, the study proposed measuring their overall motivation and attitude towards reading. It would be done by conducting a questionnaire after the final intervention. The questionnaire would provide an insight into participants' opinions about reading as such, their home reading environments, the research process, and their own evaluation about whether their reading comprehension ability has improved or not.

3.3. Study Materials

3.3.1. Questionnaire

The questionnaire consisted of 11 questions (questionnaire presented in Appendix), which were presented to the participants both in English and in Polish, in order to assure that all of them have understood the question at hand. Although the students were asked to fulfil the questionnaire right after the discussion on May 6th, 14 out of the 17 participants submitted their answers. The answers were submitted anonymously.

The specific questions were chosen, in order to assess participants' overall attitude towards reading (question 1,4,5,6,7); their home reading environment (questions 2,3); their opinion about the specific study (questions 3,4,10,11); their reading preferences (question 8,9)

A note here, concerning question 5 – the students are at their final year learning at the specific school and there is no possibility to continue the additional reading lessons in the same format, as they are to graduate and continue their education in several institutions. Therefore, the question is rather hypothetical, and was presented to the participants as such, that they would want one if it were possible.

3.3.2. Texts for Reading

The texts children were reading came from two sources, those being selected based on two key criteria: the texts should fit within a specific level, according to The Common European Framework of Reference for Languages: Learning, Teaching, Assessment. Each participant

had to read on five different levels, ranging from A1 to C1, or from Basic user, to Proficient user, according to the CEFR. (CEFR, 2020).

As a source for these texts, three books were used: Real Life Global Elementary Students Book (ISBN-10: 140589704X); Real Life Global Pre-Intermediate Students Book (ISBN-10: 1405897066) and Real Life Global Intermediate Students Book (ISBN-10: 1405897058). These books were chosen based on two reasons: the books have been approved by the Polish Ministry of Education as books permitted for course work in primary school, English as a secondary language teaching; and secondly – the students have not been studying from the specific books, so there was limited possibility that they had seen these texts prior to the research interventions.

The following is an example, of an A2 level text, presented to the students during the first intervention, in September of 2019. The text is from the “Real Life Global Pre-Intermediate Students Book”

Cheerleading is a very popular activity for girls in the USA. Most American secondary schools have got a cheerleading team. They cheer at sports matches at their school, for example, American football and basketball matches. Some teams also enter competitions. But is it really a sport? Over 50 percent of Americans don't think so. Here are two opinions of two American teenagers.

Hannah: "No, I don't think cheerleading is a sport. In my opinion, it's just dancing. The cheerleaders entertain the crowd at school sports events, but they're just sports fans in uniforms! At my school, cheerleading is just for girls, and only the pretty girls join the team. In cheerleading competitions, the teams don't score goals or points, like in football or tennis. I think cheerleading is stupid."

Dan: "First of all, cheerleading isn't easy. Some of the routines are very difficult. Cheerleaders train a lot, and it's important that they are strong, fit and healthy, just like other sportspeople. And they're very skilful. A lot of cheerleaders are very good at gymnastics. Also, there are cheerleading competitions. So of course it's a sport!" (Cunningham & Moore, 2010)

To the specific text, five questions were added, in order to assess, whether the readers grasped the sense of the text, and are able to find specific information within it:

- What do cheerleaders do at sports events?
- Do girls and boys do cheerleading at Hannah's school?
- How is cheerleading different from sports like tennis?
- How are cheerleaders similar to other sportspeople?
- What other sport are cheerleaders often good at?

Alternatively, as another source for the texts, The British Council’s Learning English services were used. As one of the main reasons for that choice was the fact that BC-LE offers texts in all the necessary levels, and a variety of exercises accompanying the texts. Additionally, to that, the texts were often available as images, from real-life contexts, which was seen as an additional bonus.

The following is an example, of an A1 level text, presented to the students during the fifth intervention, in December of 2019. The text is from the “Learning English Teens” services from The British Council. (The British Council, 2020)

Figure 2 - British Council Learning English Text “The school library”

The Maine School LIBRARY
Reading for the future

OPENING HOURS		THURSDAY	09:00 - 17:00
MONDAY	09:00 - 17:00	FRIDAY	08:00 - 15:00
TUESDAY	09:00 - 17:00	SATURDAY	09:00 - 12:00
WEDNESDAY	09:00 - 20:00	SUNDAY	CLOSED

LIBRARY RULES

- All students **must** have a library card.
- Computers are for schoolwork only.
- No food or drink in the library.
- No running or shouting in the library.
- Mobile phones must be off.
- Students can borrow 3 books at one time.

Thank you!

To the specific text, five questions were added, in order to assess, whether the readers understood the information available on the image, and are they able to find specific information within it:

- When is this library closed?
- How many books can students take home?
- What must students do?
- What should be switched off?

- Can you use Facebook at the library?

As previously mentioned, the texts were taken from a variety of levels, from A1 to C1. The assessment, where does a reader fit on the scaled, solely based on their reading abilities, is described as follows:

A1: I can understand familiar names, words and very simple sentences, for example on notices and posters or in catalogues.

A2: I can read very short, simple texts. I can find specific, predictable information in simple everyday material such as advertisements, prospectuses, menus and timetables and I can understand short simple personal letters

B1: I can understand texts that consist mainly of high frequency every day or job-related language. I can understand the description of events, feelings and wishes in personal letters.

B2: I can read articles and reports concerned with contemporary problems in which the writers adopt particular attitudes or viewpoints. I can understand contemporary literary prose.

C1: I can understand long and complex factual and literary texts, appreciating distinctions of style. I can understand specialised articles and longer technical instructions, even when they do not relate to my field. (Council of Europe, 2020)

It was chosen not to include texts of the level C2, due to two reasons: the possible lack of time during the lesson. Each lesson lasts 45 minutes, with the anticipation that there might be a delay in order to begin the specific intervention due to tardiness of students, or technical issues, it can be presumed that the participants had 40 minutes in each intervention, of *pure* reading time. Adding a sixth text could possibly skew the results, as the chances of students reaching this level would be lower, and the point of the research was not to test the speed of reading. Secondly, the students, at the end of primary school level, which they are at, are not expected to read upper-intermediate level texts, according to the Polish standard of education.

The data collected from the reading activities was:

- How many texts did the child read;
- How many questions did the child answer correctly per level;
- Progression through the months of texts, reading and correct answers over the months.
- The data overall would be anonymized and as a sample it would look like this:

Demo Student:

	A1		A2		B1		B2		C1	
	Texts	Que+	Texts	Que+	Texts	Que+	Texts	Que+	Texts	Que+
September	1	1	0	0	0	0	0	0	0	0
October 1	1	2	0	0	0	0	0	0	0	0
October 2	1	3	1	1	0	0	0	0	0	0
November	1	5	0	0	0	0	0	0	0	0
December	1	5	1	1	0	0	0	0	0	0
January	1	5	1	2	0	0	0	0	0	0
February	1	5	1	3	1	2	0	0	0	0

According to the example shown in the table above, Student A read one level A1 text in September, answering correctly to 1 out of 10 questions. The student did not read any texts beyond this level. During the first intervention in October also read one text in the level A1, while answering correctly to two questions. During the second intervention in October, the student read the A1 level text, answering correctly to three questions, but also read the text in the level A2, answering correctly to one of the questions attached to that text. In November the student read the first text, and answered all five questions correctly, however, did not proceed to reading any other texts. Taking part in December's intervention, the student once again read the A1 level text answering all questions correctly, but also read the level A2 text and answered correctly to one question. In January's intervention, the same result was achieved at the level A1, while 2 correct answers were given to questions attached to the level A2 text. Finally, during the last intervention in February, the student achieved the same result at the level A1, then read the level A2 text, answering correctly to three questions, but also had read the level B2 text, answering correctly to 2 questions attached to that text.

This would then show how many texts in the specific level has the pupil read and how many questions has the learner answered correctly in the corresponding level. This data would provide a general overview of their progress or lack of it. Such tables would be available for each student. Providing an individual and a group overview, depending on the reading group – paper or electronic.

4. Results

4.1. Students' overall attitude towards reading

In order to answer our research question whether the reading format has an impact on students' overall attitude towards reading, we analysed students' survey responses. In the following we present the analysis of the responses for each item of the questionnaire.

1. *How valuable do you think reading is as a skill?*

The answers were measured on a scale from 1 – not important, to 5 – very important, with the following results: 2 participants valued it at “3”, 3 at “4” and the majority - 9 participants valued it at “5” thus a very important skill.

2. *How often do you read for pleasure?*

The answers were measured on a scale from 1 – never, to 5 – always, with the following results: one participant valued it at “1”, 4 at “2” and the same amount at “4”, while the largest response amount was 5 participants, who valued it at “3” – as in, that they do it regularly, but not often.

3. *How often others, in your home, read for pleasure?*

However, when asked about the home reading environment, the picture is slightly different. Here, the scale being the same as in question two, however the results painted a slightly different picture, as 2 participants marked the value at “2”, 3 at “3”, 4 at “5” and 5 at “4”. Meaning, that if the average value for the children reading for pleasure was 2.9, then for this question, the average value is 3.8, showing a significant increase in interest in reading, from other people in the household, and notably not one participant answered that nobody reads for pleasure at their household.

4. *How much do you think that the additional reading lessons helped you improve your reading skills?*

The participants here had to answer on a scale from 1 – not at all, to 5 – very significantly, and it was requested, that participants explain their choice. Three participants measured it at “2”, four at “3” and 7 at “4”, indicating, that overall the students believed, that these lessons have helped them improve.

The explanations written, could be grouped in the following way: 1) Some believe, that reading as such leads to improvement (e.g. original Polish comment: *“Myślę że bardzo*

poprawiły ponieważ im więcej czytania tym lepiej." Translated quotation: "I think that increased significantly, because the more I read, the better") such comments were written twice; 2) general positive comments (e.g. original Polish comment: "Poprawiły się trochę" Translated quotation: "Slightly improved") such were written three times; 3) Comments mentioning a specific skill that has improved (e.g. Original Polish comment: "Niektóre słowa, które były tam zawarte, pisałam źle, a dzięki temu mogłam sobie je powtórzyć i poprawić moją pisownię" Translated quotation: "Some of the words which were mentioned I spelled incorrectly, thanks to this I was able to revise and improve my writing skills") such comments appearing eight times; 4) general negative comments appeared twice (e.g. original Polish comment "ponieważ było ich mało" Translated quotation: "because there were few"; 5) Other – one comment was simply a full stop, and one was an unfinished sentence.

5. *Would you want to have additional reading lessons next year?*

Multiple choice of yes or no were given as options with 11 participants (71.4%) answering "yes" while 4 participants (28.6%) answering "no".

As previously noted, this question has significance due to the fact that students will not continue their education at the same school, as they are now. It was communicated to them, to treat this as a hypothetical question, that if it could be possible, would they opt to have such a lesson. This question was also considered almost as a litmus test, whether the answers match, between this question and question four. Considering that 11/14 of participants stated that they believe the lessons helped them improve, and in this case 11/14 answered that they would continue, it can be presumed, that the students were answering honestly.

6. *Jaką formę czytania preferujesz? What is your favourite reading format?*

Multiple choice of yes or no were given as options with 10 participants (78.6%) answering "yes" while 3 participants (21.4%) answering "no". It was also requested that participants explain their choice after the question.

Here the comments could be grouped as: 1) indicating ease-of-use (e.g. Original Polish comment "Ponieważ jest mi wygodniej" Translated quotation: "Because it's more comfortable for me") such comments appearing six times; 2) Indicating eye strain (e.g. Original Polish comment "ból oczu." Translated quotation "eye pain.") appearing twice; Other comments can only be singled out, as one simply being a full stop, one comment noting that the participant does not care, one preferring digital, because the participant is used to it, one noting, that they tend to make notes, while reading and thus prefer the paper version. One

comment stands out as a significant stating that “Na telefonie i na komputerze jest dużo rozpraszaczy, a tu ktoś do ciebie napisze, a tu jakaś głupia gierka wysyła powiadomienie, że odbierz dzisiejszą nagrodę i jak tu się skupić na czytaniu.” Translatable to „There are many distractions on the phone and on the computer. Somebody messages you, or some silly game sends a pop-up notification, that you should collect your daily reward. So how are you supposed to concentrate on reading.” This comment truly stands out as it signifies the situations that may occur while reading digitally.

7. Do you think that the reading format matters?

Multiple choices of yes or no were given as options with 11 participants (71.4%) answering “yes” while 4 participants (28.6%) answering “no”. As it was requested, that participants explain their choice after question, some standout comments were, for example, “I think that if it's interesting, then it will be interesting anyway.” (original spelling kept) noting that the participant believes that it is the content and not the format, that matters. Other comments mostly are generally positive towards one of the formats, or negative towards the other, noting such things as eyestrain, general fondness of one format or the other, and mentioning distractions.

8. Which format did you read in, during the lessons?

Multiple choices of paper or digital were given as options, however, it seems that the question was misunderstood. 10 participants answered “paper” while 3 participants answered “digital”, however only 9 students read the texts on paper. Therefore, the answers here are not taken into consideration, as there is no way of validation with the anonymous questionnaire.

9. Which format do you prefer, when studying?

Multiple choice of paper or digital were given as options and the paper format was selected almost unanimously. 13 out of the 14 participants (92.9%) answered that they prefer reading on paper. As this question also asked for an explanation, the comments left mostly indicated already previously brought up concerns, such as general comfort, preference or eyestrain, as well as internet connectivity issues among others.

10. What did you enjoy during these reading lessons?

Presented as an open-ended question, and comments could be grouped as follows: 1) comment on the texts as such were named four times; (e.g. “ciekawe teksty, dużo nowych informacji” Translated: “Interesting texts, a lot of new information”) 2) comments about the process were named three times; (e.g. “Silence”) 3) twice it was said, that everything was

good; 4) one comment was given about what was not enjoyable; 5) final four comments were focused on the results of these lessons whether be it results or feeling of improved skills (e.g. "Można było sprawdzić i polepszyć poziom swojego czytania." Translated: "It was possible to check and improve your reading level.").

11. What did you not enjoy during these reading lessons?

Presented as an open-ended question, comments provided can be grouped as such: 1) comment on the texts as such were named four times; (e.g. "Niektóre teksty były za długie" Translated: "Some of the texts were too long") 2) comments about the process were named three times; (e.g. "Głośno było trochę" Translated: "It was a bit loud") which is in contradiction to comments in the previous question 3) twice it was said, that the participant did not enjoy reading on the computer; 4) one comment was given about what was enjoyable; 5) two comments were generally neutral, such as "I don't know" or "nothing"; 6) One participant stated that they would have wanted to try out the other reading type as well. (Polish original "to, że nie mieliśmy porównania jak się czyta w tej drugiej formie")

4.2. Students' performance on reading activities

In order to assess students' performance in terms of reading comprehension and regarding the intervention (digital vs. paper), we analysed their performance in the tests following the reading activities using conditions comparison and descriptive analysis. Next, we elaborate on our findings.

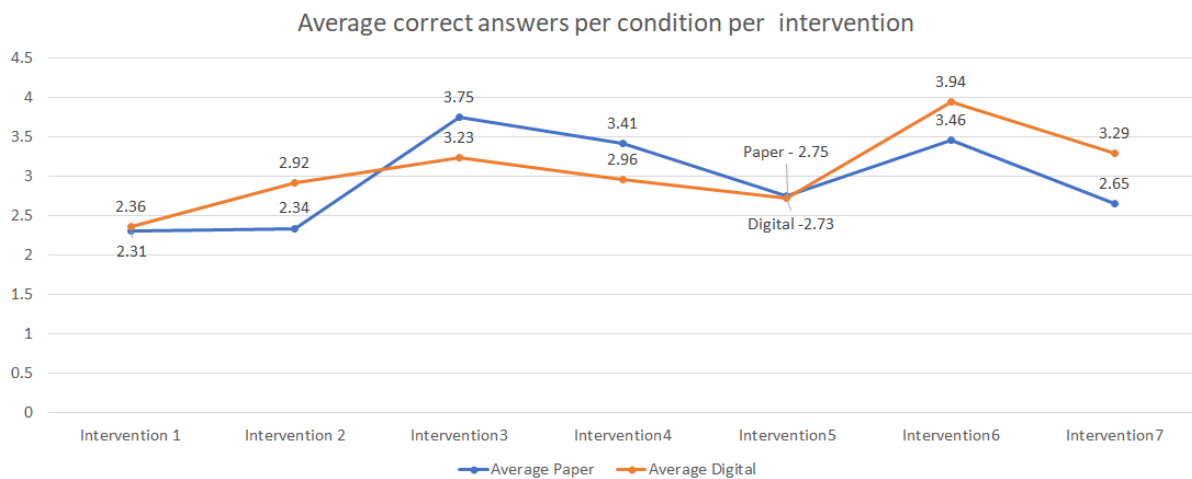
4.2.1. Descriptive Analysis

In order to assess participants' progress in the whole period of the study, the amount of correct answers was noted during each of the interventions. As the texts children read were of varying complexity, we added a numerical weight to each of those, in order to take into account the more advanced level of reading comprehension necessary to correctly answer a more difficult question.

As the level A2 is the easiest children had to read at, it had a complexity value of 0. Level A1 was assigned a complexity value of 0.15; B2 the value of 0.2; B1 was assigned with 0.25, while the most complex level of C2 was assigned the complexity value of 0.3. This meant that a student's comprehension during a specific intervention will fall within the range between 0 and 5. These results were then compared between the research condition groups, taking into account the average results of participants in group "Paper" and "Digital".

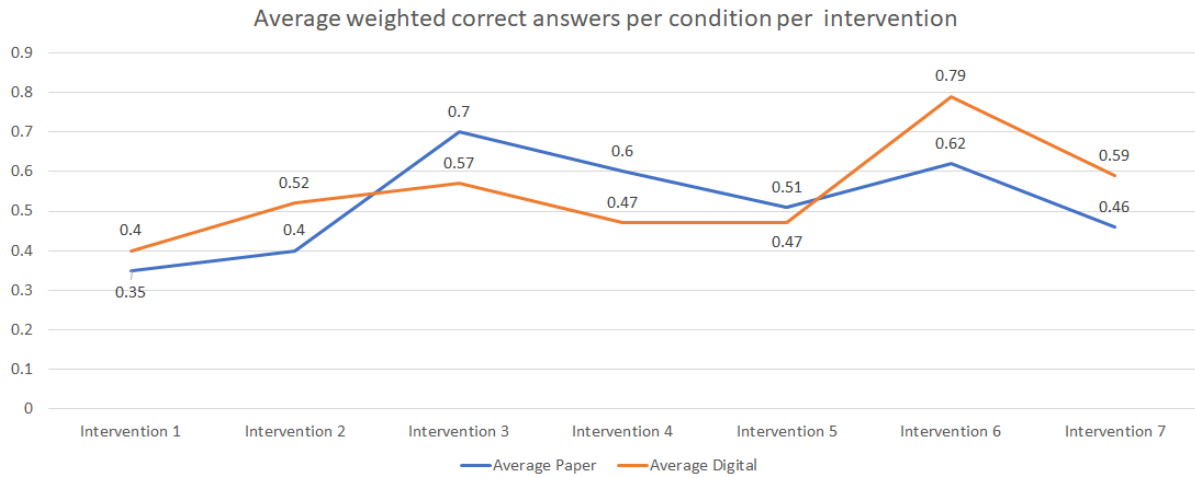
The following figure (figure 3) shows the score of average correct answers per condition per intervention. Noting that, absent students’ values are not taken into consideration. The figures show that both condition groups had overall similar results at the beginning of the research, both groups similarly completed the research with a higher amount of correct answers during the last intervention, comparing it with the first one. Although, considering the indications of the Mann-Whitney test show, that the results should be investigated further, it must be noted, that throughout the course of the research, the correct answer value does not go below the results of the first intervention. This could signify that there was overall progress among the groups throughout the study.

Figure 3 - average correct answers per condition per intervention.



Additionally, we explored the impact in terms of correctness by calculating the average of weighted correct answers per condition, per intervention. The results are depicted in figure 4, and paint a very similar picture, to that with mean average results. Both condition groups have similar trend lines, whether it is a mean or a weighted average correct answer result. Once again, it is worth noting that both condition groups complete the research with higher results than during the first intervention, and at no point the results go below those of the first intervention, so it can be deduced that both condition groups overall have a positive change in reading comprehension abilities.

Figure 4 - average weighted correct answers per condition per intervention.



In order to evaluate participant’s individual progress, an individual gain was measured. When evaluating a student’s progress or overall “gain”, the result of the first intervention was deducted from the results of the last intervention. A negative gain therefore indicating a lower amount of correct answers, while a positive gain meaning a larger amount of correct answers during the intervention. Similarly to the correct answer average, these results were measured in two ways - considering the mean average, and the weighted average. Those are depicted visually in figures 5 and 6 respectively.

Figure 5 - participant’s individual gain.

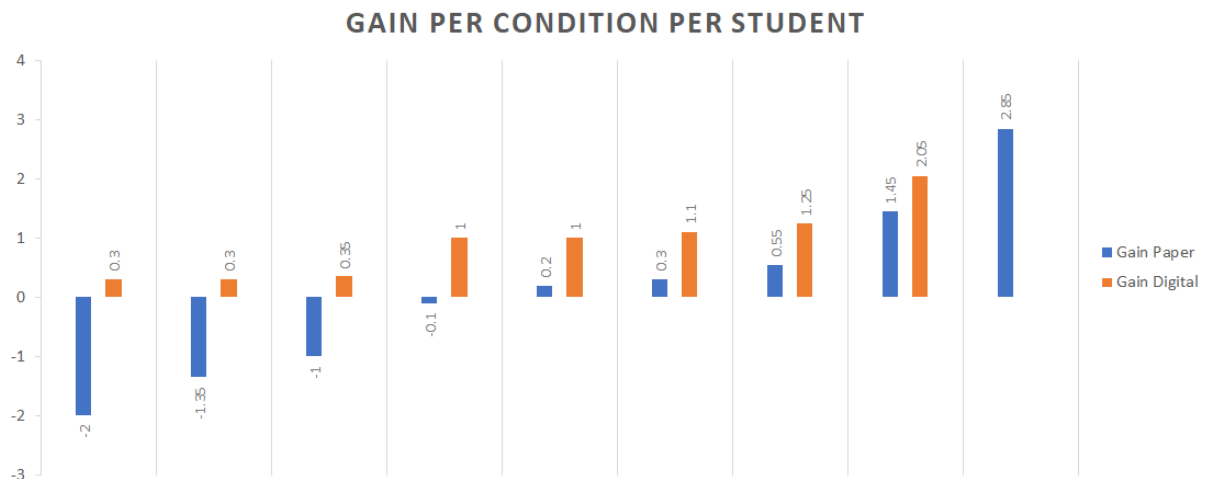
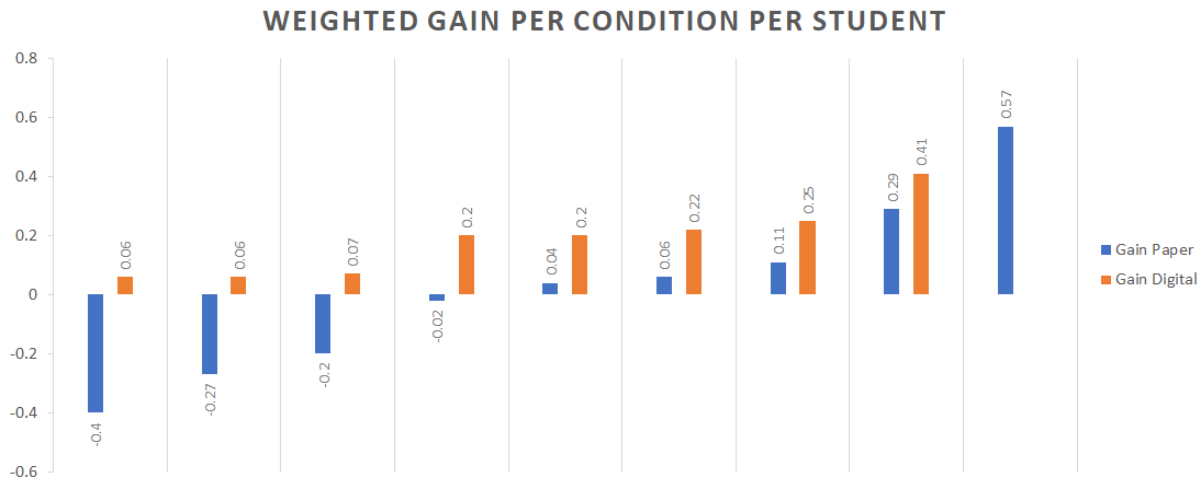


Figure 6 - participant’s individual weighted gain.



When analysing the gains, it must be noted, that 13 out of 17 participants results indicate an overall positive gain. All students, who were a part of the digital condition group indicate a gain from 0.3 to 2.05 with an average gain of 0.92. The weighted gain per student for the digital condition group is ranged between 0.06 and 0.41 with an average weighted gain of 1.47.

Participants of the paper condition group show differing results, as four of the nine students in this condition show a negative gain. At the same time, one student in this condition also shows the highest overall gain from all participants. The gains for this condition group range from -2 to 2.85 with an average gain of 0.51. The weighted gain per student for the paper condition group is ranged between -0.4 and 0.57 with an average weighted gain of 0.02. In comparison with the other condition this shows, that the mean average gain for the paper condition is 55% from that of the digital condition, while weighted gain is only 1.36% from that of the digital condition.

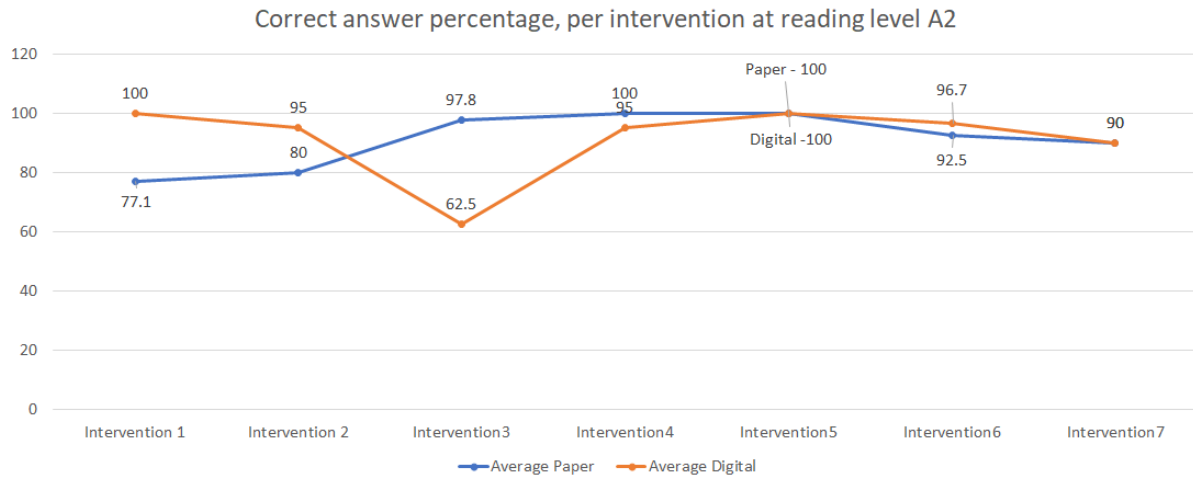
During the study, the amount of correct answers per complexity level per intervention were measured. The following charts show what has been called the “Potential correct answer percentage” in the calculation, it has been taken into consideration how many participants took part in the specific intervention, rather than just those who read texts at the specific level. If a student was absent or there was an error during submission, then that result is not taken into consideration during the calculation. The following calculation was used:

$$X = \frac{\text{correct answers at level} \times 100}{\text{amount of participants at intervention} \times 5 (\text{maximum of correct answers})}$$

As it could be predicted, the Potential correct answer percentage number drops by each level of complexity. For example, as seen in figure 5, which shows the results at reading level A2,

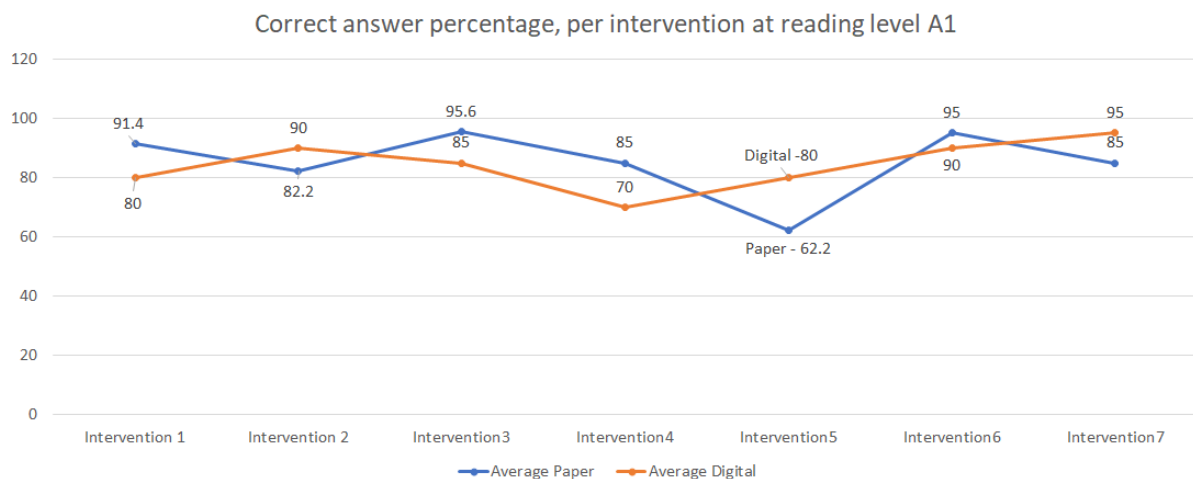
each condition group answers to all the questions correctly twice. That is the only complexity level, at which this occurs.

Figure 7 - Correct answer percentage, per intervention at reading level A2



Analysing the average results at reading level A1, although slightly worse than those of level A2, the results are comparatively high, with results generally ranging between 70 and 96 percent correct, with only one condition group achieving a lower result than that - 62.2% during intervention 5 for the paper condition group. Visual representation of these results can be seen on figure 6.

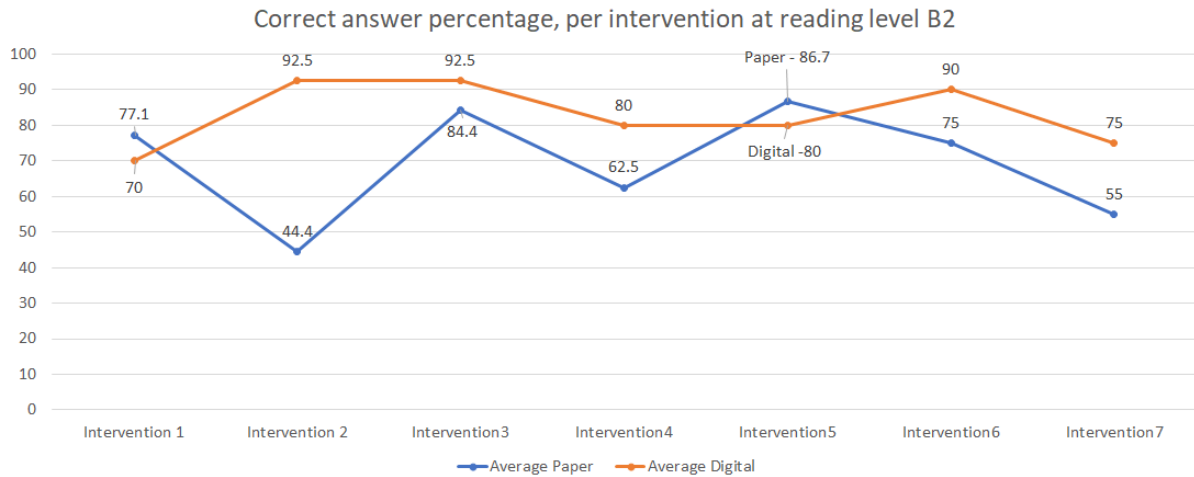
Figure 8 - Correct answer percentage, per intervention at reading level A1



For all the previous results, the average results across all interventions were 91.2% correct overall, with 91.1% for the paper condition and 91.3% correct for digital within the complexity level A2. For the level A1 the results were 84.7% overall with 85.2% for paper condition and 84.3% for digital condition respectively. Viewing the results for the reading complexity level B2, the results are lower, as visualised in figure 7. On average, paper

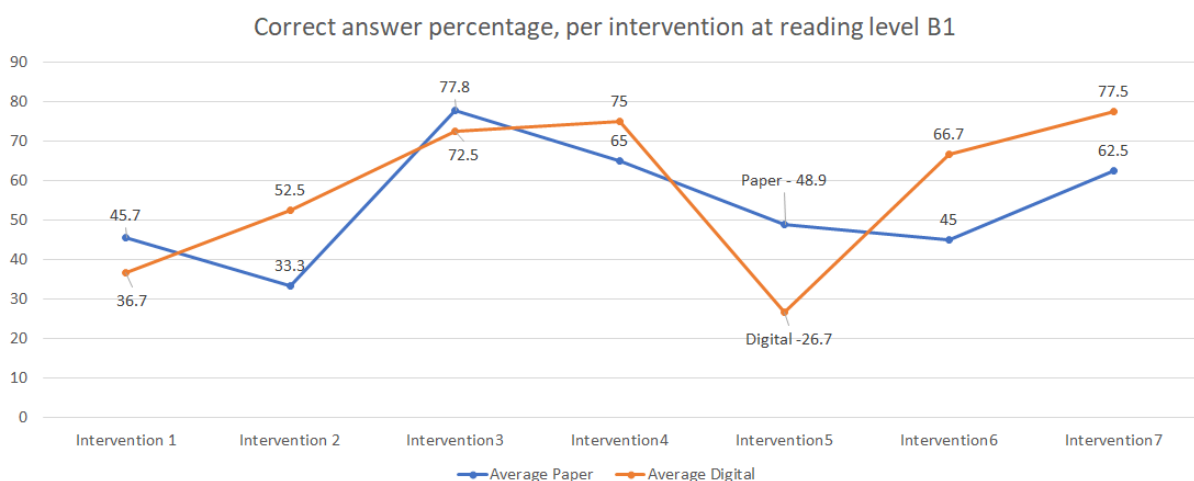
condition group answered to 69.3% correctly, while digital condition group to 82.9%, leading to a 76.1% overall average.

Figure 9 - Correct answer percentage, per intervention at reading level B2



For the reading complexity level B1, the downwards trend continues with paper condition group averaging 54% correct answers across all interventions, digital condition group 58.2%, leading to an overall average of 56.1%. The results for each condition per intervention are represented visually on figure 8. It is noteworthy that the overall drop in correct answers is nearly three times that of what was present with previous changes. If the drop-off was 7.13% between A2 and A1, and similarly between A1 and B2 at 7.97%, then between B2 and B1 the difference is 20%.

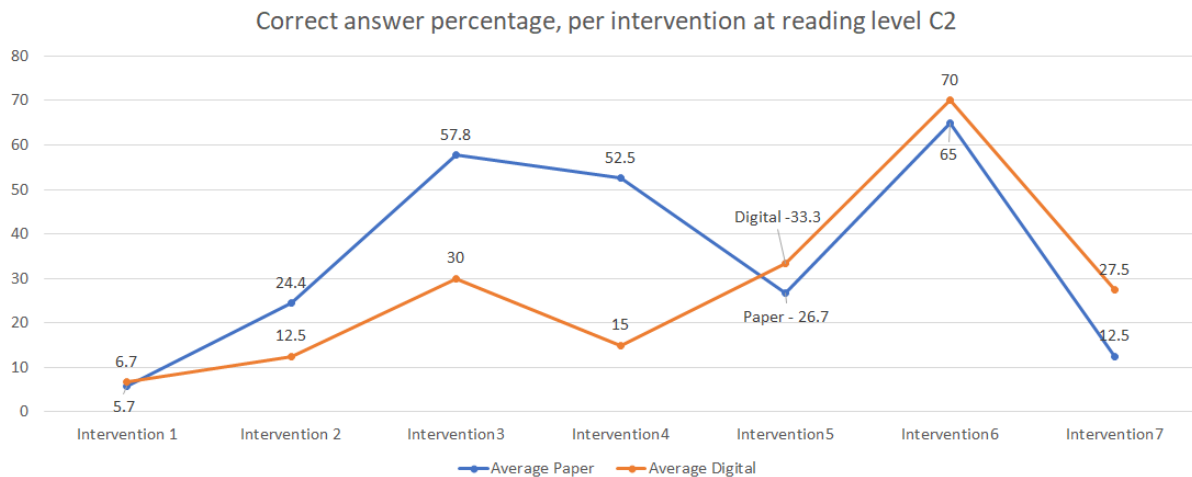
Figure 10 - Correct answer percentage, per intervention at reading level B1



Lastly the results at the reading complexity level C2, visually represented in figure 9. The condition groups had potential correct answer percentages of 34.9 and 27.9 for paper and digital groups, accordingly, leading to an overall average of 31.4%. This also shows, that

expectedly, the most advanced level of complexity has the lowest amount of correct answers. The difference in correct answers was also the highest between levels B1 and C2, measuring at 24.7%.

Figure 11 - Correct answer percentage, per intervention at reading level C2



Overall, viewing all these results, it seems to reflect little consistent growth from one intervention to another. While between some interventions we can identify clear trend lines, be it positive or negative, there seems to be no evidence of a single trend. This may relate to the small sample size, or with the fact that the texts covered a variety of topics. Only on one of the five levels, C2, indicated that the results never fell below the first intervention. Another issue worth revisiting is the fifth intervention that took place in December, as it has significantly lower results in comparison to what seemed to be overall progress. Although at level A2 both condition groups reached 100% during that intervention, other complexity levels have sudden drops, most notably in levels A1, B1 and C2.

4.2.2. Conditions comparison

A two-tailed Mann-Whitney U-test was conducted to compare the impact of the intervention (digital vs. paper) on reading comprehension between the two conditions. analyse the results of data collected. Mann-Whitney test indicated that the reading comprehension level improvement was greater in terms of learning gain for participants reading texts digitally (Mdn = 1), than for participants reading texts on paper (Mdn = 0.2). However, the difference was not statistically significant at $p < .05$.

Similarly, when comparing weighted learning gains, the Mann-Whitney test indicated that the reading comprehension level improvement was greater for participants reading texts digitally (Mdn = 0.2), than for participants reading texts on paper (Mdn = 0.04) Still the results were not statistically significant at $p < .05$. Therefore, the results cannot be generalized.

5. Discussion

The study aimed to answer whether students reading digitally leads to better reading results within a given timeframe, and whether reading format has an impact on students' overall attitude towards reading. Comparing the study formats, it is inconclusive whether any one format has an advantage over the other. Participants show an overall improvement regardless of condition group they were placed in, over the course of the research. Both formats have their benefits and drawbacks. On one hand, students learn using paper materials since the very first stages of their education and there is no need for a familiarisation stage, meaning that there are no technical errors submitting work done, nor uncertainty on how to complete the task. On the other hand, the digital format allows for rapid feedback and results can be stored and shared through cloud services allowing for easy and quick analysis. However, cloud services and potential safety and privacy risks can be a point of concern at any situation and participants may need a familiarisation stage if new tools are used. At the same time, improper storage of paper materials can lead to their loss, and students would regularly forget to sign their work, on each sheet of paper. Lastly, the paper format also is admittedly a lot more damaging towards the environment.

5.1. Motivation of completing tasks

An important aspect of the study process, which must be studied carefully is the participants' motivation throughout the research. Within the model of this research, their motivation was practically analysed only twice - in December, at what was intended to be the middle point of the study, and at the end of the process. However, uncovering the motivational aspect of their participation could provide insight in the results.

Deci & Ryan (2002) note that the four key elements for lack of motivation are ability beliefs, effort beliefs, characteristics of the task and value placed on the task. In this context these four elements are highly important yet would need to be further investigated. Although participants may have had inner motivation to complete the tasks, with the premise that it would improve their abilities, it was left undiscussed.

This becomes particularly important, when analysing the student gains. It can be presumed that if participants would have known that it is the final assessment, then a higher level of inner motivation might have been present. As this was not known at the time of completion, it can be presumed that learners could have had an overall low level of motivation for the completion of tasks. This could be argued based on the fact that during the discussion in December some students expressed disinterest in continuing the tasks, if there would be more

than one additional reading lesson per month. This leads to a presumption that at least a part of participants mainly had external motivation.

This factor, in combination with the possibility that a participant was simply unfamiliar with the topics that were covered on the particular day, could have led to a lower result during the last intervention. Similarly, perhaps there could have been other external factors, such as disturbance in personal life, lack of sleep prior to the final intervention, stress concerning upcoming tasks, or any others.

Based on this, it is worth looking at the results of a gain and whether it contradicts the overall trend line. The gain should not be an indication which is contradicting the overall trend line, analysing progress with overall reading comprehension. As such, it seems noteworthy, that there were no students, who stated that they believed these lessons did not help them, or made their reading comprehension level worse, while the gain measured would imply that exactly that has happened on several occasions.

5.2. Measuring growth of vocabulary

When conducting the research, it was decided that the materials in question would cover a variety of topics. This was chosen due to two reasons. Firstly, the research was carried out in a general primary school, where the classes do not specialise in any particular field, therefore it is expected that their knowledge would cover a variety of topics. If this would be a vocational school it may have also had an impact on their motivation, as choosing materials that are directly linked with their field of interest could lead to a higher level of inner motivation. Secondly, it was believed that providing texts about a variety of topics would lead to a higher level of interest and make the tasks less mundane.

However, this element of the research could be modified depending on the overall aims of the process. As the results indicate, during the final interventions participants had made mistakes on all levels, including the simplest. On one hand this could be connected to the above-mentioned reasons, such as lack of motivation, yet it could also be caused by the difference in topics covered.

Presumably, if the texts in all interventions would be about a single topic, this would create a fundamental base of knowledge for the topic at hand. This, in turn, could lead to higher overall results, as participants would be more familiar with terminology and would be more confident in their ability to answer questions for the topic given. This, of course, could lead to

a negative effect on participant's motivation, as it was noted also in the final questionnaire that some of them enjoyed the fact that they were able to learn about a variety of things.

The mistakes on lower levels of complexity could simply be attributed to chance or lack of attention, or any other reason, which may not relate to the participants overall reading comprehension level.

5.3. Choice of levels of complexity

When forming the reading tasks and deciding on the design of the study, time available was taken as a key element, and how many tasks could participants potentially complete within the given time frame. It was decided that with a limited amount of questions that need to be answered, a student could potentially read up to five texts and answer five questions attached to each of those texts.

With this assessment in mind, students had to read texts of exactly five different levels as described by CEFR - A1, A2, B1, B2 and C1. However, it is worth noting, that the students are normally not required to read texts of such high complexity as C1.

The students in question, during last two study years, learned from Oxford University Press published books "English Plus Options" for class 7 (ISBN: 978-0-19-474724-0), "English Plus Options" for class 8 (ISBN: 978-0-19-474746-2) and "Oxford Repetytorium Ósmoklasysty" (ISBN: 978-0-19-440490-7) which have been approved by the Ministry of Education (MoE) with permits Nr 835/1/2017, 835/2/2018, and 930/2018 respectively. As evaluated by the MoE, all three of these books are set at CEFR level A2-B1.

This means that students, although types of tasks asked to complete were familiar, had to read texts at a level that they are not expected to be able, according to educational standards set by the Polish MoE. This fact could be a reason why there is a significant drop off in correct answers at the level B2, as it is the first level of reading comprehension that is considered beyond their expected ability level. The fact that there is an even more significant drop off for questions to the C1 complexity level, could confirm this theory.

However, there were students who were able to reach these levels and managed the complexity level well, even if it is not expected of them. Due to this, it could be up for discussion, if replicating this study, whether to only provide texts within the expected level, or to go beyond that. Similarly, whether to highlight to the students that these levels are supposed to be a challenge for them.

5.4. Practical implications

Reviewing the study design, that measuring participant motivation during each of the interventions and lessening the amount of texts asked to read could allow to focus only on an expected level of comprehension, while allowing for discussion time. Such an approach could provide results, which are related only to the levels the students are expected to read at, while providing a larger sense of the tasks at hand. Believing that a discussion element and generally summoning input from participants throughout the interventions could lead to a higher sense of purpose and ownership of the tasks, this could also lead to a higher level of inner motivation while participating.

As such, it could be wise to analyse participants' fields of interests, prior to starting the study process, in order to cater to the participants in order to make task completion more motivating. This would have to depend on the general sense of the research process and whether all texts would cover a single or a variety of topics. It can be believed that allowing participants to propose topics or specific texts for the additional reading lessons would lead to a higher sense of ownership and more internal motivation.

This research process could also be a part of a wider, inter-disciplinary focus on self-guided learning. Including such aspects as key elements of the study process throughout the year also with other activities, so that these lessons would fit better with the students' curriculum. Setting a hard schedule for such additional reading lessons and inform participants about each intervention at the very beginning of the study process would allow setting and managing participants' expectations, while also setting a clear focus and understanding on why such tasks are necessary. Such an approach, however, would be most effective if it is set as a priority for the class, across all or majority of subjects.

A more in-depth analysis of students' motivation during the participation could provide more insight on the progress they do or do not achieve. Including a discussion element for each intervention carried out could lead to a higher overall engagement and a deeper sense of purpose for the tasks carried out. This, in turn, could lead to better results and more growth throughout the study process. It was noted during the discussion in December, that students were eager to know what their progress has been individually, while some, also, in comparison to their classmates regardless of the condition group they were placed in.

Such analysis of participants' motivation should also take into consideration the power of external motivation towards completing the tasks. As these participants received no external motivation in the form that they are used to (grades, comments about engagement in e-journal), students had to rely on internal motivation and belief in the process to set and achieve goals. For this study it was decided that students will not be motivated by these external factors, in order to minimise pressure to perform well, and make mistakes. During each of the interventions they were reminded, that there is no punishment for wrong answers, that it is a learning process and they were asked to focus on their own work, asking students not to cheat and copy each other's answers.

In a similar vein, it would be useful to evaluate which participants are more subjected to external pressure to perform well. As noted earlier, home reading environment can play a significant role in a participant's approach towards reading. In order to evaluate any participant's approach towards reading in comparison to their approach the tasks provided in a school environment. it would be important to focus more on their home reading environment. If students would have to report on their reading habits, in a diary form, or otherwise, it could provide an insight into whether the attempt to give reading heightened importance reflects also on students' lives outside of school. A negative home reading environment, where a child has not been given the impression that reading is a valuable skill, in combination with a high pressure environment where a child is expected to participate well no matter how complex the task is could impact participant's motivation towards the additional reading lessons. Similarly, a high-pressure environment in combination with the specific study, where no external awards were provided, could have led to disinterest towards the tasks.

Finally, to achieve a comprehensive oversight of changes in participants' attitude, other faculty members as well as students' parents would need to be involved. Although, it might create external pressure to perform well for the parents' sake, rather than due to internal motivation, it is worth asking for involvement of others, so to have a full picture of the participant throughout the study. Considering these points, such a study could provide significantly deeper understanding and clearer results if: 1) the initial intervention would be considered as a benchmark result 2) from that, an individualised study plan for participants with SMART goals to achieve would be set; 3) other faculty members, participant family members and educational institution administration should be involved; 4) participants should be de-briefed after each intervention; 5) in order to strive for a higher level of motivation and engagement, opportunities for students to take ownership of the process should be provided..

6. Conclusion

This study aimed to answer two central research questions: whether students reading digitally leads to better reading results within a given timeframe, and whether reading format has an impact on students' overall attitude towards reading.

Even though the study shows a clear link between having additional reading lessons and overall development of reading comprehension skills, the results are not statistically significant, to imply a link between the reading form and progress participants have made. However, it should be taken into consideration that participants who were a part of the paper condition group expressed interest in reading digitally, while that did not happen in the opposite direction.

By focusing on reading as an overall skill, the learners generally showed an interest in developing this skill, acknowledged it as valuable and confirmed that if possible, would have been interested in continuing such skill-based lessons in the future. Which can be considered a success towards establishing a link between the importance of a given task and inner motivation to complete it.

In the current state of education and uncertainty surrounding learning form, and general evaluation of pros and cons in the context of digital education. The aim of policy makers, educational institutions and professionals certainly has been shifting towards digital platforms and tools, and how those can be used to improve the study process. However, it is important not to forget that no matter the form, every participant needs to feel a sense of purpose and ownership of the tasks. Form alone loses its novelty soon enough, and then the content and the value of task is what truly matters, rather than the ability to participate digitally.

Acknowledgements

I would like to thank my thesis supervisor Irene-Angelica Chounta for her advice, help, and patience making sure, that this thesis is the best version it could have been. Thank you for steering me in the right way and making sure that I stay on track with work that needs to be done. Thank you to the programme director Emanuele Bardone for finding the moments to check in on whether everything is going according to plan and providing assistance along the way.

A sincere thank you to my parents and my family for showing me the value of education. For making sure that I always felt that I should do more and that I definitely could do more. Thank you for teaching me, what are the things to be proud of.

Finally, I would like to thank my better half, Dominika, for being the support, care and push at the right times. Thank you for the confidence in me, and assurance on every step along the way. Without all that support it would not have been possible for this thesis to ever become reality.

Author's declaration

I hereby declare that I have written this thesis independently and that all contributions of other authors and supporters have been referenced. The thesis has been written in accordance with the requirements for graduation theses of the Institute of Education of the University of Tartu and is in compliance with good academic practices.

Kārlis Caune

04/06/2020

References

- Abeywickrama, P. (2010). Research methods in applied linguistics by Zoltan Dornyei. *Canadian Journal of Applied Linguistics/Revue canadienne de linguistique appliquée*, 13(2), 195-198.
- Bandura, Albert. "Self-efficacy: toward a unifying theory of behavioral change." *Psychological review* 84.2 (1977): 191.
- Baza szkół w Polsce, szkoły podstawowe, przedszkola, licea, technika, gimnazja, uczelnie wyższe. (n.d.). Retrieved April 29, 2020, from https://www.coig.com.pl/Baza_szkol_w_Polsce.php
- Bell, T.I. (2001). Extensive Reading: Speed and Comprehension.
- Biblioteka Narodowa. (2020). Stan czytelnictwa w Polsce w 2019 roku. Retrieved from <https://www.bn.org.pl/download/document/1587585168.pdf>
- Brown, G. J. (2001). Beyond print: reading digitally. *Library Hi Tech*, 19(4), 390–399. <https://doi.org/10.1108/07378830110412456>
- Brozo, W. G., Shiel, G., & Topping, K. (2007). Engagement in Reading: Lessons Learned From Three PISA Countries. *Journal of Adolescent & Adult Literacy*, 51(4), 304–315. <https://doi.org/10.1598/jaal.51.4.2>
- Collins, A., & Halverson, R. (2018). Rethinking education in the age of technology: The digital revolution and schooling in America. Teachers College Press.
- Council of Europe. (n.d.-b). Official translations of the CEFR Global Scale. Retrieved May 13, 2020, from <https://www.coe.int/en/web/common-european-framework-reference-languages/official-translations-of-the-cefr-global-scale>
- Council of Europe. (n.d.). Common European Framework of Reference for Languages self-assessment grid. Retrieved from <https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=0900000168045bb52>
- Cunningham, S., & Moor, P. (2010). *Real Life Global Pre-Intermediate Students Book*. London, The United Kingdom: Pearson Longman.
- Deci, E. L. & Ryan, R.M. (2002). Overview of self-determination theory: An organismic dialectical perspective.
- Fortunati, L., & Vincent, J. (2014). Sociological insights on the comparison of writing/reading on paper with writing/reading digitally. *Telematics and Informatics*, 31(1), 39-51.

- Gregory, M., & Carroll, S. (2018). *Language and situation: Language varieties and their social contexts*. Routledge.
- Guthrie, J. T., Hoa, A. L. W., Wigfield, A., Tonks, S. M., Humenick, N. M., & Littles, E. (2007). Reading motivation and reading comprehension growth in the later elementary years. *Contemporary Educational Psychology*, 32(3), 282-313.
- Halliday, M. A. K. & Martin, J. R. (1993). *Writing Science*. Amsterdam, Netherlands: Amsterdam University Press.
- Komiyama, R. (2013). Factors underlying second language reading motivation of adult EAP students. *Reading in a foreign language*, 25(2), 149-169.
- Lamnias, C. (2002). The contemporary pedagogic device: functional impositions and limitations. *Pedagogy, Culture & Society*, 10(1), 21–38.
<https://doi.org/10.1080/14681360200200131>
- Luque-Agulló, G., & González-Fernández, L. (2012). The Use of Newspapers for L2 Reading: Practical Activities. *Creative Education*, 03(04), 471–478.
<https://doi.org/10.4236/ce.2012.34072>
- Margolin, S. J., Driscoll, C., Toland, M. J., & Kegler, J. L. (2013). E-readers, computer screens, or paper: Does reading comprehension change across media platforms?. *Applied cognitive psychology*, 27(4), 512-519.
- Mayes, D. K., Sims, V. K., & Koonce, J. M. (2001). Comprehension and workload differences for VDT and paper-based reading. *International Journal of Industrial Ergonomics*, 28(6), 367–378. [https://doi.org/10.1016/s0169-8141\(01\)00043-9](https://doi.org/10.1016/s0169-8141(01)00043-9)
- Ministerstwo Cyfryzacji. (2020, May 15). Wystartowała „Zdalna szkoła+” - Ministerstwo Cyfryzacji - Portal Gov.pl. Retrieved May 21, 2020, from <https://www.gov.pl/web/cyfryzacja/wystartowala-zdalna-szkola>
- Noyes, J. M., & Garland, K. J. (2003). VDT versus paper-based text: Reply to Mayes, Sims and Koonce. *International Journal of Industrial Ergonomics*, 31(6), 411-423.
- Nuttall, C. (1996). *Teaching reading skills in a foreign language*. Heinemann, 361 Hanover Street, Portsmouth, NH 03801-3912.
- OECD (2020), Reading performance (PISA) (indicator). doi: 10.1787/79913c69-en (Accessed on 29 April 2020)
- Perfetti, C., & Stafura, J. (2014). Word knowledge in a theory of reading comprehension. *Scientific studies of Reading*, 18(1), 22-37.
- Perfetti, C. (2007). Reading ability: Lexical quality to comprehension. *Scientific studies of reading*, 11(4), 357-383.

PISA 2015 Assessment and Analytical Framework. (2016). PISA.

<https://doi.org/10.1787/9789264255425-en>

PISA 2018 Results (Volume I). (2019). PISA. <https://doi.org/10.1787/5f07c754-en>

Prezes Rady Ministrów RP. (2020, March 11). Rozporządzenie Ministra Edukacji Narodowej z dnia 11 marca 2020 r. w sprawie czasowego ograniczenia funkcjonowania jednostek systemu oświaty w związku z zapobieganiem, przeciwdziałaniem i zwalczaniem COVID-19. Retrieved April 27, 2020, from <http://dziennikustaw.gov.pl/DU/2020/410>

Rose, D. (2007). A reading based model of schooling. *Pesquisas em Discurso Pedagógico*, 4(2), 1-22.

Schwabe, F., McElvany, N., & Trendtel, M. (2015). The school age gender gap in reading achievement: Examining the influences of item format and intrinsic reading motivation. *Reading Research Quarterly*, 50(2), 219-232.

Skinner, C. H., Williams, J. L., Morrow, J. A., Hale, A. D., Neddenriep, C. E., & Hawkins, R. O. (2009). The validity of reading comprehension rate: Reading speed, comprehension, and comprehension rates. *Psychology in the Schools*, 46(10), 1036–1047.

Tække, J., & Paulsen, M. (2017). Digitalisation of education: the theory of the three waves. The Centre for Internet Research.

The school library. (n.d.). Retrieved May 13, 2020, from

<https://learnenglishteens.britishcouncil.org/skills/reading/beginner-a1-reading/school-library>

Uusen, A., & Mürsepp, M. (2012). Gender Differences in Reading Habits Among Boys and Girls of Basic School in Estonia. *Procedia - Social and Behavioral Sciences*, 69, 1795–1804. <https://doi.org/10.1016/j.sbspro.2012.12.129>

Wiggfield, A., & Eccles, J. S. (1992). The development of achievement task values: A theoretical analysis. *Developmental review*, 12(3), 265-310.

Annex 1

Questionnaire for learners participating in additional reading lessons

*Required

1. Na ile wartościową umiejętnością jest czytanie? How valuable do you think reading is as a skill? *

Mark only one oval.

	1	2	3	4	5	
Nie jest ważne	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Jest bardzo ważne

2. Jak często czytasz dla przyjemności? How often do you read for pleasure? *

Mark only one oval.

	1	2	3	4	5	
Nigdy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Zawsze

3. Jak często osoby w Twoim domu czytają dla przyjemności? How often others, in your home, read for pleasure? *

Mark only one oval.

	1	2	3	4	5	
Nigdy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Zawsze

4. Jak sądzisz, na ile dodatkowe lekcje czytania poprawiły Twoją umiejętność czytania? How much do you think that the additional reading lessons helped you improve your reading skills? *

Mark only one oval.

	1	2	3	4	5	
Wcale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Bardzo mocno

5. Uzasadnij swój wybór. Explain your choice. *

6. Czy chciałbyś / chciałybyś mieć dodatkowe lekcje czytania w przyszłym roku? Would you want to have additional reading lessons next year? *

Mark only one oval.

- Tak
 Nie

7. Jaką formę czytania preferujesz? What is your favourite reading format? *

Mark only one oval.

- Papierową
 Cyfrową

8. Uzasadnij swój wybór. Explain your choice. *

9. Czy uważasz, że forma czytania ma znaczenie? Do you think that the reading format matters? *

Mark only one oval.

Tak

Nie

10. Uzasadnij swój wybór. Explain your choice. *

11. W jakiej formie czytałeś / czytałaś podczas lekcji? Which format did you read in, during the lessons? *

Mark only one oval.

Papierowej

Cyfrowej

12. Ucząc się wolisz czytać... Which format do you prefer, when studying? *

Mark only one oval.

na papierze

cyfrowo

13. Uzasadnij swój wybór. Explain your choice. *

14. Co Ci się podobało podczas lekcji czytania? What did you enjoy during these reading lessons? *

15. Co Ci się nie podobało podczas lekcji czytania? What did you not enjoy during these reading lessons? *

This content is neither created nor endorsed by Google.

Google Forms

Non-exclusive licence to reproduce thesis and make thesis public

I, Kārlis Caune,

1. herewith grant the University of Tartu a free permit (non-exclusive licence) to:

1.1. reproduce, for the purpose of preservation, including for adding to the DSpace digital archives until the expiry of the term of copyright, and

1.2. make available to the public via the web environment of the University of Tartu, including via the DSpace digital archives, under the Creative Commons licence CC BY NC ND 3.0, which allows, by giving appropriate credit to the author, to reproduce, distribute the work and communicate it to the public, and prohibits the creation of derivative works and any commercial use of the work from **05/06/2020** until the expiry of the term of copyright,

“Improving children’s comprehension and attitude towards reading by using technology”, supervised by Irene-Angelica Chounta (PhD).

2. I am aware of the fact that the author retains the rights specified in p. 1.

3. I certify that granting the non-exclusive licence does not infringe other persons’ intellectual property rights or rights arising from the personal data protection legislation.

Kārlis Caune

05/06/2020