

Faculté de philosophie, arts et lettres

Using digital and mobile tools for learning and teaching English as a foreign language. A focus on reading comprehension

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Abstract (EN)

This study explores whether reading on a mobile device enhances the comprehension and motivation of 3rd and 5th grade learners. The research compares the comprehension outcomes and motivational factors associated with reading on paper versus screens. Using a mixed-method approach, quantitative data was collected through comprehension tests and qualitative insights were gathered via student feedback questionnaires. Despite the 3rd graders showing no statistically significant differences in comprehension between the two mediums, trends suggested a slight preference for paper. For 5th graders, initial results favoured paper, but this distinction diminished when the reading mediums were switched. Qualitative findings highlighted the influence of interest for reading, instruction clarity, and reading context on motivation and engagement. The study's limitations include a small sample size and incomplete data, affecting generalizability. The results underscore the need for diverse reading formats and student autonomy in book selection to enhance engagement and comprehension. Future research with larger, more controlled samples is recommended to validate these findings and further explore the impact of reading mediums on young learners.

Abstract (FR)

Cette étude examine si la lecture sur un téléphone portable améliore la compréhension et la motivation des apprenants de 3e et 5e année. L'étude compare les résultats de compréhension et les facteurs de motivation associés à la lecture sur papier et sur écran. Grâce à une approche mixte, des données quantitatives ont été collectées par le biais de tests de compréhension et des informations qualitatives ont été recueillies par le biais de questionnaires sur les réactions des élèves. Bien que les élèves de 3e année n'aient pas montré de différences de compréhension statistiquement significatives entre les deux supports, les tendances suggèrent une légère préférence pour le papier. Pour les élèves de 5e année, les résultats initiaux favorisaient le papier, mais cette distinction s'est atténuée lorsque les supports de lecture ont été échangés. Les résultats qualitatifs ont mis en évidence l'influence de l'intérêt pour la lecture, de la clarté de l'enseignement et du contexte de lecture sur la motivation et l'engagement. Les limites de l'étude comprennent un échantillon de petite taille et des données incomplètes, ce qui nuit à la généralisation. Les résultats soulignent la nécessité de diversifier les formats de lecture et l'autonomie des élèves dans le choix des livres afin d'améliorer l'engagement et la compréhension. Des recherches futures avec des échantillons plus importants et mieux contrôlés sont recommandées pour valider ces résultats et explorer davantage l'impact des supports de lecture sur les jeunes apprenants.

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List of abbreviations

CALL	Computer Assisted Language Learning
CMC	Computer Mediated Communication
EFL	English as a Foreign Language
ER	Extensive Reading
ERP	Extensive Reading Program
FTF	Face To Face
GPA	Grade Point Average
ICT	Information and Communication Technologies
iOS	iPhone Operating System
MALL	Mobile Assisted Language Learning
MCQ	Multiple Choice Question
PE	Pacte for Excellence in education
SRQ-L	Learning Self-Regulation Questionnaire
UAA	Unité d'Acquis d'Apprentissage

1 - Introduction

The integration of digital and mobile tools into educational practices has revolutionised the way learners interact with content, particularly in the domain of language acquisition. This master thesis, titled "Using Digital and Mobile Tools for Learning and Teaching English as a Foreign Language: A Focus on Reading Comprehension," aims to explore the impact of mobile devices on enhancing reading comprehension among learners of English as a Foreign Language (EFL). It also investigates the effects of these tools on learners' motivation to read.

In an increasingly digital world, the use of mobile-assisted language learning (MALL) has become prevalent. Mobile devices offer unique advantages such as portability, ease of access, and the ability to engage learners through multimedia resources. These features make mobile devices particularly suitable for language learning, where frequent practice and exposure are crucial. The focus on reading comprehension is driven by the understanding that reading is a fundamental skill in language acquisition, essential for vocabulary development, cultural understanding, and overall language proficiency.

The traditional classroom setting, with its limited time and resources, often falls short in providing sufficient reading practice. Mobile devices can bridge this gap by offering learners the opportunity to read anytime and anywhere, thus potentially enhancing their reading habits and comprehension skills. This thesis investigates whether the convenience and interactive capabilities of mobile devices translate into improved reading comprehension and increased motivation to read among EFL learners. Thus, this study is guided by two primary research questions: Does reading on a mobile device enhance the comprehension of learners? What are the effects on their motivation to read a book? These questions aim to elucidate the cognitive and affective impacts of mobile reading tools on EFL learners, providing insights into the practical implications for language teaching and learning.

The State of the Art is structured into four main parts, each addressing different aspects of the research. In the first part a literature review will be conducted. The first section reviews the evolution of MALL, its theoretical underpinnings, and its application in language learning. It explores how mobile devices facilitate language practice and the specific benefits they offer for reading comprehension. It also presents the Belgian

context linked to mobile learning and discusses the impact of MALL compared to the age of the learners. Motivation plays a critical role in language learning. The second section of the literature examines theories of motivation in educational psychology, particularly those relevant to reading and language acquisition. It also considers the concept of investment, which looks at the personal and social factors that influence a learner's commitment to reading. Engagement will also be discussed as well as autonomy since they both have an impact on motivation and are linked to MALL. Effective reading requires sustained attention and concentration. The third section reviews studies on how digital reading impacts cognitive processes such as attention, highlighting the differences between reading on paper and on screens. Reading in a second language presents unique challenges. This last section discusses the theory concerning reading comprehension in a foreign language. Some data from previous studies regarding reading comprehension and reading on a screen will be presented as a basis for this master thesis and the concept of Extensive Reading (ER) will be brought forward.

In the second part, the methodology will be explained. It outlines the research design, including the experimental setup, data collection methods, and analytical approaches used in the study. The first subsection describes the preliminary test experiment conducted to refine the research instruments and procedures. It includes details on participant selection, materials used, and the initial findings that informed the main study. A second subsection presents the main quantitative and qualitative studies. It details the experimental design, including the use of control and experimental groups, and the specific mobile reading tools and apps employed. The quantitative study measures reading comprehension through standardised tests, while the qualitative study explores learners' experiences and perceptions through questionnaires.

In the final part, the results and discussions will present the findings of the study, interpreting the data in the context of the research questions and existing literature. The first subsection reports the statistical analysis of the quantitative data, discussing the extent to which mobile reading tools enhance reading comprehension. The second subsection provides an in-depth analysis of the qualitative data, offering insights into learners' motivation and experiences with mobile reading. It discusses the themes that emerged from the interviews and questionnaires, linking them to the theoretical

framework. Finally, the last part is dedicated to pedagogical and practical recommendations for educators and teachers on how to effectively integrate mobile reading tools into their teaching practices to support EFL learners.

2 - State of the Art

2.1 - MALL definition

MALL, which stands for Mobile Assisted Language Learning, refers to an approach to language acquisition that uses mobile technologies, primarily tablets and smartphones (Pegrum, 2014). However, the scope of MALL can be expanded to include other devices such as radio, cassettes, and CDs (Dong et al., 2022). Radin (2017, p.79) includes all devices that can be held in one hand and therefore comprise e-book readers as well. The use of technologies has been under study for more than 30 years (Radin, 2017) and is therefore well known, however the use of mobile technologies in the context of learning is not as old (Pegrum, 2014). It should, however, be viewed as teachers utilising technology for instructional preparation and delivery, as well as leveraging it as a learning tool for students (Inan & Lowther, 2010).

This thesis focuses specifically on smartphones as the technology under study, as such no distinction will be made between IOS and Androids. While the devices themselves are an important factor in defining MALL, Pegrum (2014) emphasises that mobility extends beyond the physical aspect of the device and also encompasses how it is utilised. Mobile learning can be undertaken even during activities, such as bus rides, highlighting its flexibility and accessibility. Furthermore, an essential aspect of MALL is the convenience and ease of use inherent in mobile technologies. Pegrum's definition also recognises the integration of mobile learning into the "everyday social reality" (2014, p. 14). Hence, it can be argued that mobile learning places the learner at the centre of the educational experience (Dong et al., 2022). However not every mobile technology can be used in any context, and some adaptation and careful preparation needs to be made (Radin, 2017, p.80). A significant advantage of mobile learning, particularly through smartphones, is its ability to personalise the learning process (Kearney et al., 2012). Through the use of applications (apps), learners have the autonomy to select their proficiency level, determine the duration of study sessions on the app, set up the frequency of reminders, and choose specific language aspects to focus on, such as grammar, vocabulary, reading, writing, or listening. Moreover, smartphones possess the capacity to adapt the instructional content to the learners' location (Pegrum, 2014) and this has led to the development of applications that incorporate historical or cultural elements relevant to the geographical context of the

learners, thereby enhancing the learning experience (Chu, 2014). Further advantages of MALL will be further discussed in the following part.

The research conducted in Dong's (2022) article focuses on smartphones, which is the most commonly employed mobile technology in studies related to mobile learning (Chee et al., 2017). When comparing the impact of MALL with CALL (Computer Assisted Language Learning) and traditional Face-to-Face (FTF) classrooms (Dong et al., 2022), the researchers observed notable differences in terms of student motivation, self-efficacy, and anxiety between the technologically assisted groups and the FTF group. However, no significant distinction was found between the CALL and MALL groups. It is important to note that this study was conducted exclusively in Iran and focused solely on adult male participants, which limits its generalizability to Belgian high school students. In this part, a deeper understanding of MALL will be provided, focusing on the stakes, the advantages and drawbacks and the interests of MALL depending on the context of use that will be existing within the experiment led in this thesis.

2.1.1 - Advantages and Drawbacks of MALL

Advantages

Mobile technologies offer numerous benefits when used in educational settings by teachers and students. One significant advantage is connectedness (Solomon & Schrum, 2014, p.14). Connectedness includes two main aspects: the student's connection with other individuals, such as teachers and peers, and the student's access to past, present, and future information (Solomon & Schrum, 2014).

Mobile technologies provide access to Open Educational Resources (OER) (UNESCO, 2023, p.48). This allows students to find resources for additional practice, such as online exercises, game-based learning applications, or online classes to get more explanations on subjects they are learning in class. These resources enable students to review past lessons, ensuring they grasp previously covered material, and to prepare for future classes. Additionally, OER facilitates the redistribution of educational resources, even in countries with limited budgets (UNESCO, 2023, p.68).

Incorporating MALL into traditional learning settings can help extend learning beyond the formal classroom context. Qian et al. (2018) highlight the pedagogical

benefits of teaching English to university students through both distance and face-to-face education. They advocate for incorporating this blended approach into the curriculum to maximise learning outcomes. According to their research, it is crucial for teachers to create small, engaging activities that are both easy to understand and memorable. These activities should be designed to align with student expectations and seamlessly integrate with their lives outside of the classroom. By doing so, the learning experience becomes more relevant and personalised, catering to the individual needs and preferences of each student.

In addition to connectedness, Solomon and Schrum (2014) highlight another advantage of MALL: communication. Through the internet and social media, students gain access to a global audience. This allows teaching materials to be used in authentic situations, making the learnt material more relevant and useful to students. To communicate effectively, students are motivated to work harder. Solomon and Schrum (2014) argue that this access to a real audience is a significant source of motivation. It has also been shown that practising in authentic situations, rather than simulated environments, is crucial for students. Mobile phones can significantly enhance in situ interactions (Viberg et al., 2018, p.136-137). Additionally, creating authentic content through mobile devices fosters peer learning and social meaning-making, which further enhances language learning (Radin, 2017).

Task authenticity refers to the extent to which tasks are realistic and offer problems encountered by real world practitioners. Factual authenticity refers to how particular details of a task (such as characters, instruments etc.) are similar to the real world, while a process level of authenticity refers to how learner practices are similar to those practices carried out in the community or “real-world” of practice. (Kearney et al, 2012, p.9)

Authentic situations and communication help bridge the gap between formal and informal learning (Viberg et al., 2018). Formal learning refers to a systematic and organised educational process that takes place in traditional settings such as classrooms. It features a well-defined curriculum, explicit educational objectives, and structured assessments, including exams and assignments, to evaluate students' progress (Viberg et al., 2018).

In contrast, informal learning is a spontaneous and unstructured process of acquiring knowledge and skills, often occurring subconsciously and outside conventional educational institutions. This form of learning is driven by personal

interests, real-life experiences, and interactions with the environment, rather than being guided by a formal curriculum (Viberg et al., 2018).

Connectedness and communication are closely linked to informal learning. The use of mobile technologies can foster informal learning by facilitating spontaneous interactions and real-life applications. Connection with others, especially through social media, increases student engagement and investment, largely due to the authenticity of these interactions (Darvin & Norton, 2023).

Mobile learning also significantly impacts language learning by fostering the creation of communities of learners, which provide support and extend beyond the school environment (Viberg et al., 2018). These communities allow students to practise language skills, reducing the influence of factors such as gender, race, culture, religion, and socioeconomic or political situations (Pegrum et al., 2018). Within these learner communities, communication helps develop metacommunicative and metalinguistic skills (Afonso et al., 2023, p.10). These skills are crucial for overcoming the fear and difficulties associated with speaking a foreign language, whether in front of other students or native speakers (Afonso et al., 2023, p.10; Dong et al., 2022).

These three advantages — connectedness, communication, and a sense of community among learners — highlight another significant aspect of using mobile technologies for learning: collaboration. M-learners actively participate in extensive collaboration facilitated by mobile devices, enabling robust connections with peers, teachers, and experts (Kearney et al., 2012, p. 10). This collaboration encompasses multimodal communication, the exchange of information, and the sharing of content and artefacts across various times and locations.

MALL opens up another possibility for both students and teachers: personalised learning (Kearney et al., 2012; Radin, 2017). Personalised learning involves tailoring the content to match the learner's personal and linguistic characteristics, thereby adapting the learning experience to meet individual needs and preferences. This customisation is crucial for enhancing the effectiveness of the learning process (Radin, 2017). In electronical-learning (e-learning), personalisation draws upon motivational and socio-cultural theories to empower learners with choices, agency, self-regulation, and customisation. It allows learners to control various aspects of their education, such as when, where, and how they learn. They can set their own goals independently or in

collaboration with peers. Mobile learning activities are designed to provide experiences that are "just enough, just-in-time, and just-for-me" (Kearney et al., 2012, p. 9), ensuring a personalised learning journey that aligns with individual learning styles and preferences (Kearney et al., 2012).

One defining aspect of MALL is its emphasis on advantages such as portability and flexibility (Pegrum, 2014). Mobile learning enables learners to access educational content anytime, anywhere, thus enhancing flexibility and convenience (Viberg et al., 2018, p. 136). This flexibility and portability are particularly advantageous in contexts where students travel frequently to attend school or university.

Pegrum (2014) also highlights that MALL can stimulate motivation for "just-in-case, just-in-time" learning. Mobile technologies uniquely bridge local and global contexts, facilitate short-term and long-term activities, and support personal and social interactions. These features are present across all levels of mobile learning (m-learning) but are most pronounced in situations requiring immediate access and responsiveness. This distinction sets m-learning apart from e-learning and differentiates MALL from CALL. However, it is important to note that affordability is typically lower at this advanced level of mobile learning (Pegrum, 2014, p. 21).

Mobile learning's advantages extend beyond personal contexts to address broader societal challenges. In many countries with limited access to traditional learning resources, tablets and smartphones have introduced significant improvements. For instance, ProFuturo, a technology-assisted learning program, has been widely implemented on tablets across Latin America, Asia, and Africa, enhancing active teaching time and providing effective drills and practice exercises (UNESCO, 2023, p. 72). Moreover, mobile technologies have proven invaluable in countries experiencing conflict, war, or economic hardship, greatly facilitating learning in challenging environments (Traxler, 2016). When combined with Open Educational Resources (OER), mobile learning substantially increases the educational opportunities available to students in these regions. It is also due to the cost effectiveness of mobile technologies. Compared to traditional educational materials and infrastructure, mobile devices are often more affordable and easier to distribute. This cost-effectiveness makes it feasible for educational programs to reach a larger number of learners, especially in resource-constrained settings. (UNESCO, 2023, p.72-73) Mobile learning

has democratised access to education, particularly in remote or underserved areas where traditional infrastructure is lacking. It allows marginalised populations, including rural communities and people with disabilities, to participate in learning opportunities they might otherwise not have. Social, economic and health impact on learning are lowered (Pegrum, 2014).

Drawbacks

However, there are drawbacks that must be considered when discussing Mobile Learning and MALL, one of which is not inherent to how MALL functions but rather relates to school policies, particularly in Belgium. Many schools do not fully embrace the use of smartphones and, in fact, are increasingly banning them.

It appears that mobile learning requires still a long way to go, and the existing barriers are represented by the lack of policy support as well as governmental investment and negative attitudes towards cell phones in the school environment due to cyber-bullying, cheating, etc. (Metruk, 2020, p.5)

To address these challenges, governments, teachers, parents, and students must transition from viewing mobile technologies primarily as leisure devices to recognizing their potential for educational purposes. Many teachers currently lack the skills necessary to effectively integrate MALL into their teaching practices or feel disconnected from newer teaching methodologies (Metruk, 2020). It is crucial to note that if teachers do not master these technologies correctly, their effectiveness in the classroom diminishes (UNESCO, 2023, p. 72). Moreover, simply using technology does not guarantee that students will effectively learn or transfer knowledge beyond the classroom context (Hoi & Mu, 2021, p. 881).

Furthermore, teachers' acceptance of computers for teaching does not necessarily extend to mobile technologies. MALL faces greater implementation challenges compared to CALL (Metruk, 2020). This reluctance can be attributed partly to data showing that in 2018, the primary uses of smartphones were for watching videos, using messaging apps, playing games, and checking social media (Rodriguez-Gomez et al., 2018). Consequently, MALL is not always perceived as a serious tool capable of delivering positive educational outcomes. Additionally, concerns about cheating persist with the use of smartphones in classrooms. While technologies like computers have introduced "exam" modes to prevent cheating, similar functionalities

are less common on smartphones (Metruk, 2020). Cheating, facilitated by smartphone cameras, messaging systems, and increasingly sophisticated artificial intelligence, presents ongoing challenges that educators must address through effective monitoring and prevention strategies.

In summary, while mobile technologies offer significant educational potential, overcoming these challenges requires concerted efforts to enhance teacher training, adapt educational strategies, and address concerns related to technology use and academic integrity in the digital age.

If these challenges are more context-specific to the use of MALL, there are also direct drawbacks associated directly with MALL itself. One of the primary concerns is access to mobile technologies, although this access is steadily increasing. For instance, in 2014, 80% of students in grades 9-12, 65% in grades 6-8, and 45% in grades 3-5 had access to private smartphones (Solomon & Schrum, 2014). Tablets are also frequently provided to students in schools, often used alongside eBooks in classrooms. However, there is still a notable deficiency of eBooks in Belgium, and the integration between technologies and traditional textbooks remains underdeveloped (UNESCO, 2023). This is represented in figure 1 (UNESCO, 2023)

Due to the lack of integration between technologies and traditional textbooks, students miss out on opportunities to utilise technology for studying, limiting their development of skills in using smartphones or tablets beyond leisure activities.

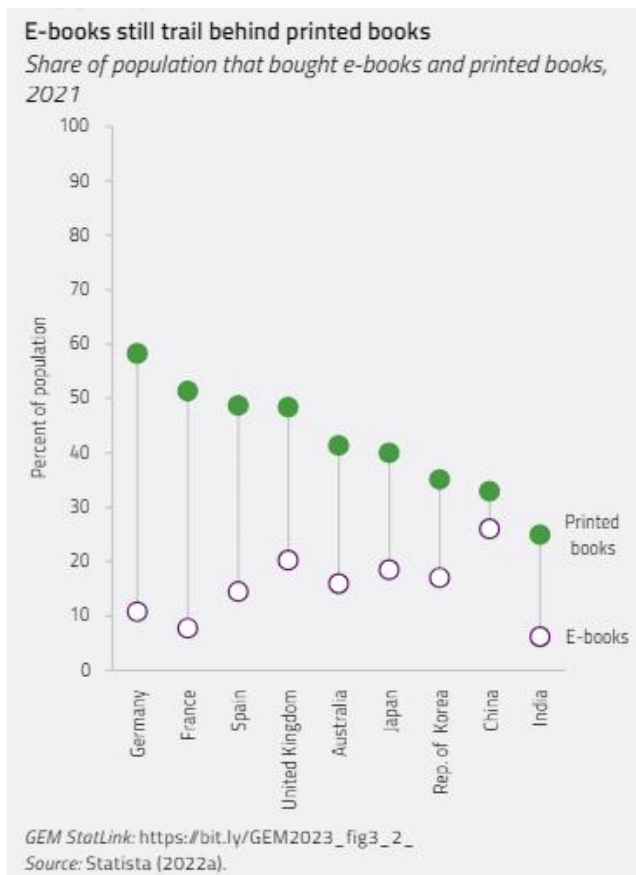


Figure 1: E-books still trail behind printed books. (UNESCO, 2023)

MALL often relies on internet connectivity for efficient use, whether through apps or accessing Open Educational Resources (OER). However, this reliance on connectivity can be considered a drawback, particularly in Belgium where data plans are more expensive compared to countries like France (Gafni et al., 2017). Without access to mobile data outside of Wi-Fi zones, the mobility advantage of MALL is diminished. Furthermore, while being connected enables increased interaction and the benefits discussed earlier, it also exposes students to distractions such as calls, SMS, and notifications, which can disrupt their concentration during learning (Gafni et al., 2017, p. 310). However, in studies, students reported that with experience and habituation to working on smartphones, the impact of these distractions decreased over time (Gafni et al., 2017, p. 310).

Distractions can also stem from how mobile apps and technologies are designed. They often prioritise functionality over learning, which can further exacerbate distractions (Kearney et al., 2012; Radin, 2017). In mobile learning developments, there has been a tendency to focus more on designing tools rather than optimising for effective learning outcomes and experiences (Kearney et al., 2012, p. 1). Moreover,

connectivity issues or device malfunctions can disrupt the learning process, causing frustration and hindering educational experiences (Radin, 2017, p. 80). These factors underscore the need for careful consideration of both technological design and access issues in implementing MALL effectively.

In several studies, noise has been identified as a potential drawback (Chu, 2014; Gafni et al., 2017). However, findings from the Gafni et al. (2017) article suggest that while noise can be distracting, students were able to adapt and learn effectively despite its presence.

One of the major concerns raised about MALL is its impact on cognitive load, which is rooted in how the human brain processes and retains information, involving both short-term and long-term memory capacities. Cognitive load refers to the brain's ability to manage new information, typically handling only two or three new elements at a time. Improper design of learning content and instructional strategies can overload students' working memory, thereby increasing cognitive load (Chu, 2014, p. 333).

Understanding cognitive load in the context of MALL involves considering three key aspects:

Firstly, Intrinsic Cognitive Load relates to the inherent complexity of instructional content, which can escalate when interactive components are integrated. Secondly, Extraneous Cognitive Load pertains to how tasks impact learning, often exacerbated by inefficient instructional design. Lastly, Germane Cognitive Load involves instructional design that enhances learning by effectively addressing essential variables (Chu, 2014, p. 334).

It is essential to interpret Chu's (2014) findings on cognitive load carefully, as they were derived from real-world mobile learning activities. Factors such as limited learning time, question complexity, and the blend of physical and digital learning resources were considered but may not be inherent to all MALL contexts. Nevertheless, cognitive load theory underscores the critical importance of how human cognitive processes handle learning tasks during the MALL experience (Chu, 2014).

Therefore, cognitive load must be carefully managed and considered in MALL settings to optimise learning outcomes and mitigate potential challenges associated

with instructional design and content complexity. The link between cognitive load and attention will also be discussed in part 2.3.2.

Mobile learning may inadvertently limit interaction between students and teachers, reducing opportunities for in-depth discussions and feedback (Radin, 2017, p. 80-81). This appears to contradict the earlier presented advantage of enhanced communication. However, the communication facilitated by MALL differs significantly from the interpersonal interactions that occur in a classroom setting.

The use of mobile devices for learning may raise concerns about data privacy and security. Issues such as unauthorised access to personal information, exposure to inappropriate content, or potential data breaches can undermine trust in MALL implementations. Even though it was argued by Pegrum (2014) that it lowers the importance of social and economic distinctions and despite increasing access to mobile technologies, disparities in device ownership, internet access, and digital literacy skills persist among student populations. This digital division can exacerbate educational inequalities rather than mitigate them. Furthermore, considerations about age come into play, as papers like Spitzer (2012) and Castaignède (2018) have highlighted potential negative effects on younger children. These effects may include reduced concentration abilities, diminished capacity for communication, and limitations in social, manual, and sensory interactions.

In essence, while MALL enhances certain forms of communication and learning opportunities, it also poses challenges related to interpersonal interaction and may impact younger learners differently than older ones.

2.1.2 - General context and uses

The advantages and drawbacks of educational technologies vary depending on the context of specific schools and countries. Therefore, an analysis of the Belgian context will be conducted. Additionally, the relationship between learners' ages and their use of technologies, which was previously mentioned, will be further explored and clarified based on the current state of the art.

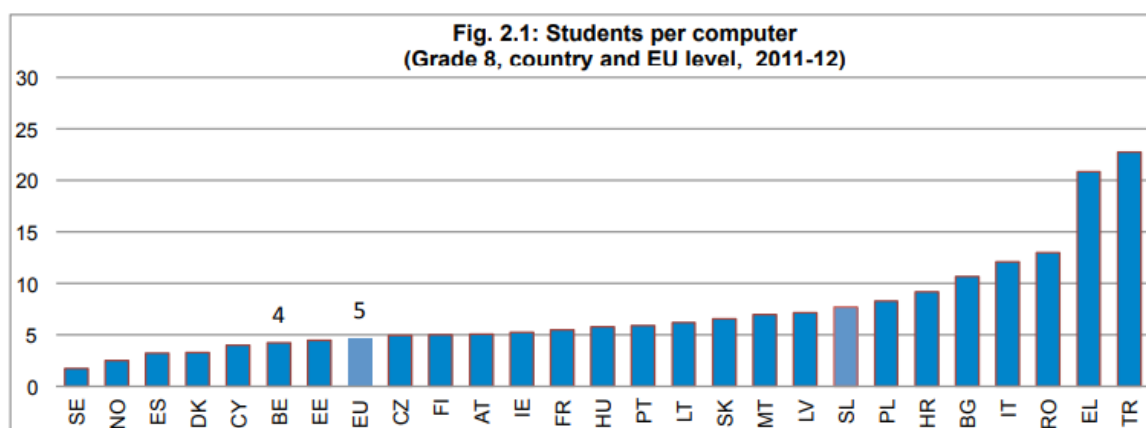
Belgian context

The Belgian context is particularly relevant for this study because the experimental part of the thesis will be conducted in Belgium. It is important to note that

Belgium has three communities responsible for education: Flanders, Wallonia, and the German-speaking region. The Belgian state itself only oversees certain legal aspects related to schools.

In Belgium the three Communities are responsible for education, but there are the following exceptions: the determination of the end and the beginning of compulsory school attendance; the minimum requirements for the issuing of diplomas; and the regularisation of retirement for the employees in the educational system, all of which are in the hands of the federal state. Full-time compulsory education lasts until the age of 16, and until the age of 18 for part time compulsory school attendance. (European Schoolnet and University of Liège report, 2012)

To write this part, the major source is a report by the European Schoolnet and the University of Liège. It was published in 2012. This means that the data may have changed in 12 years, however no report was published on this matter since then. All the figures in this subchapter come from the report. The report focuses on Information and Communication Technologies (hereafter ICT), which includes computers and tablets but excludes smartphones from its definition of ICT. However, smartphones are mentioned in some of the tables. Figure 2.1 shows the number of students per technological device in schools. In this regard, Belgium has a lower student-to-device ratio compared to the rest of the EU.



This indicates that Belgium is committed to investing in technology to enhance student learning in schools. Additionally, the use of ICT in Belgium is on par with other EU countries. This suggests that teachers in Belgium actively use the available technology and are willing to adapt their teaching methods to keep up with technological advancements. Their usage rate is comparable to other EU countries, which means

their attitudes and reluctance toward using mobile technology are similar (see Figure 2.2).

Figure 2.2 Frequency of use of ICT equipment by teachers in lessons (in % students, Belgium and EU, 2011-12)

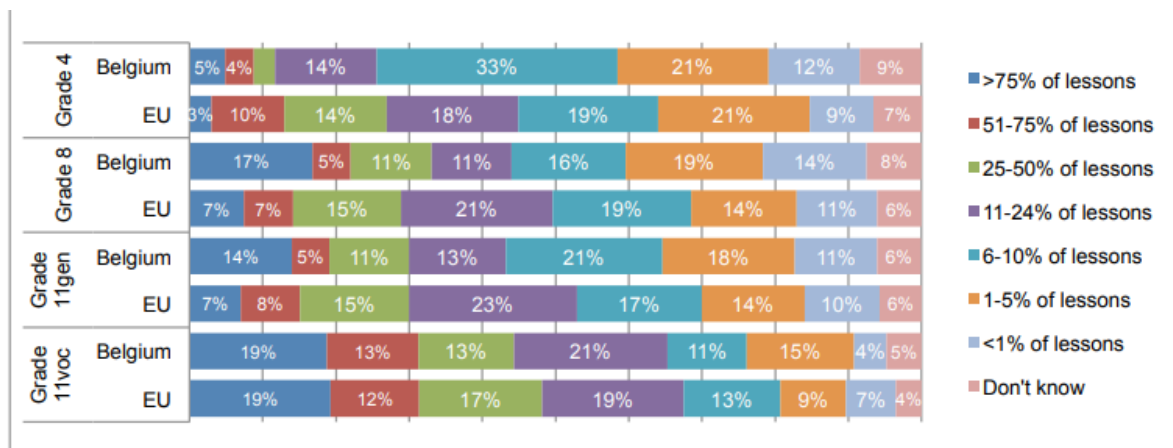
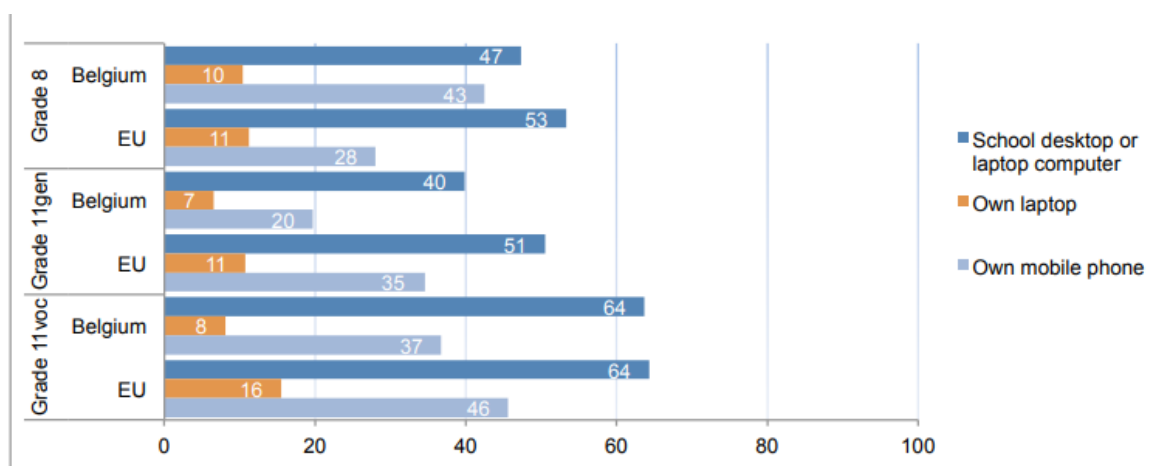


Figure 2.3 highlights the significance of mobile phones by comparing the use of school computers, personal laptops, and personal smartphones. In 2012, Belgian schools permitted the use of cell phones at a rate similar to other EU countries. Although the data is 12 years old and smartphone prevalence and capabilities have since increased, this information still provides valuable insight into how open Belgian schools are to mobile technologies.

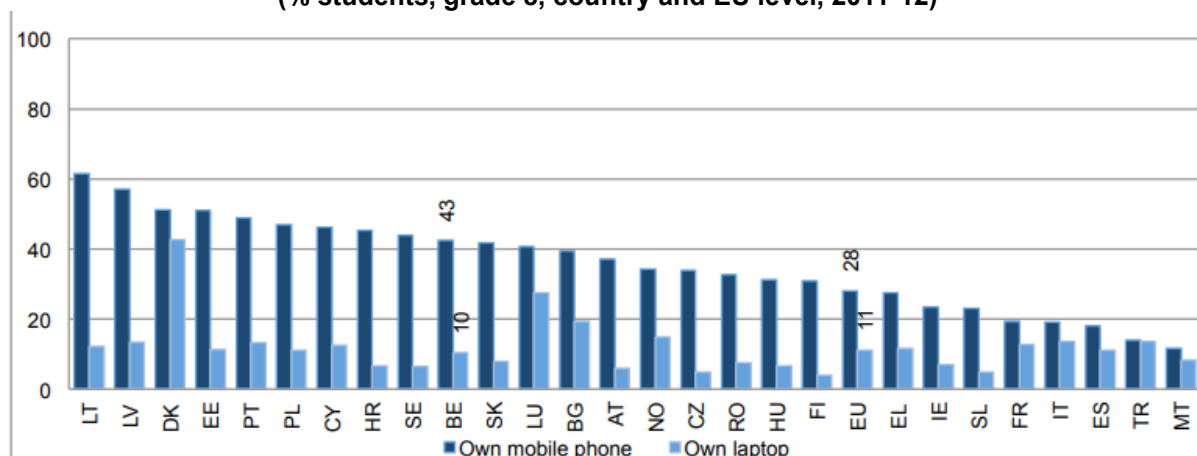
Figure 2.3 Percentages of students using ICT equipment in class for learning, at least once a week (Belgium and EU, 2011-12)



In 2012, Belgium ranked 10th among European countries in the use of mobile phones in schools. The use of mobile phones was significantly higher than that of laptops in Belgium, indicating that students were more inclined to use smartphones for

schoolwork. This could suggest that smartphones were either more accessible or more convenient for students compared to laptops (see Figure 2.4).

Figure 2.4: Use of own mobile phone or laptop for learning purposes at least weekly
(% students, grade 8, country and EU level, 2011-12)



Under the "Pacte pour un Enseignement d'excellence" (Pact for Excellence in Education, hereafter PE), several decisions regarding ICT and the use of technologies in schools were made in 2017. The PE is implemented by schools and aims to achieve objectives that both schools and teachers must support. As part of this initiative, schools are required to adopt a digital plan to better integrate technology into their educational environment. Some schools have provided each student with a tablet or personal laptop, while others have invested in interactive boards. Additionally, a program outlining the ICT skills students need to acquire has been developed (Fiévez, 2017).

Context linked to age

In modern times, young learners tend to be more confident and familiar with everyday aspects of literacy, especially visual literacy mediated by ICTs, compared to older teachers and parents (Hefper, 2000). However, this technological confidence can sometimes become a problem. A lack of training among older teachers and parents leads to a lower success rate when using mobile technologies in teaching contexts (Ravin, 2017). Even within younger populations, the question of readiness arises. In Briz-Ponce's study (2017), 94% of students found mobile devices very easy to use, yet only 24% felt prepared to complete tasks with these technologies. This study surveyed

150 students aged 18 to 25 and 10 students aged 26 to 35, indicating that even university students who use smartphones daily may not feel adequately prepared to work and learn on their mobile devices. However, a general assessment can still be made about younger learners' familiarity and confidence with technology.

Prensky (2001) introduces two concepts to explain why some people have greater affinities with (mobile) technologies than others: “digital natives” and “digital immigrants” (Prensky, 2001; Ravin, 2017, p.86-87). Digital natives are young individuals who have grown up surrounded by technology and are comfortable using various digital devices and applications from an early age. They navigate the digital world effortlessly. In contrast, digital immigrants are individuals who did not grow up with technology or have limited experience with digital devices, typically older than 35. They often find it challenging to adapt to new technologies and may require more guidance and support when using digital tools (Prensky, 2001; Ravin, 2017, p.86-87).

For older populations considered digital immigrants, using mobile devices and implementing MALL can lead to lower motivation rates and a lack of self-discipline, often resulting in failure and cessation of learning (Ravin, 2017). For these learners, a hybrid method is preferable to maintain motivation. Additionally, the need for user-friendly apps and activities increases with the age of the learners (Ravin, 2017).

Younger individuals, categorised as digital natives, do not face the same challenges as older generations when using technology. They find it easier to use and are not intimidated by it. However, this does not automatically translate to efficient learning using mobile devices (Briz-Ponce, 2017). Within the digital native population, further categorization can be made: primary school learners, secondary school learners, and university students. Although all these groups have grown up with an access to technology, the effects of MALL on their learning vary. They have different needs, capacities, mentalities, and levels of awareness about their learning processes.

In elementary schools, opinions diverge regarding the use of technology in classrooms or elsewhere for learning purposes. Sahlin et al. (2017) found that after being given tasks using ICT, most students were able to begin working on them without further instructions. It is important to note that ICT encompasses both computers and mobile devices. This study showed that ICT use increased student motivation.

When specifically considering mobile devices, some positive effects have been observed in children aged 0 to 8 years old. Educational applications on mobile devices can improve children's hand-eye coordination, language skills, and motivation to learn (Radeski et al., 2016). However, alongside these positive aspects (Radeski et al., 2016; Darvin & Norton, 2023), there are negative considerations to address, particularly regarding concentration and potential impacts on the developing brain of young children. Prolonged exposure to mobile devices during early childhood can adversely affect attentional and cognitive development (Radeski et al., 2016). There are also concerns that excessive use of mobile devices may hinder critical thinking, imagination, and problem-solving skills in young children.

It is crucial to note that the focus of this master's thesis is not on children aged 0 to 8 years old. Therefore, it is reasonable to infer that these risks are less pertinent in the context of the thesis's target age group. Nonetheless, chapter 2.3 will further discuss the concepts of attention and concentration.

In the case of teenagers who often face disengagement towards learning, MALL has been proven to be useful to help them become motivated again.

The community has demonstrated that mobile devices can extend, enhance, enrich, challenge and disrupt existing ideas and assumptions about learning. (...) and has shown that mobiles can raise motivation for learning, most especially amongst disenfranchised and disengaged learners. (Travler & Kukulska-hulme, 2016, p.2)

Teenager's use of digital technology is called "digital engagement" by Haddock et al. (2022, p.3). Adolescents' digital activities are generally driven by friendships, personal interests, or a blend of both (Jenkins, 2009). The relationships created in class can therefore become a source of motivation to work online, with their classmates.

While there are positive aspects to using technologies for learning, there are also notable negative outcomes depending on the age of the users. Adolescents are particularly vulnerable to the allure of technologies and the risk of developing addictions (Toto, 2018). Daily internet use can lead to social isolation, feelings of loneliness, and depressive moods due to reduced face-to-face interactions. Excessive use of social media among teenagers has been linked to decreased in-person social contacts, increased loneliness, and diminished self-esteem (Toto, 2018). Although these issues are not directly tied to Mobile-Assisted Language Learning (MALL),

teenagers predominantly access the internet via smartphones, potentially increasing screen time and exacerbating these negative consequences.

Conversely, there is also potential for technology use to have a positive impact. If teenagers can be guided to use their mobile devices primarily for studying rather than for social media, it may help mitigate addiction risks. Studies have shown that teenagers prefer human feedback over computer interactions (Toto, 2018), suggesting that maintaining social connections could be a preventive measure against addiction. According to Toto and Strazzeri (2019, p.141-143; Toto, 2018, p.205), some research indicates that prevention and education focusing on health and physical activity can help adolescents become responsible users of technology rather than passive consumers.

Nonetheless, Haddock et al (2022) regret that most of the time, studies and searchers are influenced by historical concerns and the public perspective also focuses more on the potential dangers and drawbacks than on an objective perspective over the use of technologies by teenagers (p.6).

Despite the focus on the negative impacts of technology on child development, the evidence linking digital engagement and negative outcomes is frequently overstated, focused on extreme users, and supported by studies lacking requisite nuance and complexity to discern specific effects (Haddock et al, 2022, p.6)

In Haddock et al.'s meta-analysis of 131 studies, the results provide a comprehensive understanding of the effects of technology on adolescents. This extensive analysis did not focus on a single type of technology but rather on how various technologies—such as the internet, social media, and video games—are used. These technologies are often accessed via mobile devices, making the findings particularly relevant in this context.

Positive effects on adolescents' cognitive development were identified, including improvements in executive control, problem-solving, working memory, and information-gathering skills. Additionally, there were benefits for brain development, such as enhanced visual-spatial attention and visual-motor integration (p.5). Socio-emotional development also saw positive impacts; for instance, prosocial gaming did not directly influence executive functions like fluid reasoning and empathy but did enhance social-emotional competencies through game-based learning programs. Internet use promoted creative thinking and reflection on social relationships, while

social media facilitated social connections, identity development, and positive emotions. Online peer communication via social media improved friendship quality, social support perception, and overall connectedness among individuals (p.5).

In conclusion, while technology addiction is a genuine concern, the use of technology by teenagers offers numerous beneficial outcomes for both their personal lives and learning. MALL can be effectively utilised by teenagers, provided teachers are confident in their ability to explain, guide, and provide feedback to these learners.

2.2 - Motivation and investment

2.2.1 - Motivation

Motivation is a central tool within learning. It refers to an internal state enabling action (Darvin & Norton, 2023). It can be influenced by various factors such as personal goals, values, and needs. (Bauer et. al., 2016) Motivation can be intrinsic, which means it comes from within and is driven by personal enjoyment or satisfaction, or extrinsic, which means it is driven by external rewards or consequences (Bauer et al., 2016). Intrinsic motivation is when individuals engage in behaviours for their own sake, deriving pleasure and satisfaction from the activity itself. Extrinsic motivation, on the other hand, involves engaging in behaviours to obtain external rewards or avoid negative consequences such as getting good grades, a gift or a promotion (Bauer et al. 2016). A study by Bauer (2016) analysed the relationship between motivation and training outcomes. The results showed that overall motivation had a strong relationship with trainee reactions, a weak relationship with declarative knowledge, initial skill acquisition, and transfer. Trainee reaction is defined as the trainees' satisfaction with their experiences during the training course (Sitzmann et al. 2008). It reflects how satisfied trainees were with the training content and includes affective judgments such as enjoyment and usefulness of the training content (Sitzmann et al. 2008). Transfer refers to the ability of trainees to effectively use what they have learned in a training setting and apply it to their work tasks and responsibilities (Bauer et al. 2016). Even if motivation is not surely linked to the effectiveness of the learning outside of the class, as explained in the meta-analysis by Bauer et al. (2016) it is related to the desire to learn, and without desire one does not learn at all (Colquitt et al. 2000). It is also linked to the effectiveness of the teaching in class. Motivation is also influenced by the perceived task value, ability belief, and expectancies for success (Hsieh, 2014; Dong

et al, 2022). Task value refers to the student's evaluation of how interesting, important, or useful a task is. Ability belief refers to the student's beliefs that their efforts to learn will result in positive outcomes. Expectancies for success refer to the student's confidence in their ability to learn (Hsieh, 2014). Motivation is also linked to investment and engagement; however, they are different aspects for many researchers that distinguish many elements apart from motivation (Darvin and Norton, 2023; Hsieh, 2014; Dong et al, 2022). The elements that impact motivation and or investment and engagement will be further developed in the following paragraphs of this section.

2.2.2 – Investment

To understand what can influence the desire to learn within a student, one has first to understand more than motivation, as it is different from investment and engagement. Darvin and Norton (2023) explain that there is a difference between motivation and investment in language learning. Investment in language learning is defined as a choice made by individuals to participate in a social practice, such as learning a language, based on understanding the material and symbolic context in which this choice is made. Investment emphasizes the social and contextual aspects influencing the decision to engage in language learning. Investment refers to “a choice to participate in a social practice” (Darvin and Norton, 2023, p.33). Research on investment focus on examining the conditions that shape an individual's commitment to language learning, highlighting the dynamic and situated nature of investment in different learning contexts. By exploring 'how', 'why', and 'to what extent' (Darvin and Norton, 2023, p. 33) certain conditions influence learners' investment, researchers aim to uncover the complex interplay between individual agency, social structures, and power dynamics in language education. On the other hand, motivation is viewed as 'less a trait than a fluid play' (Darvin & Norton, p.34, 2023) and a process that illuminates changes in L2 learners as they adapt to an ever-changing environment. It is recognized as a continuous adaptation process, situational, and temporary rather than a stable trait or personal attribute. Motivation is understood as a complex, contradictory, and evolving state that involves continuous adaptation and aligns with the complexity of today's world. As it evolves with today's world it can also evolve with the school environment, the group's atmosphere and many other aspects, some of which can be influenced on by teachers. In every group of learners, dynamics and

perceptions exist; they influence the investment of every learner in the group. One important element is power, as “the social world in which learners negotiate their identities is circumscribed by power.” (Darvin and Norton, 2023 p.32; Darvin and Norton, 2016; Bourdieu 1977). Power can be understood as the control and influence that certain individuals or groups have over others. In the context of language learning, power is manifested through various forms such as economic, cultural, and social resources. Learners who possess certain resources, such as linguistic proficiency or social connections, may have more power and agency in navigating different communicative contexts. On the other hand, learners who lack these resources may face limitations and barriers in accessing and participating in these spaces. Power, therefore, influences the extent to which learners can invest in their learning and claim their right to speak, read, and write in a second language (Darvin and Norton, 2023). One can expect that MALL will be able to influence the importance of power within learning and will reduce its importance for the learners. A second aspect that is linked to investment is identity. It is related to investment in language learning as learners invest in learning a second language because they hope it will provide them with a wider range of material and symbolic resources that increase the value of their cultural capital and social power. At the same time, learners' identities, such as race, gender, ethnicity, social class, or sexual orientation, can impact their investment in language learning. If learners feel marginalized in a classroom or community because of their identity, they may not be as invested in the language practices of those learning contexts, even if they have high levels of motivation. Therefore, understanding identity is crucial in examining and understanding investment in language learning (Darvin and Norton, 2023; Darvin and Norton, 2016; Lee 2023). In a learning context where students are not in the classroom, it may be possible to lessen the influence of identity on their investment in order for marginalized students to feel freer to invest themselves in their learning process. It may also be interesting to know if some conditions (like a student on the Autism spectrum) can have an influence on this aspect. In Lee's article (2023) the findings showed that motivation and investment complemented each other and were situational and contextual. The participants' imagined future selves stimulated their language learning, and their actual and imagined identities played a role in their learning context. The study emphasized the need for teachers to understand and balance students' motivations and investments in order to support their language learning. One could summarize the relationship between Motivation and

investment as follow: research on motivation “is based on social psychological and cognitive perspective” (Lee, 2024, p. 821) whereas investment research “focuses on sociocultural and sociopolitical perspective” (Lee, 2024, p. 821). These two elements influence how a student is learning a foreign language, but they are not linked to the same aspects of the context, and they are both necessary to understand why and why not a student manages to learn a foreign language.

2.2.3 – Engagement

Another element that could be added to the reasons of success or failure of the students, also linked to motivation and investment is engagement. Engagement and motivation are two related but distinct concepts in the context of learning. While motivation refers to the internal drive or desire to engage in a task or activity, engagement refers to the actual behaviours and actions that individuals exhibit while participating in that task or activity. In other words, motivation is the underlying psychological state that influences engagement. Motivation can be seen as the fuel that drives engagement. (Hsieh, 2014) Engagement, on the other hand, refers to the observable behaviours and actions that individuals exhibit while participating in a task or activity. It involves active involvement, attention, and effort. Engaged learners are fully immersed in the learning process, actively seeking to understand and apply new knowledge or skills. They may ask questions, participate in discussions, collaborate with others, and demonstrate a high level of cognitive effort. (Hsieh, 2014) Engagement is also defined as a dynamic, multidimensional construct that includes cognition, affect, and behaviours, such as social interactions, in which action is a necessary component. It is highly context-dependent and can be directed towards a learning task, language learning activities, or language itself as the outcome of learning. Engagement always has an object, which can be a topic, a person, a situation, or an activity/task. (Hiver et al, 2024) “High learner engagement has been linked to many positive outcomes in education. “ explains Hiver et al. (2024, p.206) therefore it is really important to study this aspect. In this light the link between motivation and engagement is so important, that what influences motivation will in the end have an impact on engagement (Dong et al, 2022). Furthermore, one can also link it to investment and understand that aspects which influence investment will influence engagement. Let’s take an example to illustrate the link between engagement, motivation and technologies. When it comes to creating engaging language learning

environments, technology plays a significant role. (Henry, 2019) using video games, synchronous Computer Mediated Communication (CMC) tools, authentic social media, web-based language activities, and other technological tools to engage students and enhance L2 interaction during online exchanges. Additionally, connecting learners with both L1 and L2 speakers of the language can help raise their awareness of different language varieties through cross-cultural communication. These ideas blur the boundaries between classroom language learning and extramural language development, providing more meaningful purposes for language use and stimulating learner engagement (Hiver et al, 2024).

2.2.4 – Influencing motivation

Many elements have an impact on motivation, engagement and investment, they need to be invested in order to help teachers to improve their classes and have students who will be more motivated, engaged and invested. While helping teachers it also helps students, as they will learn more easily. One of those elements is Autonomy it is highly linked to MALL; therefore, it is interesting to discuss how it impacts student's motivation. It will be discussed in a first part, then in a second part the Self-Determination Theory will be studied. It is a theoretical framework developed by Deci and Ryan (1985). It suggests that humans' motivation to perform a task is determined by three basic psychological needs: competence, autonomy, and relatedness. When these needs are fulfilled, individuals become self-determined and motivated to accomplish a task. Self-Determination Theory has been used to explain students' motivation and engagement in online classes (Dong et al, 2022). Autonomy is highly linked to MALL; therefore, it is interesting to discuss how it impacts student's motivation.

Autonomy in learning provides several advantages. Firstly, it allows students to set their own learning objectives and take control of their knowledge, motivation, and behaviour. This sense of ownership and agency can enhance their engagement and motivation in the learning process (Darvin & Norton, 2023; Linca & Matei, 2023).

Human development can be characterized in terms of movement toward greater autonomy and that this movement depends in part on the continual acquisition of a variety of competencies. (...) Recent work on the psychology of control has indicated that people have a need to experience control over their environment or their outcomes. (Deci and Ryan, 1985, p.30)

Secondly, autonomous learners develop critical thinking skills as they reflect on their learning and make decisions independently. This promotes deeper understanding and the ability to apply knowledge in a wider context. Lastly, autonomy in learning prepares students for real-life situations by fostering skills such as problem-solving, decision-making, and self-regulation. Overall, autonomy in learning empowers students to become independent, lifelong learners. (Linca & Matei, 2023). Age can influence the autonomy of the learner, but it is always motivating for students (Linca & Matei, 2023), as they could tailor their learning to their individual needs and interests, which can evolve depending on their ages and enhance enjoyment of the learning process. In their meta-analysis, Hiver et al. (2024) mentions that autonomy is one of the indicators of emotional engagement in language learning.

Autonomy's influence is central in MALL, as most of the time, students are facing their device's screen and are alone. If autonomy does not influence correctly their motivation to learn, then the process of learning will be slowed down, and the progress won't be as visible as in a more typical way of learning. In the article of Linca and Matei (2023) the results of the experience made on the autonomy of learners depending on their age are really interesting. The study compared the average scores obtained by male and female students on the SRQ-L questionnaire. A one-way analysis of variance (ANOVA) was performed, taking age with 4 categories (15 years, 16 years, 20 years, 21 years) as the independent variable and controlled regulation as the dependent variable. The results showed statistically significant differences between the means of the groups of 15, 16, 20, and 21 years in terms of controlled regulation. Controlled regulation is defined as the process of individuals actively monitoring, regulating, and controlling their own learning. It involves setting learning objectives, managing motivation, and controlling one's own behaviour in the learning process. This is important in the case of this master thesis, as the students who will be subject to the experiment are between 15 to 18 years old. The data analysis highlighted a significant difference between 16- and 21-year-olds in terms of controlled regulation in learning, indicating that 21-year-old girls are more autonomous in learning than 16-year-old girls. However, there were no significant differences in controlled regulation in the other age categories (Linca & Matei, 2023). Autonomy can be linked to *self-regulated learning* which refers to the process by which individuals actively and intentionally manage their own learning. It involves setting goals, planning strategies,

monitoring progress, and making adjustments as needed (Zimmerman, 2000). Self-regulated learners are able to regulate their thoughts, emotions, and actions in order to achieve their learning goals. This includes using metacognitive strategies (such as self-reflection and self-evaluation), managing motivation and emotions, and employing task-specific strategies. Self-regulated learning has been shown to have a positive impact on student achievement and performance (Panadero 2017). They can easily be linked to autonomy in the way that the learner has to learn alone, the main difference with autonomy being that the learning for self-regulated learners is fully in autonomy and doesn't get the help of any teacher or coach. In the context of the thesis, this is exactly what corresponds to the experiment.

Self-efficacy is an important parameter that can influence motivation. (Dong et al, 2022). Self-efficacy refers to students' beliefs in their own capabilities to succeed in completing tasks. It influences their decisions, efforts, and behaviours when faced with challenges. (Dong et al. 2022, p.4, Panadero et al, 2017) Self-efficacy also plays a role in the levels of anxiety experienced by language learners while performing tasks. It is considered a strong predictor of success or failure and can impact learners' emotions and motivation. (Hsieh, 2014 p.426, Dong et al, 2022, Panadero et al, 2017) Self-efficacy can be influenced by various factors, including past experiences, observations of others, persuasive messages, and psychological conditions such as stress and anxiety. (Dong et al. 2022, p.4). Concerning foreign language, the anxiety linked to it was defined by Horwitz and Cope (1986) as “a distinct complex of self-perceptions, beliefs, feelings, and behaviours related to classroom language learning arising from the uniqueness of the language learning process” (p.128, as cited in Ro, 2013, p.214). Hsieh elaborates on self-efficacy by explaining that “if instructors can provide students with more successful learning experiences, students can develop more confidence in their ability to learn in their major courses.” (2014, p. 427). Four factors can help teachers to increase the self-efficacy feeling of their students. The first one is letting students experience successful performances, the second is observing other students succeeding in their learning, the third is the encouragement given by the others and mostly the teacher and finally some psychological factors can have an impact on the self-efficacy feeling of a learner. (Panadero et al, 2017). Self-efficacy is also highly linked to Self-regulated learning and therefore, autonomy. It has become part of

models used to study both motivation and self-regulated learning (Panadero et al, 2017).

Technologies in the context of mobile learning, have an impact on students' motivation. Both CALL and MALL fulfil student's psychological needs and therefore help them to become intrinsically motivated. For example, it fulfils their need of autonomy, of a feeling of competence and in turn can decrease their anxiety (Dong et al, 2022). However, when linked to reading, technologies might not compensate for the lack of motivation that can exist in some students. Students may not be keen on doing work in their own time, especially if they don't read in their first language (Robb & Kano, 2013). One way to increase their motivation to read is to impact their final grades since the proportion of students conforming to reading requirements increases with the weighting of outside reading in their final grade (Robb & Kano, 2013).

2.3 - Attention and concentration

2.3.1 - Definitions: Attention and concentration

Attention and concentration are fundamental cognitive processes that play a critical role in learning. Understanding how these processes work is essential for developing effective educational strategies, especially in today's technology-rich environments. This section of the thesis aims to explore the mechanisms of attention and concentration and examine the impact of MALL on these vital capacities in the context of learning.

The rapid integration of mobile technologies in educational settings has transformed traditional learning paradigms, offering new opportunities and challenges. While MALL provides innovative ways to engage students and enhance learning experiences, it also raises questions about its influence on students' ability to maintain focus and process information effectively.

In this section, we will first delve into the cognitive science behind attention and concentration, outlining the key theories and models that explain how these processes operate and what ecological impacts exist and affect attention and concentration. We will then review the existing literature on the effects of mobile technologies on attention and concentration, highlighting both positive and negative outcomes.

By addressing these questions, this part of the thesis seeks to provide a comprehensive understanding of how MALL influences attention and concentration,

thereby informing best practices for integrating mobile technologies in educational contexts.

Attention is regulated by neurological brain centres that must function correctly. It is both a biological process and a voluntary psychological behaviour, influenced by internal variables of the individual and external factors. (Garay-Jiménez et al., 2021, p.409).

As a psychological process, attention is characterized by transforming its initial reflection nature to an active interaction with the environment. Generally, it is guided and facilitated by a mediator. Then, attention is a conscious search in the perceptual field, unlike the state of alert or wakefulness, which is associated with the level of consciousness and the perceptual field is briefly perceived unless a relevant stimulus appears and then attention is focused. (Garay-Jiménez et al., 2021, p.409).

It is a cognitive process that involves focusing on specific stimuli while ignoring others. It plays a crucial role in various mental tasks such as working memory, decision-making, and problem-solving. (Luo et al., 2019) Attention can be further described as a multifaceted construct encompassing different components such as focus attention, selective attention, sustained attention, divided attention, and executive attention. (Garay-Jiménez et al., 2021, p.409; Luo et al., 2019 ; Reigal et al., 2020 p.2). They define those attentions as follows.

Focused attention refers to the ability to respond to specific visual, auditory, or tactile stimuli. This involves concentrating on a single source of information while ignoring all other stimuli. An alert person who lacks sufficient attention or is inattentive cannot effectively filter out irrelevant stimuli, leading to distraction from external sounds, movements, and visual inputs occurring around them. (Garay-Jiménez et al., 2021, p.409)

Selective attention involves responding to a specific stimulus while inhibiting responses to distracting stimuli. It requires monitoring multiple information channels to complete a simple task. Individuals with deficits in this area are easily distracted by irrelevant stimuli, including external visions, sounds, activities, and internal distractions such as thoughts, feelings, or concerns. (Luo et al., 2019 ; Garay-Jiménez et al., 2021, p.409, Reigal et al., 2020, p.2)

Sustained attention involves maintaining focus over an extended period and the ability to provide a consistent behavioural response during a continuous and repetitive activity. It refers to remaining alert to stimuli for long durations. Individuals with

impairments in this area can only focus on tasks and maintain responses for a short time (seconds to minutes) or experience fluctuations during brief tasks. Sustained attention also includes mental control, such as performing memory exercises and manipulating information while keeping it in mind. This type of attention is generally reinforced during the early stages of formal education. (Garay-Jiménez et al., 2021, p.409; Luo et al., 2019 ; Reigal et al., 2020, p.2)

Divided attention involves the ability to respond simultaneously to the demands of multiple tasks. It requires attending to more than one task at the same time, providing two or more behavioural responses while monitoring multiple stimuli. This skill is necessary for managing simultaneous demands, such as driving a car while listening to the radio or conducting a conversation. Divided attention may involve continuous alternating focus or an implicit and automatic process for at least one of the tasks. (Garay-Jiménez et al., 2021, p.410; Luo et al., 2019 ; Reigal et al., 2020, p.2)

Executive attention encompasses higher-level cognitive processes responsible for goal-directed behaviour and cognitive control (Luo et al., 2019). The last type of attention is called alternate attention and refers to the ability to exhibit mental flexibility, allowing individuals to shift their focus between tasks with different cognitive requirements and selectively manage the information to be addressed. Difficulties at this level are evident in individuals who struggle to switch attention from one task to another, once one has begun. This level of attentional control is frequently required in real-life situations, for example when one is trying to write a thesis but has to switch to reading peer reviewed articles in order to find more information, or when someone is working on a task and suddenly has to answer a phone call or an email. (Garay-Jiménez et al., 2021, p.409-410)

Concentration is highly linked to attention; it is a state that comes from an intense focal attention state. It involves maintaining attention over a period of time and directing mental effort towards a particular goal or objective. (Reigal et al., 2020, p.2)

It is measured by how the subject maintains a particular activity with proper functioning both in intensity and amplitude. The task attended must be complicated or changing so that the mind remains fixed on the event. There must be an appropriate state of alertness, and the stimulus should be attractive or motivating. These functions are more complex than the previous one (Garay-Jiménez et al., 2021, p.410)

Both attention and concentration are seen as critical cognitive abilities in order to learn and to create memories. They are influenced by motivational, internal, and external

factors, such as information overload, emotional states, environmental or physiological conditions, and the absence of strategies for seeking relevant information, among other factors in typical health conditions (Garay-Jiménez et al., 2021, p.410; Reigal et al., 2020, p.2). Reigal (2020) also mentions the existence of “arousal” (p.2), a state of alertness or readiness to respond to stimuli, influencing attention levels. Higher arousal levels can enhance attention and performance on tasks requiring focus and concentration. One typical health condition that influences attention and concentration is ADHD (Attention Deficit Hyperactivity Disorder) (Luo et al., 2019; Romain, 2024). ADHD is not under focus in this thesis but some of the students who will be in the experiment have ADHD, therefore it is still important to mention that ADHD has an impact on attention, since reading requires a lot of concentration and is a challenge for ADHD individuals (Romain, 2024, p.41). Furthermore, stress anxiety and depression can also lead to lower levels of attention (Garay-Jiménez et al., 2021, p.410).

Reading long texts (for example novels) requires a higher level of concentration (Chang & Millett, 2013, p.139) however it was found that it was helpful for students to have an allotted time in order to finish the book. This pushed them to be more focused on their reading (Chang & Millett, 2013) In the same article, they tested how repetition would influence reading comprehension and discovered that it also had an influence on the level of concentration and motivation. Some students found it harder to concentrate on the text after three readings of the same story. Even if their comprehension level was higher with each reading, their attention was lower, and therefore, one can expect that asking the students to reread the books more than 2 to 3 times would be too much, and their concentration would get lower, thus they would gather less elements within the text (Chang & Millett, 2013). When reading, the attention of the learner is focused on understanding but also on learning some new aspects of the language, enjoyment is also a part of the process (Ro, 2013, p.213). It seems that reading for an extended period of time also increases the ability to focus longer while using the foreign language (Ro, 2013, p.216).

2.3.2 - Elements that impact attention and concentration

This section explores the influence of MALL on learners' ability to focus and maintain attention, examining both its potential benefits and drawbacks. Additionally, we will delve into other key elements that affect attention and concentration, including

motivational, internal, and external factors. By understanding these dynamics, we can better harness MALL's capabilities while mitigating any negative effects on learners' cognitive processes.

MALL and attention span

From an early time on, studies have tried to know if technologies had a negative impact on human's brain, more precisely, if the use of those technologies can have a negative impact on human's brain. In 1990, the concept of "nonchemical addiction" was introduced, including any addiction that were not coming from ingested elements, for example gambling addiction or online sex (Bilieu et al, 1990, as cited in Sha and Dong, 2021, p.1). This phenomenon is increased with children and teenagers. In their study, Bhosale and Minchekar (2016) included a global view of the link between attention span, short term memory and mobile phone addiction. Their results showed positive correlation between Internet and mobile phone addiction, negative correlation between addictions and short-term memory, and no significant difference between male and female students in the studied aspects (Bhosale & Minchekar, 2016). Short term memory is necessary in order to learn anything new, therefore the question of increasing the amount of time spent on mobile phones is relevant. Increasing or creating an addiction to those technologies would in the end affect the capacities of the learners.

In 2021, most students and teenagers indicated that they were able to study and simultaneously use social media, without having to experience any drawbacks or inconvenience in their work capacities (Barton et al., 2021). However, research suggests that individuals are actually engaging in task switching (alternating between tasks) rather than multitasking (performing and executing two or more cognitive activities simultaneously) (Karpinski et al., 2012). Moreover, task switching is linked to ineffective information learning and poor task performance. Most studies examining social media usage, multitasking ability, and students' academic performance have found a negative correlation between social media use and academic achievement (Karpinski et al., 2012).

In order for two processes to be carried out at the same time, there needs to be as many processors as there are processes (e.g., multi-core computers). Humans, due to the cognitive architecture of their brains and the limits that this architecture places on processing information,

are incapable of true multitasking. What is possible is task-switching. (Karpinski et al., 2012, p.1183)

Therefore we can argue that studying on a mobile phones might not always be the best solution in order to increase the performances of the learners, since most of the people access social media through mobile phones, and since many notifications can interrupt their learning and lead to task switching, Nonetheless, smartphones offer some “do not disturb” features nowadays, and once this feature is activated, the notifications as source of task switching are non-existent and the attention can stay focused on one task. These studies, however, prove that in order to learn efficiently, divided attention is not the type of attention that should be targeted (Karpinski et al., 2012; Barton et al., 2021).

Karpinski et al. (2012) even elaborate further, the study found that most students spent their study time on social media because it was more appealing and readily accessible than their assignments. This indicates that social media affects students' ability and motivation to regulate their effort in completing tasks, which can negatively impact their overall academic performance. It is more often happening on their smartphones than on their computers, therefore the question of the student's ability to study on their smartphones is relevant. Barton et al. (2021) found a significant and negative correlation between the use of social media and GPA, the more students use social media, the lower their GPA are. In the light of this information and knowing that MALL has a positive impact on Motivation, and positive effects on the level of the students, the question of the balance and guidance of adults while using this method seems to be heightened.

Attention and cognitive load

Cognitive load refers to the capacity of the human brain to process new information, encompassing working memory, short-term memory, and long-term memory. Research indicates that only two or three new elements can be effectively handled at a time. Improperly designed learning content and instructional strategies can increase cognitive load, leading to the overload of students' working memory (Chu, 2014). It is highly linked to attention and concentration, since when the cognitive load is too high, one cannot pay attention as well as normally, the brain is saturated and too many materials are to be taken into account, they can be considered as stimuli for the brain. Furthermore, attention is also required to transfer some new elements to the

working memory (Chen and Lin, 2016, p.555). Active cognitive processing facilitates the meaningful construction and transfer of knowledge, integrating it with prior knowledge into long-term memory (Mayer & Moreno, 2033, as cited in Chang, 2018).

In a mobile or ubiquitous learning activity, the learning materials from both real-world and digital-world environments can significantly contribute to mental load. This is because the quantity and complexity of these materials are likely to increase the interactions among the tasks, students, and learning materials (Chu, 2014; Chang, 2018).

Mobile devices in themselves can increase the cognitive load of learners if they are not familiar with them. If that is the case, it might have a bigger impact than surrounding events or interruptions (Moreno, 2002, as cited in Chang, 2018). Reducing cognitive load during the learning process is essential for enhancing learning outcomes and should be a key consideration when designing mobile learning activities (Chang, 2018; Chu, 2014).

2.4 - Reading comprehension

2.4.1 - Reading in English as a Foreign Language

Reading in a foreign language is not the same exercise as reading in one's mother tongue. It is a major competence in language learning and is always developed when learning a language in a Belgian school. Most of the time, teachers work on reading comprehension using newspaper articles, small stories etc... The texts are always adapted to the level of the learners. In A1 level, the texts are less authentic, however in higher level classes, teachers tend to favour authentic texts. It is still rather rare that students read books. The time it takes and the investment necessary from the students are often seen as reasons not to read books and to avoid any project including long texts or readings.

Reading is also often disapproved as a project by students, due to their lack of motivation with reading (Ro, 2013; Chang & Hsu, 2011).

Due to the intensive reading approach, studying reading material in detail, including memorizing morphological information and analyzing sentence structures, oftentimes deteriorate learners' interest in reading. (Lin, 2014, p.48)

We can therefore consider that book readings and longer readings are harder to plan in the Belgian context.

In many papers “extensive reading” (here after ER) was under study, it is defined as quantitative reading in the second language (L2) for an extended period solely for personal pleasure, without the inclusion of additional tasks or follow-up language work (Ro, 2013). This approach focuses on understanding and gaining knowledge or enjoyment, contrasting with traditional reading exercises in language classrooms that often involve more structured tasks and activities. Extensive reading aims for learners to acquire language incidentally rather than through deliberate instruction or study (Ro, 2013). Since ER does not include any further activities than reading, it is not exactly what will correspond to a book reading in the context of Belgian schools, since more often than not, teachers need to grade their students and reward their level of comprehension. However, it is the type of reading that corresponds the most to the book readings that are under focus in this MA thesis.

Using reading to offer the opportunity to be more in contact with the language is also one of the reasons that reading in a foreign language is a good way to improve in the said language (Robb & Kano, 2013, p.244). The process of reading includes four main aspects: symbol decoding, vocabulary, comprehension and reflection (Harris & Sipay, 1985, as cited in Chang & Hsu, 2011).

Symbol decoding is a crucial aspect of the reading process, involving the ability to interpret and understand the symbols or characters that make up written language. It is the initial step in reading where individuals translate written symbols into meaningful information. This process lays the foundation for further comprehension and understanding of the text being read (Chang & Hsu, 2011, p.155). This aspect is not fully relevant for EFL learners speaking French, since both languages use the Latin alphabet, however it would have an impact if the language learnt was not using this alphabet, or if the learner’s mother tongue was for example Korean or Russian. Furthermore, it also includes the decoding of the punctuation which helps organise the construction of the text and varies depending on each language (Chang & Millett, 2013). Symbol decoding is a crucial component of reading fluency, involving the ability to recognize and interpret symbols such as letters, numbers, and punctuation marks in written text. In the context of reading fluency, symbol decoding contributes to automatic word recognition, which is essential for rapid and accurate reading. (Chang & Millett, 2013)

Vocabulary plays a crucial role in reading comprehension as it determines the reader's ability to understand the text. When readers encounter unfamiliar words, it can impede their ability to construct meaning and negatively affect their reading speed. Difficulty with vocabulary often leads to unsuccessful reading experiences and can be a significant reason for comprehension difficulties (Chang & Hsu, 2011, p.156).

Many of the obstacles that are encountered by people who learn EFL are often a result of poor vocabulary proficiency; these obstacles can give learners the impression that English reading activities are complex and difficult (Lin, 2002; Segler, Pain, & Sorace, 2002 as cited in Chang & Hsu, 2011, p.156). If readers find it difficult to identify the correct meaning of the words they encounter when reading, then their meaning construction is likely to be impeded and their reading speed negatively affected; this will then affect their comprehension outcomes (Chang & Hsu, 2011, p.156).

The reflection step in the reading process involves the reader's ability to think critically about the text they have read. It includes analysing and evaluating the content, making connections to prior knowledge, and forming opinions or conclusions based on the material. This phase allows readers to deepen their understanding, engage with the text on a deeper level, and apply what they have learned to real-life situations. Reflection is essential for comprehension and retention of information obtained through reading (Chang & Hsu, 2011, p.156). It also encompasses the reader's ability to engage with the text critically, evaluate the information presented, and draw conclusions based on the text's content and context. It involves not only understanding the literal meaning of the words but also grasping the underlying ideas, themes, and implications conveyed by the author (Tabata-Sandom, 2023).

Reading comprehension in a foreign language is also impacted by reading fluency, which includes rapid, smooth, and automatic reading with little focus on decoding (Meyer, 1999 as cited in Chang & Millett, 2013, p.127). Faster reading rates in a second language may sometimes lead to a decrease in comprehension levels, highlighting the delicate balance between speed and understanding (Cushing-Weigle & Jensen, 1996 as cited in Chang and Millett, 2013, p.127).

Highly linked to motivation, reading in a foreign language often causes anxiety. Therefore, playing on the self-efficacy and security feelings can enhance the quality of the results in reading comprehension. However, it is one of the competences that create the least anxiety compared to speaking or writing (Brantmeier, 2005, as cited in Ro, 2013, p.214). Ro (2013) even elaborates further, by explaining that ER and the

absence of any secondary activities around reading enhance the motivation of the learner. In their case study initially unmotivated, the learner's motivation increased as she found convenience and satisfaction in doing ER. This case study can give an insight on results that could be expected after an experiment on a book reading from home, even if it would not be considered as ER since the students would have to be graded. ER in a foreign language helps students to get more comfortable in reading in a foreign language, Lin (2014) states that to alter learners' misconceptions about reading, many language teachers have introduced extensive reading in their classes (p.48). Results show that subjects exposed to extensive reading achieved significantly faster reading speeds and higher scores on reading comprehension measures (Robb and Kano, 2013). Therefore, we can also expect that after reading books, the comprehension of the students while reading shorter text would be increased.

Reading, as one competence that is graded in the Belgium curriculum, is not the only skill that is evaluated. Writing is another one, that give a lot of anxiety to learners (Brantmeier, 2005, as cited in Ro, 2013, p.214), however, reading improves writing skills when learners read enough. That means that ER is a good way to improve writing (Sakurai, 2017) linked to vocabulary acquisition and writing improvement, book reading is a good way to help students learn a language, create intrinsic motivation and lower their anxiety around a foreign language. Reading is an input that has a high impact on learning languages

Krashen (1989) stated that "Input Hypothesis assumes that we acquire languages by understanding messages" (p. 440). More precisely, he believed that comprehensible input made a significant contribution to language acquisition. Extensive reading materials provide comprehensible and interesting input to language learners. Comprehensible input promotes different aspects of language acquisition, including vocabulary and spelling (Krashen, 1989 as cited in Zhou & Day, 2021, p.104).

Based on those affirmation we can argue that reading is an central competence in learning a language and it needs to be developed in classes in order to help the students.

2.4.2 - Mall and reading in foreign language

When comparing reading on paper and reading on screen and taking into account the level of comprehension of the reader, without looking at if the language in which it is written in a foreign language for the reader or not, the results are the following : in

2011, there was no significant differences on reading performances between paper and screen, however 91% of the readers rather read on paper than on small screens such as the one from smartphones (Holzinger et al., 2011). This is due at the time to some elements such as the lack of effective contextual cues that aid readers in recalling information from memory and searching for specific details (Morineau, Blanche, Tobin, & Guéguen, 2005 as cited in Chen and Lin, 2016, p.554), or any information about how many pages are left to read (Chen and Lin, 2016, p.554). At the time, that information was not available, but nowadays apps have been improved and those problems are not relevant anymore (an example of a reading app is given in the methodological section of this MA thesis, chapter 3.2.2). Problems linked to small screens (like the unavailable options to increase the font size) that existed in 2014 (when Chen and Lin's article was written) have mostly been corrected, and they are not bothering the readers anymore.

When reading on a mobile device, there is only one screen where the text can be, therefore the question of the display is raised, is it better to have the readers scrolling or paging as if they were turning a book page? Sanchez and Branaghan (2011, as cited in Chen and Lin, 2016, p.555) explain that scrolling can attract the attention of the reader on the movement and make them lose their clues about where they were reading, and the location of important information. Furthermore, the loss of attention can lead to a lower comprehension. Reading comprehension is highly linked to sustained attention (Stern and Shalev, 2013).

However, reading online brings many advantages that are only available when using technologies. Useful features such as book searching tools, audio files, and font-size adjustment are available when reading on a smartphone or on a computer (Tabata-Sandom, 2023). If they were not available in 2011 leading to no significant differences between reading on paper and reading on a screen, they can now impact the results. Some applications even offer the ability to set and achieve reading goals (Tabata-Sandom, 2023), this can influence the motivation of the learners, as it was explained in an earlier part of this MA thesis (chapter 2.2.4). Achieving goals impact the self-efficacy feeling and the autonomy of the learners, which are levers for motivation. In their article, Zhou and Day (2021) showed that the motivation to read was increased, no matter how advanced the level of the learners was. The flexibility brought by smartphones is also an advantage that helps decreasing the anxiety linked

to reading in a foreign language, for example, by reading in their bathtub, when they are totally relaxed, students could enjoy some free time while doing something useful and not stress about it (Tabata-Sandom, 2023, p.175). They could also use this time to read, because reading necessitate a lot of time to invest, and when one does not have so much time, smartphones allow to read at any time and from anywhere, without needing the help of a dictionary. In the same case study, they used an application that offered vocabulary help when needed, this enhanced the vocabulary of the readers and helped them to read with less interruptions which usually impact the larger comprehension of the text (Tabata-Sandom, 2023). One can expect that giving help with vocabulary reduces the time spent searching for it on another app or in a dictionary, therefore the concentration on the global meaning is less impacted and the attention is more focused than divided (Garay-Jiménez et al., 2021, p.409-410).

According to Day and Bamford (2002), for students to enjoy reading, the material needs to be easy, meaning it should fall within the learners' comfort zone (Day & Bamford, 2002). For beginners, more than one or two unknown words per page can make the text too challenging, while for intermediate readers, a general guideline is no more than five unknown words per page (Day & Bamford, 2002). Additionally, unlike apps, L1 online reading materials often lack readability level information, making it difficult for students to select appropriate texts (Zhou & Day, 2021), therefore using application to read enhance the probability that the learner will enjoy their reading, since they will find some vocabulary explanations directly on the same application.

Gutiérrez-colón et al (2023) have conducted a meta-analysis about reading comprehension and mobile learning. In their conclusion they state many important aspects of reading comprehension and mobile technologies. The use of mobile devices can enhance L2 reading comprehension by providing a flexible and interactive learning environment. Instructors play a crucial role in using mobile technologies effectively, requiring appropriate training to adapt to teaching methods. The size and features of the screen impact how learners perceive texts, with small screens potentially limiting access to in-depth reading. Mobile devices show favourable results in informal language learning settings, boosting learners' interest and motivation. Blended learning, integrating mobile devices, can enhance L2 reading skills both inside and outside the classroom (p.859 – 861). However, their results and the research articles

that were available rarely contained both ER and MALL, therefore, the question of how one can influence the other is still opened.

Lin's article (2014) presents a program focusing on both ER and Mobile Learning, therefore their results are highly relevant for this review section and will be used to compare with the results that will be analysed in chapter 4 of this MA thesis. Lin (2014) compared two groups, one reading on desktop computers and one reading on tablets (iPads mini). The results were the following: the mobile group outperformed the PC group in time spent, books read, and tests taken in the online Extensive Reading Program. The mobile group showed greater appreciation of the online ERP than the PC group in terms of usefulness, ease of use, and satisfaction. The mobile group achieved higher average scores and outscored the PC group in reading skills tests, including knowledge, comprehension, application, and analysis. Reading on mobile tablets led to better reading achievement than reading on PCs, emphasizing the effectiveness of mobile devices in the online ERP. Significant differences were found between the two groups, with the mobile group spending more time, reading more books, and taking more tests on the online ERP. The study highlighted the importance of mobile devices in enhancing learning outcomes and collaboration in the online ERP, with a focus on mobility and spontaneity offered by mobile devices. (p.53-57)

The integration of MALL further enhances EFL reading comprehension. Mobile devices offer flexibility, interactivity, and features such as vocabulary aids and goal-setting tools, which can boost learners' motivation and engagement. Studies indicate that reading on mobile devices can lead to better outcomes compared to traditional methods, highlighting the importance of technology in modern language education.

Overall, reading is a central competence in language learning that needs to be nurtured in the classroom to aid students' linguistic development. The combination of ER and MALL provides a promising approach to improving reading comprehension and overall language proficiency in EFL learners.

3 - Methodology

3.1 - First experiment

During the academic year spanning 2022 to 2023, I assumed the role of a fifth-grade educator in Belgium, marking my second year within the teaching profession while concurrently undertaking the composition of my master's thesis. My selected research theme focused on mobile learning, with a particular emphasis on investigating reading comprehension among students acquiring a foreign language. Following preliminary investigations, my interest peaked around exploring the aforementioned topic, prompting the conceptualization of an initial experimental framework aimed at elucidating its practical implications, logistical requirements, and methodological considerations.

The group consisted of 22 pupils, whose second foreign language was English, following Dutch as their first foreign language. Their education focused on the sciences, with aspirations to pursue careers in medicine, physics, mathematics, or engineering. While English was not their primary academic focus, they demonstrated considerable enthusiasm for learning it, especially during classroom interactions, though they showed less commitment to extracurricular assignments. Despite my being their second teacher that academic year, their engagement remained steady, albeit with a reduced dedication to homework outside of class.

In preparation for the experimental intervention, I decided to allocate an extended timeframe for students to engage with a prescribed book, thereby reducing the risk of discovering that pupils did not complete their assignment after 8 weeks. This decision was predicated upon a pragmatic consideration aimed at fostering a conscientious approach of the pupils towards the assignment while accommodating their diverse learning needs and preferences and ensuring that they would be able to work on everything correctly. The experimental design encompassed an eight-week duration, positioned between successive academic breaks, with each student tasked with reading a designated book of approximately eighteen chapters, each one two to three pages in length. To facilitate seamless engagement, I devised a structured format Google Forms, enabling students to access chapter-specific queries, when necessary, thereby promoting flexibility and accommodating individualized reading paces.

In the absence of prior empirical insights into motivational dynamics, I did not offer students a choice in selecting their reading material, a decision influenced by a too

narrow comprehension of motivational psychology. Concurrently, I devised supplementary activities aligned with the book, including related media content, such as an episode of the Sherlock Holmes Series that came out in 2011, to deepen student engagement and contextual understanding. Despite these preparatory measures, initial implementation revealed a disparity in student progress, with notable variances in reading pace and completion rates. Some of the pupils finished the reading in under two weeks whereas some of them waited until the last week to complete the experiment. Subsequent reflections highlighted the need for a more refined experimental protocol in the ensuing academic cycle, necessitating adjustments to optimize data validity and instructional efficacy.

Foregoing progress assessments, I abstained from active intervention throughout the experimental period, thereby preserving the integrity of collected data and mitigating potential biases due to unwanted facilitation. Nonetheless, logistical constraints and unforeseen circumstances, including my contract termination, compromised the conclusive execution of the experiment, more precisely the collection of their full opinion and feelings about the experiment and the reading.

In the subsequent pages the precise organization of this preliminary experiment will be explained as it served as a framework on which the final experiments were developed. First the question of the groups will be dealt with, then the question of the integration of the book within the curriculum and academic year's objectives. Subsequently, a concise examination of the feedback gathered from student participants, useful in perfecting subsequent experimental protocols, will be undertaken.

The first element to determine was the creation of the groups aiming at ensuring both representativeness within the class and broader alignment with the general proficiency levels characteristic of fifth-grade, second foreign language learners (FL2). One viable approach was to randomly pick the pupils, a method often regarded as optimal to avoid any bias when creating an experiment. This is called a group randomization. (Bhattacharjee, 2012) Randomization confers heightened reliability to experimental outcomes, particularly when the participant sample size is sufficiently large, as it serves to equate group characteristics, thereby engendering comparability akin to that achievable through studying the entire population (Bhattacharjee, 2012). It is however not possible to study all the 5th grade pupils of Belgium and that's why

groups need to be made. To give an example of how randomization allows a group to be representative, consider the scenario wherein various socio-economic, cultural, or familial factors may impede equitable access to educational resources, such as technology or academic support services. If enough students are randomly allocated in the control and the experimental groups, then the likelihood of encountering diverse socio-demographic profiles within each group is enhanced enough to ensure that the groups are representative. Crucially, randomization ensures that the observed outcomes of the experiments are solely due to the treatment and not to any outside variables that would have created a bias within the dataset (Bhattacharjee, 2012). Notably, some biases may elude detection, given the number of personal attributes that may not be systematically accounted for by researchers.

However, in the context of a single class division into two groups, randomization does not appear as the most representative approach to create groups. The reason for this decision is due to the size of the group. With a class of 22 pupils, which is not fully representative of the broader Belgian student demographic, the subdivision further compromises group representativeness as one cannot consider 11 pupils to be representative of a country. Nevertheless, given the logistical constraints inherent in the trial experiment, which was confined to a single class during the 2022-2023 academic year, randomization constituted the sole feasible approach for group allocation. An additional explanation pertains to the limited familiarity with the students' reading proficiency levels upon commencement of the initial experimentation, because of the recent departure of their first English teacher. It would have been harder to create two groups representative of the level of the class than letting random selection create the groups.

The resultant groupings were structured as follows: the first group comprised 11 pupils, consisting of 7 males and 4 females, while the second group encompassed 11 pupils, comprising 6 males and 5 females. To ascertain the efficacy of randomization, the students' grades in reading comprehension were subjected to a t-test analysis. The t-test yields a p-value ranging from 0 to 1, wherein a value below 0.05 signifies statistical significance, indicating a substantive difference between the groups. In the present case, the calculated p-value was 0.763652626340533 (Fig. 3.1), indicative of a lack of statistically significant divergence between the two groups, thereby affirming the adequacy of the initial randomization procedure.

Figure 3.1, calculated P value of the groups (first experiment)

```
1 # -- coding: utf-8 --
2
3 from scipy import stats
4
5
6 sample1 = [12,12,11,16,10,11,13,11,15,17,15]
7 sample2 = [10,11,17,18,10,16,10,13,11,14,17]
8
9
10 t_statistic, p_value = stats.ttest_ind(sample1, sample2)
11
12
13 print("Test statistic:", t_statistic)
14 print("p-value:", p_value)
```

Python 3.11.2 (main, May 3 2023 04:00:05)
Type "help", "copyright", "credits" or "license" for more information.
>>> # script executed
Test statistic: -0.30481997123947474
p-value: 0.763652626340533
>>>

Doing this calculation was a necessary step into ensuring that the base of the experiment was fair. It was also necessary to estimate the impact of the experiment and evaluate how efficient it was. The difference between the two T-test (the one made at the beginning and the one made at the end is also a way of showing how important the impact of the experiment was on the student.)

The question of including this experiment into the Belgian curricular was important, as a teacher one is expected to follow the curriculum and teach a class following different “UAA” (Unité d’Acquis d’Apprentissage). Inside those UAA, 5 major competences are targeted: Listening Comprehension, Reading Comprehension, Written Expression, Oral Expression Without Interaction and Oral Expression with Interactions. This first experiment was mostly based on Reading and then Listening (with the series) but a last part of the work made around the experiment was to make the student create and film their own detective scene. The Goal at the time was to mobilize as many competences as possible. The experiment as exposed earlier was the most important part and the only one that could be done before my departure of the school. Because of my early departure there won’t be any feedback, nor any analyse of the results in this presentation of this first project conducted for this master

thesis. One thing should still be noted, mixing so many competences and creating a full unit around this project granted at least 20 hours in class for all this. With 4 hours a week, this means that the unit would have taken 5 weeks, had it been fully completed. In the case of the 2023-2024 school year, I was teaching in a school that was not based on exams taken in December and June but on continuous assessment, therefore it was mandatory to grade each competence three times every year and a five-week program was interfering with the number of evaluations necessary to complete the curriculum. Furthermore, the range and variety of data linked to the unit would have been too much to work on for this master thesis, therefore it was decided that the experiment would be centred on Reading Comprehension.

To ensure their comprehension and to be in adequation with the curriculum, the book chosen was adapted to their English level. In this case the book was written using a B1 level. It was adapted from one of the Sherlock Holmes cases called *The Hound of the Baskervilles*. This case was selected because it was also adapted in the series. The book was 22,861 words long divided in 18 chapters. There was no picture inside it to help the pupils. No vocabulary was given in the paper version while the group reading on smartphones using the Google Book app could click on the words and get a definition without changing apps. This was seen as one of the major variables between the two allowed medias.

The pupils had time to share their thoughts on the project, even though they couldn't complete the full project and had only finished the reading part. Out of 22 pupils, 15 had read the book completely, 5 read around half of the book and 2 did not open it. No link could be found between the media and the reason why they would not finish or read the book. Only 8 pupils shared their thoughts about the reading, as they could not know that I was not going to come back in January. Out of the 8 pupils, 5 had read on their smartphones, 3 had read the books. From what I gathered, they liked the idea of reading on their smartphones, but would also say that they would forget the homework more easily without the object to remind them that they had to read for their English class. 1 pupil said that they did not like reading on her smartphone because she would get too distracted with the notifications. 1 pupil, suffering from dyslexia, explained that it was the first time they could fully read a book without being tremendously tired, thanks to the changes in the size of the font and to the fact that he could click on the words and have definitions. 5 did not like reading and were not really

motivated by the book, but recognized they enjoyed reading in English more than in French, because they would only read in French for their French class, and they did not like the themes of those books. They expressed their need to choose what they were reading. They also explained that a grade for their engagement in this task would have been a great way to finish the project, they were sad that this reading could not count for their final school report.

All in all, this first experiment was useful to create a base and make decisions during the 2023-2024 school year. Many changes were brought for the second round of experiments, though one of the major ones was not voluntary: a change of school and of students.

3.2 - 2023-2024 Final experiments

3.2.1 - Presentation of the general context

During the 2023-2024 school year, I taught three different learner groups. The first group was comprised of first-grade students, aged between 12 and 13 years old, who were in their initial year of learning English. In Belgium, Dutch is introduced as the second language in primary school, so these students had no prior exposure to English. This was the primary reason this group was not selected for the experiment; the students were too young and inexperienced in learning English. Research indicates that autonomy in students under 15 years old is more challenging and less beneficial (Linca & Matei, 2023). Additionally, their A1 proficiency level made it difficult to find suitable books that met the experiment's parameters. Books at this level are typically illustrated, and the students would require more than two weeks to read even the shortest book of 20 pages. Therefore, this group was excluded from consideration as potential subjects for the experiment. In Figure 3.2 the level to be reached in English during the first year, based on the Belgian curriculum is shown.

Figure 3.2 : CECR level based on the Belgian curriculum first degree

	Continuum pédagogique	
	Cycle 4	1 ^{er} degré commun
	cours 2H	LM1 4H
CA	A1 (+)	A2 (-)
CL	A1 (+)	A2 (-)
EE	APPRENTISSAGE A1 (+) mais NON CERTIFIABLE	A2 (-)
EOEI	A1 (+)	A2 (-)
EOSI	A1 (+)	A2 (-)

The second group considered for the experiment consisted of third-grade students, who were beginning their third year of learning English. According to the curriculum for Langue Moderne 1 (first modern language, hereafter LM1) at the second degree (third and fourth grade), students are expected to achieve a B1- level in reading (See figure 3.3). This proficiency level allowed the selection of books without extensive illustrations, as the presence of images would introduce additional variables that could skew the data. For instance, it would be unclear whether comprehension was achieved through text or images, or if the pictures sufficiently supported vocabulary understanding. (See figure 3.2 and 3.3)

Figure 3.3: CECR level based on the Belgian curriculum. 2nd & 3rd degree

Transition								
	LM1 4h		LM2 4h				LM3 4h	
	2 ^o degré	3 ^o degré	2 ^o degré		3 ^o degré		3 ^o degré	
			GERMANIQUES	ROMANES	GERMANIQUES	ROMANES	GERMANIQUES	ROMANES
CA	B1 (-)	B1 (+)	A2 (+)	A2 (+)	B1 (-)	B1 (+)	A2 (+)	B1 (-)
CL	B1 (-)	B2 (-)	A2 (+)	A2 (+)	B1 (-)	B2 (-)	A2 (+)	B1 (-)
EE	B1 (-)	B1 (+)	A2 (+)	A2 (+)	B1 (-)	B1 (+)	A2 (+)	A2 (+)
EOEI	B1 (-)	B1 (+)	A2 (+)	A2 (+)	B1 (-)	B1 (-)	A2 (+)	A2 (+)
EOSI	B1 (-)	B1 (+)	A2 (+)	A2 (+)	B1 (-)	B1 (-)	A2 (+)	A2 (+)

The last group was a 5th grade group, in which the reading comprehension level has to reach B2- at the end of the year. Just like in the 3rd grade, this group has 4 periods of 50 minutes in English per weeks, which means three hours and a half of English. They had all be learning English for four years and it was the beginning of the fifth year for them.

Parental consent was required for students to participate in the experiment. Consent forms were distributed early in the year, allowing parents time to contact me with any questions regarding the project, the data to be collected, or data handling procedures. The authorisation letter is included in appendix 7.1. All parents signed the consent form, and no emails were received with inquiries. During a regular parent-teacher meeting, the mother of student G.2.7.3 inquired about the project and expressed disappointment that her child had not participated in the first reading session. She believed the project was an excellent opportunity to encourage her child to read and enjoy reading. This feedback highlighted the parental perspective on the experiment and their hopes for their children's reading development.

To ensure student anonymity, a specific coding pattern was used. The codes followed this format: “G.1.1.3, G.1.2.3, G.1.3.3 ...” and “G.2.1.3, G.2.2.3, G.2.3.3 ...” and “G.1.1.5, G.1.2.5 ...” and “G.2.1.5, G.2.2.5 ...”. Here, “G” denotes the group. Each class had two groups; hence, the first number indicates if the student is in the first or second group of the class. “G.1” represents a member of the first group, and “G.2” represents a member of the second group. The second number identifies the student based on alphabetical order. For example, “G.1.1” precedes “G.1.2” in the class's alphabetical list. The final number indicates the student's grade: “G.1.1.3” is in the third grade, whereas “G.1.1.5” is in the fifth grade. To clarify, consider an example with hypothetical names: in Figure 3.3, Charlotte’s anonymised identification number is G.1.1.3 because she is in the first group, first in alphabetical order, and in the third grade.

Figure 3.3: example of anonymisation.

First group (3 rd grade)	Second group (3 rd grade)
Charlotte -> G.1.1.3	Antoine -> G.2.1.3
François -> G.1.2.3	Sophie -> G.2.2.3
Matthieu -> G.1.3.3	Thomas -> G.2.3.3

The experiments were set like this: Each class would be divided into two groups. One control group would read on paper and one treatment group would read on their smartphones.

3.2.2 - Application used

The application that was used for the experiment is “PLAY BOOK”. It is available on different Appstore and on all kind of smartphones (android and IOS systems). Therefore, it was selected, since all the students would be able to use the same application to read the books and that would not create a bias in the data that was collected. It is also a free application, where students could add their own files, and therefore access free files that were sent by the teacher.

The following features were available with this application, in order to help the students to read (see appendix 7.5 to compare the description with pictures of the application): the E-book were interactive with the possibility to customize text: Users can adjust font size, background colour, and text spacing to suit their reading preferences, aiding in reducing eye strain and improving readability. There was also a built-in dictionary that offered Instant access to word definitions and translations helps learners understand unfamiliar words without interrupting their reading flow.

Students could track their progression, highlight text and make notes, enabling them to keep and review important information. The application tracks reading time, pages read, and how many pages are left before the end of the books, compensating for the absence of a physical book which helps to visualize where the reader is situated in the story.

3.2.3 - 3rd Grade

In the third-grade class, there were 18 students aged between 14 and 18 years old, with 6 boys and 12 girls. Some cases were particularly interesting and warrant detailed examination due to their potential impact on reading comprehension within unusual contexts. For example, student G.2.5.3 is a refugee learner from Ukraine. She arrived two years ago and attended a French as a foreign language adapted school before joining a typical French-speaking school in Belgium. Student G.1.9.3 joined the school in January from Portugal and refused to attend the school for French learners. She did not speak French or English, and her engagement in class was nearly non-existent. Student G.2.3.3 was at risk of academic disengagement and potential

dropout. Student G.2.2.3 was diagnosed with severe ADHD, significantly affecting his classroom behaviour and learning methods. Student G.1.8.3 had already failed the third grade twice and was approaching 18 years old. Despite this, his engagement in English class was excellent, with an English comprehension level around B2+.

Despite these unique profiles, the class was representative of typical Belgian classrooms, where students commonly repeat one or two years during their schooling.

Dans l'enseignement secondaire, est considéré comme « redoublant » tout élève qui est inscrit deux années scolaires successives dans la même année d'études (...), la courbe du taux de redoublants est en nette augmentation pour les élèves qui fréquentent une deuxième. Ce taux s'élève à 15,7 % en 2018-2019. Les troisième, quatrième et cinquième année de l'enseignement ordinaire secondaire présentent des taux de redoublants importants. Les taux les plus élevés concernent la S3, ils varient au cours de la période autour de 20 %. Les taux de redoublants plus bas, en S6 (6 % en 2018-2019) peuvent entre autres être liés aux abandons en fin de parcours (décrochage scolaire, arrivée à l'âge de la majorité et donc fin de l'obligation scolaire, choix de l'enseignement en alternance ou de promotion sociale).¹ (Fédération Wallonie Bruxelles, 2020)

It is also not mandatory to speak the official language of the school to attend it. Socio-economic status data for the students was unavailable, as the school did not permit the collection of information on parental education or occupation. Consequently, economic status was not a variable in this experiment. Two groups were created based on their initial reading comprehension levels (figure 3.4). Gender and specific profiles were not considered in group formation; only their proficiency levels determined group placement.

Figure 3.4: Groups based on their basic level

Group 1	basic level	Group2	basic level
G1.1.3	90	G2.1.3	45
G1.2.3	80	G2.2.3	60
G1.3.3	77	G2.3.3	42

¹ In secondary education, a 'repeater' is any pupil who is enrolled for two successive school years in the same year of study (...), the rate of repeaters is rising sharply for pupils attending a second year. This rate is 15.7% in 2018-2019. The third, fourth and fifth years of ordinary secondary education have high repetition rates. The highest rates are in S3, varying over the period at around 20%. The lower repetition rates in S6 (6% in 2018-2019) may be linked, among other things, to pupils dropping out at the end of their course (dropping out of school, reaching the age of majority and therefore the end of compulsory education, opting for sandwich courses or social promotion).

G1.4.3	22	G2.4.3	52
G1.5.3	68	G2.5.3	53
G1.6.3	37	G2.6.3	73
G1.7.3	85	G2.7.3	52
G1.8.3	80	G2.8.3	92
G1.9.3	No Grade	G2.9.3	70
average	67,375	average	59,88888889
stand. dev.	24,54114621	stand. dev.	15,88587773

Figure 3.3 presents the results and distribution of the groups. Although the averages differed by eight points, the high standard deviations indicated that the groups were comparable. Student G1.9.3 had no grade yet because they arrived after the initial reading comprehension test. This student, who did not speak any English, was included in the test to maintain consistency, but their results were likely not representative and thus excluded from the final analysis.

As discussed in section 2.2 on Motivation, allowing students to make choices enhances motivation and engagement in the learning process (Linca & Matei, 2023). Furthermore, most of the ER principles were kept in order to ensure that the positive effect linked to ER would also appear in the experiment. Choice is one of them (Day & Bamford, 2002). If not all the principles of ER are relevant to this master thesis, they are still interesting to know in order to get most of them into the experiment and use their known effect in our favour. Day and Bamford (2002, p.137-141) describe 10 ER principles as follows:

1. The reading material is easy.
2. A variety of reading material on a wide range of topics must be available.
3. Learners choose what they want to read.
4. Learners read as much as possible.
5. The purpose of reading is usually related to pleasure, information, and general understanding.

6. Reading is its own reward.
7. Reading speed is usually faster than slower.
8. Reading is individual and silent.
9. Teachers orient and guide their students.
10. The teacher is a role model of a reader.

Some principles could not be followed or not completely like principle number 2 (only 4 books were available each time, and only one after the vote), principle number 5, since the readings were graded and therefore principle number 9 could also not be followed: in this experiment, the teacher did not guide the students in order to keep the data as representative as possible.

Therefore following an arranged version of principle 2 and 3, students were given the opportunity to vote online for the book they would read. They had one week to read the following summaries:

Book 1, The No.1 Ladies Detective Agency by Alexander McCall Smith. Total words: about 13,780.

Mma [Mrs] Precious Ramotswe is a kind, warm-hearted - and large - African lady. She is also very unusual. She is the only lady private detective in Botswana and her agency. The No. 1 Ladies' private detective Agency, is the best. With the help of her secretary, Mma Makutsi, and her good friend Mr JLB Matekoni, she solves a number of difficult - and sometimes dangerous - problems. A stolen car, a missing finger or a missing husband - Mma Ramotswe will solve all these mysteries in her own special way.

Alexander McCall Smith lived in Botswana for some time, working on criminal law. He loves writing about Africa, and African people. His stories are always full of colour and life. One day he saw a fat Botswana lady running after a chicken for a meal. She gave him the idea for Mma Precious Ramotswe. Today the stories about Mma Precious Ramotswe who is first private detective are popular all around the world.

Book 2, Rainman by Barry Morrow, Total words: about 11,000.

Charlie's father died. The son is sure that he will receive all his wealth in inheritance. His father is a millionaire, and this money would change the life of a young businessman. But this does not happen. Charlie's brother receives the money. It is unexpected, as Charlie did not even know about the existence of his brother. It seems to Charlie unfair. Charlie's brother is not like other people. He has autism and lives in a hospital for the mentally ill. The young man decides to take his brother from the hospital and convince to give half the money to him. Charlie's brother is a brilliant mathematician. At the same time, he has the mind of a small child. He lives in his fictional world and is terrified of flying airplanes. As a result, the brothers make a car trip through the whole country.

Book 3, The curious case of Benjamin Button by Francis Scott Fitzgerald, Total words: about 6,860.

Benjamin Button is a very strange baby. Born with a white beard, he looks like his grandfather. As the years pass, he seems to get younger. This brings all kinds of problems, for him and the people around him. In the story by the great American writer F. Scott Fitzgerald, people are not always as they seem.

Book 4, Persuasion by Jane Austen, Total words: about 17,250.

Not many people are interested in Anne. She is the quiet second daughter of Sir Walter Elliot and lives in Somersetshire with him and her sister, Elizabeth. She has only one good friend. Lady Russell.

Years ago, it was different. Then, Frederick Wentworth loved her, and she loved him. But Frederick went into the navy and went away...

When his sister and her husband move to Somersetshire, Frederick visits them, and stays, and Anne must meet him. Now, he is different: he is an important man, the captain of a ship. Will he remember her? Does he love her? Or must Anne forget him - again?

Students had one week to read the summaries and vote online for their preferred book. The variety of genres—crime fiction, romance, adventure—ensured diverse choices. However, the lack of timely responses indicated a lack of motivation, suggesting that preparatory activities might have been necessary before the experiment. The final vote took place in class, allowing students to debate their choices. Figure 3.4 shows the voting results, with Rain Man selected as the first book. The other books were less favoured, and students requested the teacher to choose the second book.

Figure 3.4: Vote results. Book 1. 3rd grade



The second book chosen was *The Lost World* by Arthur Conan Doyle. It was shorter (around 8,500 words) to accommodate the students' workload as the end of the year approached.

At the beginning of the 1900s the whole world has been explored. There is nothing left to discover. But maybe this is not totally true. The eccentric Professor Challenger says that there is a place where time stopped, where dinosaurs still live. All the other scientists do not believe him. So, Professor Challenger decides to lead an expedition to this prehistoric world located in the middle of the great Amazon forest. With this fantastic adventure, Arthur Conan Doyle, the creator of Sherlock Holmes, showed that he could also write great science fiction. *The Lost World* has also inspired some of the most popular films of recent years, including *King Kong* and *Jurassic Park*.

For both books, they had 3 weeks in total, at least one of the three weeks was during the holidays so that they would not have the excuse of time not to answer the forms. The pupils were aware of their participation to this experiment and knew that the readings would be graded, and the grades would be visible in their school report at the end of the year. It was a question at the beginning of the year while the experiment was built: should those reading be graded? After reflexion and after talking with the students, it seemed fairer to give them a grade for the time they invested in this work. It should be rewarded with points, furthermore, it would enhance the participation of the students to the readings. However, to ensure equality of the final grade, and be sure that the mean used to read (paper or a smartphone app) would not influence the grades, only one average grade made of the results of the two readings would be kept, this would certify that the device used to read had no effect on the final grade in the school report.

At the end of both readings, not all the students had given answers to the forms, therefore, some of them were excluded from the data collection. Figure 3.5 is the representation of the final groups that were used to compare the data. We can see that at this point the groups are not beginning at the same level, and the results will therefore not be comparable between group 1 and group 2 for the 3rd grade.

Figure 3.5: representation of the final groups. 3rd grade.

élève 3e	Grp 1 niv base	élève 3e	Grp 2 niv base
G1.4.3	22	G2.1.3	45
G1.5.3	68	G2.4.3	52
G1.3.3	77	G2.7.3	52
G1.2.3	80	G2.2.3	60
G1.8.3	80	G2.9.3	70
G1.7.3	85	G2.6.3	73
G1.1.3	90		
moyenne	80,00	moyenne	58,67
ecartype	7,46	ecartype	11,06

3.2.4 - 5th grade

In the fifth-grade group, there were initially 17 pupils, reducing to 16 by the end of the year due to one student, who had studied in the USA, moving back to the fourth grade and thus not participating in the second reading. The group comprised 8 girls and 8 boys. Some profiles were particularly noteworthy for a potential qualitative study. For instance, student G.2.6.5 who has autism, was well-integrated into the class and had a higher English proficiency than the rest. Student G.1.1.5 had an A2 level in English, and student G1.8.5 who did not speak English at all, left school after the first reading, being already 19 years old. Student G.1.6.5 has dyslexia and struggled with reading full books but was motivated by the challenge of reading in a foreign language.

This class, like the third-grade group, represents typical Belgian classrooms. The experiment was set in an ecological situation rather than an experimental design, enhancing the representativity of the results. This setup reflects the realities any teacher might face, with students having special needs and varying capacities within the same grade.

In Figure 3.6, the distribution of the groups is shown. The groups were balanced in terms of averages and standard deviations at the start of the experiment.

Figure 3.6: Balance between the groups. 5th grade

5e	Grp 1 basic lvl		Grp 2 basic lvl
G1.1.5	50	G2.1.5	80
G1.2.5	83	G2.2.5	90

G1.3.5	80	G2.3.5	80
G1.4.5	55	G2.4.5	85
G1.5.5	55	G2.5.5	50
G1.6.5	75	G2.6.5	50
G1.7.5	70	G2.7.5	85
G1.8.5	50	G2.8.5	40
G1.9.5	93	average	70
average	67,88888889	stand. dev	18,54049622
stand. dev	15,94086293		

Students had the choice between four different books for the first reading. They had one week to read the summaries and vote online. Due to low initial participation, the vote also took place in class, revealing a lack of motivation as most students had not read the summaries beforehand. To this one I added the option “blank vote” as the vote happened after the one of the 3rd grade who explained that they would have liked to have the option.

Figure 3.7: Vote results. Book 1. 5th grade



The selected book, *Sherlock Holmes the sign of four*, was 12 000 words long and the indicated level was B2. Here is the summary of the book.

Several years after the mysterious disappearance of her father, Mary Morstan discovers an advertisement in a local paper requesting her own address. Her employer advises her to reveal it, and when she does, she receives a valuable pearl by post. Presented with these facts and little else, Sherlock Holmes and Dr. Watson must unravel a mystery involving stolen treasure, political rebellion, India, and a pact made by four convicts, in Arthur Conan Doyle's second Sherlock Holmes novel.

From what I heard; they only chose it because it was the shortest book available in the list. This means that the content or the genre was not their centre of interest and rather how long they would have to spend on reading the book. After the first book, they also decided not to vote for the second book (this time no one had voted on the due date, so I selected the book myself.) The second book they read was *City of lights* by Tim Vicary and had around 8000 words. Here is the summary.

Cathy and Helen, two astronauts, and Mary, a reporter, are making the first flight on Space Bird One, NASA's new spaceplane. They are going to the Moon. The flight goes very well until Mary sees a UFO — then everything begins to go wrong.

I selected this book to completely change the genre and also because the last unit was based on science fiction, and it felt totally connected to the unit and to the final written test that they had to do. The book was also chosen in order to raise the percentage of participation to the reading while respecting the experiment.

Participation was a major concern for this group. For the first reading almost all the students answered the google form, but there was a majority of cases where the students cheated and just answered the same thing as someone who had read the book and shared their answers. This was easily visible after while correcting the forms. 10 forms had the exact same order of answers, it was mostly visible when they were wrong or when they had to be justified. A further explanation of this event will be done in the results section. In Figure 3.8 the results of the participation after the two readings are visible. As indicated, no one cheated for the second reading, some preferred not to answer at all.

Figure 3.8: final number of participants per group and reading

5e	Grp 1 basic lvl	G1 read 1 s	G1 read 2 B		Grp 2 basic lvl	G2 read 1 B	G2 read 2 S
G1.1.5	50	cheat	71,11	G2.1.5	80	cheat	/
G1.2.5	83	cheat	/	G2.2.5	90	93,75	71,11
G1.3.5	80	cheat	86,66	G2.3.5	80	78	64,44
G1.4.5	55	54,16	73,33	G2.4.5	85	82,48	80
G1.5.5	55	62,5	/	G2.5.5	50	cheat	/
G1.6.5	75	cheat	88,88	G2.6.5	50	83,33	64,44
G1.7.5	70	68,75	64,44	G2.7.5	85	cheat	/
G1.8.5	50	cheat	/	G2.8.5	40	cheat	/
G1.9.5	93	cheat	68,88				
average	67,88888889			average	70		
stand. Dev	15,94086293			stand. dev	18,54049622		

“G1 read 1 S” and “G1 read 2 B” means that this is the first group. They did the first reading on their smartphones and the second reading on paper. To use the data correctly, all the cheaters had to be removed, therefore only very few students remained. In Figure 3.9 the final groups, and the data that will be used in the result section is visible. As explained in the description for the 3rd grade, only those who participated correctly were taken into account for the data collection, therefore, it lowers drastically the number of participants to the experiment.

Figure 3.9: Readaptation of the groups

5e	Grp 1 niv base	G1 lec 1 S	G1 lec 2 L
G1.1.5	50		71,11
G1.3.5	80		86,66
G1.4.5	55	54,16	73,33
G1.5.5	55	62,5	
G1.6.5	75		88,88
G1.7.5	70	68,75	64,44
G1.9.5	93		68,88
moyenne	68,29	61,80	75,55
ecartype	15,72	7,32	9,94

	Grp 2 niv base	G2 lec 1 L	G2 lec2 S
G2.2.5	90	93,75	71,11
G2.3.5	80	78	64,44
G2.4.5	85	82,48	80
G2.6.5	50	83,33	64,44
moyenne	76,25	84,39	69,9975
ecartype	18,93	6,66	7,37

3.2.5 - Presentation of the Google forms

The comprehension was tested on google forms. This type of formular were chosen, as they were online, available at all times, and free to use for both the students and the teacher. It was also easier to ask them to use forms since they had an email address for the school using the google system (Gmail). For three books out of the four, there were chapters inside the books. One form was created per chapter so that they would get the opportunity to read one chapter, stop their reading and answer the forms without forgetting anything in between. This was also made to help them in their comprehension. Each chapter was at least partly corrected automatically. If the students had difficulties understanding the chapters, they could complete the forms, and check their understanding before going on with the reading and hence ensure that they had correctly understood the previous chapter, as a basis for the following one. The goal was that the tests would not only test their comprehension but also help them to read the rest of the book. An example of a google forms can be found in Appendix 7.2

One Google form was different (Appendix 7.2). For the book *City of lights*, there was not any chapters to create the forms, and as the students were reading on smartphone and in the book, they could not use the same page numbers as references, therefore, only one google form was made for the whole book. The students did not express any discomfort for this, and the date of the forms' submissions give an explanation to why they did not complain. Figure 3.10 displays the time and date of submissions for the forms on *Rainman*, highlighting that students often completed all forms simultaneously, usually during periods when a teacher was absent.

Figure 3.10: Submissions grid, 3rd grade.

Rainman, chapter one	Rainman chapter three	Rainman chapter four		Rainman chapter two
16/02/2024 10:27:08				23/02/2024 15:49:44
20/02/2024 12:33:57	20/02/2024 12:39:39			23/02/2024 18:31:57
20/02/2024 18:10:54				23/02/2024 19:30:45
20/02/2024 19:07:24	20/02/2024 19:23:58	20/02/2024 19:28:31		23/02/2024 21:37:57
	21/02/2024 18:24:03			23/02/2024 23:41:35
	21/02/2024 18:25:40	21/02/2024 18:30:41		25/02/2024 15:47:10
	23/02/2024 09:48:43	23/02/2024 09:55:09		25/02/2024 16:58:02

23/02/2024 17:55:22	23/02/2024 18:01:17		27/02/2024 10:02:22
23/02/2024 18:33:58	23/02/2024 18:01:52	23/02/2024 18:04:49	15/03/2024 14:16:42
23/02/2024 21:11:39	23/02/2024 18:41:47	23/02/2024 18:46:00	
	24/02/2024 16:09:30	24/02/2024 17:52:34	
25/02/2024 14:41:24	25/02/2024 15:01:57	25/02/2024 14:45:14	
25/02/2024 14:50:21	25/02/2024 15:48:36	25/02/2024 15:07:43	
25/02/2024 14:54:41	25/02/2024 17:12:36	25/02/2024 16:10:34	
25/02/2024 17:06:49			
	26/02/2024 19:38:32	26/02/2024 19:34:19	
15/03/2024 13:46:21	15/03/2024 13:48:08	15/03/2024 13:52:14	

The usefulness of the different forms can therefore be discussed. The use of multiple forms per book had some drawbacks. Some students missed forms, leading to inconsistent responses. For example, only nine responses were registered for the second chapter of Rainman, compared to twelve for the first chapter, fourteen for the third, and eleven for the fourth. This indicates that the number of forms might have been seen as a complication. In contrast, having only one form for City of Lights simplified the process, and students' comprehension did not suffer. The intention to support their reading by creating multiple forms, which would check their understanding of the chapters and give them feedback was a bit lost with this use of the forms.

Form submission times also helped identify cheating. For instance, simultaneous submissions by students not from the same group indicated potential collaboration (see figure 3.11). Such instances were excluded from the final data to maintain accuracy.

Figure 3.11: identifying cheating thanks to submissions.

	The sign of four chapter 1 and 2	The sign of four chapter 3 and 4
G.2.1.5	25/03/2024 13:03:31	25/03/2024 13:06:38
G.1.9.5	25/03/2024 13:03:39	25/03/2024 13:06:39

As the students were not from the same group, worked in pairs, answered to the forms in pairs, and as it's highly probable that only one of them had read the book the data

has to be erased. In this case it was highly evident, and it did not take many hours to realize, but in some other case, the cheating evidence were slower to appear.

It was decided that the google forms would be mainly based on multiple-choice questions (MCQ), therefore, the data would be easier to gather and the correction of all the forms would go faster. However, when one event in the story was too complex to be reduced to an MCQ, the students had to explain in their own words what happened thus it can be argued that their comprehension was already helped by the MCQ options. Most of the MCQ had more than three answers so that the probability of them just picking one out of the others and being right was lower. The options were also based on the text and only some details could be changed between different possibilities to ensure that their comprehension was deep enough to get the important details out of the story.

3.3 - Qualitative Study

Due to the impact of student participation on the quantitative study results, a qualitative study was conducted to gain deeper insights into the students' experiences and feelings about the experiment. Data was collected using a feedback form printed on paper, which students had 50 minutes to complete in class. The two-page form, found in Appendix 7.3 primarily utilized a Likert scale.

A Likert scale is a psychometric scale commonly used in questionnaires to measure attitudes or feelings across a continuum of responses. Typically, it includes a range of options such as "strongly disagree," "disagree," "neutral," "agree," and "strongly agree" (Bhattacharjee, 2012). This format allows for capturing the degree of agreement or disagreement with a given statement, providing nuanced data on the participants' perceptions.

Figure 3.12 shows an example question from the feedback form. Alongside the Likert scale, space was provided for students to justify their answers, offering more detailed insights beyond the numerical analysis.

Figure 3.12 : Example of questions taken from the feedback form.

J'ai lu le livre. Si non, pourquoi?

Pas du tout, je ne l'ai pas ouvert	Quelques chapitres puis je me suis arrêté	J'ai tout lu.
------------------------------------	---	---------------

J'ai apprécié le livre.

1 – Non, ça ne m'a pas plus du tout	2 – Un peu, mais j'ai dû un peu me forcer à finir	3 – Moyen, j'ai aimé certains passages et d'autres moins	4 – plutôt oui, J'ai bien aimé le livre en général	5 – Oui, J'ai adoré le livre
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J'ai apprécié lire sur mon smartphone.

1 – Non, ça ne m'a pas plus du tout	2 – Plutôt non, mais j'ai dû un peu me forcer à l'utiliser	3 – Moyen, je n'ai préféré ni l'un ni l'autre	4 – plutôt oui, j'ai aimé lire sur mon smartphone	5 – Oui, j'ai adoré lire sur mon smartphone
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Pourquoi ?

After gathering the papers and reading them, I could collect the number of answers for each book (the students had to answer twice to the same questionnaire, one for each reading.) The answers were then gathered in an excel sheet to be analysed in the result section. In figure 3.13 is an example of how the results will be presented in the result section. On top, written in Bold, is the question that was asked to the students, then the possible answers going from one to five as the highest answer possible. The first line of answers was gathered in the 3rd grade, and the second line of answers was gathered in the 5th grade. In figure 3.13, B1:2 B2:2 means that for Book 1, two persons selected this answer, for Book 2 two students selected this answer, however it is not mandatory that it was the same students who checked it for both books. In this case it can be 2 to 4 students who checked this answer. The coloured cell is the cell with the most answers, in this instance, 10 students in the 3rd grade had completely read the first book, and 8 had read the second book.

Figure 3.13: presentation of the qualitative results.

2 J'ai lu le livre / I read the book			
	1 (non, pas du tout)	2 (quelques chapitres)	3 (oui, j'ai tout lu)
3 rd	B1:2 B2:2	B1:3 B2:5	B1:10 B2:8
5 th	B1:2 B2:2	B1:1 B2:2	B1:12 B2:10

Out of 16 students in the 3rd grade, all answered the feedback form, while in the 5th grade, 15 out of 17 responded. This discrepancy is due to one student (G.2.5.5) changing classes and another student (G.1.8.5) quitting school. All responses are included in the results section, even those from students not selected for the quantitative study due to non-participation or cheating. These responses provide valuable insights into their lack of motivation and the reasons behind it.

The written explanation to their answers were also gathered and written, exactly how the students write them on paper. The same French errors were reproduced to keep the data as authentic as possible and to make sure that the meaning would not be changed by my own interpretation of the sentences. In figure 3.14, an example of the presentation of these explanations is given. In this case, the identity of the student was kept in the data, as it will be used to explain why some of them did not read the books or failed using one device and not the other. If necessary, it will be linked to their answer on the Likert scale, as they are available on paper, but were not reentered in the excel document.

Figure 3.14: justification example

2 pourquoi (si livre non lu)

G.1.1.5 L1(rep2)" pas aimé le sujet, j'ai donc abandonné" ("didn't like the subject, so I gave up")
G.1.2.5 "car je n'ai pas eu le temps à cause des autres matières à étudier" ("because I didn't have time due to other subjects to study")
G.1.3.5 L1 "j'ai oublié et je n'avais pas la motivation de le lire, le sujet ne m'intéressait pas plus que ça" ("I forgot and wasn't motivated to read it, the subject didn't interest me that much")

These qualitative responses will provide a richer context for understanding the students' experiences and behaviours during the experiment.

3.3.1 - Disappointment during the experiments

One of the most challenging aspects of the experiment was dealing with the students' lack of engagement and participation. Both classes exhibited lower participation levels than expected, with the issue being particularly pronounced in the 5th grade. Despite understanding the importance of the experiment for my master's thesis, many students chose to do the bare minimum, showing more interest in achieving a good grade than in improving their English skills. This lack of motivation and subsequent cheating attempts were disheartening and threatened the integrity of the collected data.

After analysing the data from the first reading, it became evident that some students had not only avoided reading the book but had also attempted to cheat. This realization was profoundly disappointing, as it underscored a reality where students, despite knowing the significance of the experiment, prioritized minimal effort and deception over genuine learning. Had this cheating gone unnoticed, the collected data would have been skewed, rendering the results meaningless beyond illustrating the propensity for cheating among students.

In response to this issue, I decided to address it directly with the students. A message was sent, clearly stating that such behaviour would no longer be tolerated. This direct approach elicited a reaction from the students, with two of them approaching me in the subsequent class to apologize. Additionally, one student mentioned in the feedback form that the message prompted her to reflect on her behaviour, realizing that she had not been acting appropriately.

Dear students,

Following the total correction of your forms for the first reading, I've come to give you some feedback. I'm really annoyed and sad to see that most of you have swapped answers. You should know that you're not the only one involved in this equation. You're putting more than 7 years of study on the line for me. If you don't want to do it, don't, but please don't distort my statistics and put my studies at risk.

If you don't have the courage to read a book, don't read it, if you don't feel like reading it, don't read it, but take responsibility for it. Don't put an entire project at risk by abusing my trust. Anyone who cheats will have their final mark halved. There's no need to come crying to me about why and how I know. I'm already being very kind not to give you 0 because I'm giving you half the benefit of the doubt (even if, given the number of papers with exactly the same 7 wrong answers, that's more than enough proof for many teachers).

I hope you'll read the second book, which is barely 20 pages long, and that you'll answer the form ALONE and WITHOUT CHEATING. If not, don't bother.

During the first class following this incident, I reiterated the importance of the books, emphasizing that they were not only beneficial for me but also for the students themselves. I framed reading a book in a foreign language as a significant personal challenge and achievement. Moreover, I explained that their grade being divided in half allowed them to secure 50% without needing a perfect score on the second reading, which was a fortunate situation for them.

Despite these efforts, some students chose not to participate at all. This lack of engagement was another disappointing aspect of the experiment, highlighting the challenges teachers face in motivating students and ensuring genuine participation in educational activities.

4 - Results

In this section a presentation will be given, followed by a discussion around their meaning and their implications. Another section will be dedicated to pedagogical remarks and tips about the experiment, in order to help any teacher wanting to make their students read on smartphones. Out of the 16 students in 3rd grade, only 12 were kept in the final analysis. 1 was excluded because their score was abnormally low and could not be considered representative of the global level at this grade. 3 students did not complete both readings and 4 students did not complete any readings. The students who still participated in one of the readings were kept to enhance the quality of the general data, however they could not be used in case of a qualitative study concerning their specific results.

In the case of the 5th grade, as explained in the methodology section, many cases of cheating pupils were to be considered, reducing the total number of participants from 17 to 11 pupils. Only two members of the first group did the two readings and only four members of the second group did the two readings. This means that in this experiment, the general results can only be compared thanks to the groups.

First, the results of the 3rd grade will be analysed and in a second part, the results of the 5th grade will be discussed.

4.1 - Quantitative results

4.1.1 - 3rd grade's results

The first thing to consider is the reliability of the groups. As explained, the groups differed at the beginning of the experiment and at the end, the numbers of participants changed, and even if the groups were equal in their reading level when the experiment started, they changed. An example can be taken with the first experiment that was done during the year 2022-2023. Figure 4.1 is a table showing the results of the class. Every student had participated.

Groupe 1		Groupe 2	
1	60	12	50
2	60	13	55
3	55	14	85
4	80	15	90
5	50	16	50
6	55	17	80
7	65	18	50
8	55	19	65
9	75	20	55
10	85	21	70
11	75	22	85
moyenne	65		66.82
écartype	11.83		15.85

Figure 4.1: Results of the 2022-2023 class. First experiment.

From a statistical point of view, the two groups cannot be differentiated by their results: there is less than a 2% difference between the average of the first group and that of the second (65 for group 1, and 66.82 for the second). This is a very small difference, especially as the standard deviation for each of the groups is over 10. The standard deviation measures the dispersion or spread of the scores (the lower the standard deviation, the more the scores are grouped around their average value).

The graph (fig. 4.2) shows that it is impossible to differentiate between the two groups.

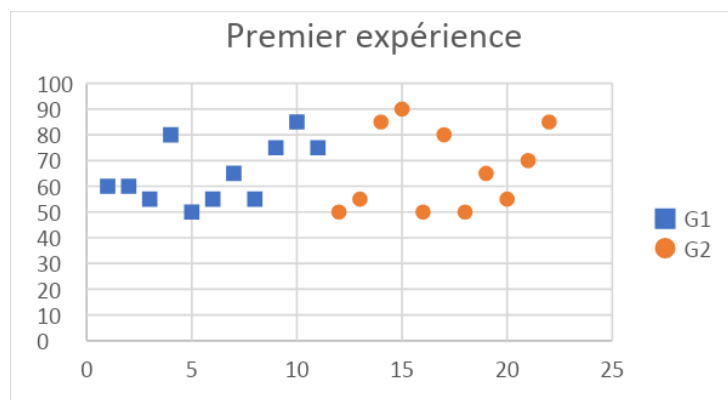


Figure 4.2: general level of the two groups before the first experiment (22-23)

This analysis is confirmed by Student's statistical test, which is used to differentiate whether two sets have a common mean or not. This test gives a result of 0.76 and, in general, very low values of less than 0.05 or even 0.01 are required to assert that the two samples behave differently. All the more so as the level of the pupils is not known and so the simplest hypothesis is to assume that the two groups are at the same level on average.

With this example taken as a basis to better understand the final results, one can now understand that the results of smaller groups are harder to discuss and are also less representative of the effects of the treatment. In Figure 4.3 the results for the 3rd grade are presented.

Figure 4.3: results per group and reading

élève 3e	Grp 1 niv base	G1 lec 1 s	G1 lec 2 L
G 1.4.3	22	8.9	57.44
G 1.5.3	68	80.59	51.47
G 1.3.3	77	65.67	58.82
G 1.2.3	80	76.11	70.21
G 1.8.3	80	60	
G 1.7.3	85	70.14	83.82
G 1.1.3	90	79.1	89.7
moyenne	80.00	71.935	68.58
ecartype	7.46	8.11	15.45
élève 3e	Grp 2 niv base	G2 lec 1 L	G2 lec 2 S
G 2.1.3	45	58.2	57.85
G 2.4.3	52	67.16	82.35
G 2.7.3	52		76.47
G 2.2.3	60	89.55	51.06
G 2.9.3	70	74.62	50
G 2.6.3	73	84.61	
average	58.67	74.83	63.55
ecartype	11.06	12.73	14.94

We can see that very few students responded to the questionnaires, which reduces the significance of our results. There were 7 pupils in the first group (including one outlier, who was set aside because of the unreliability of their level) and 6 pupils in the second, i.e. a little more than half of the original 11 pupils.

The basic level of the pupils can be observed in the first column. Finally, group 1 has a better basic level (80 +- 7.5) than group 2 (58.7 +- 11.1) due to the non-response of some students. The difference in average is significant and must be taken into account when analysing the results. This means that the levels must be compared knowing that the original levels are not equal.

In the 'Lec 1' test, group 1 read on screen while group 2 read on paper. The reading comprehension tests seem to show that group 2 (paper) did slightly better (74.8+- 12.7) than group 1 (screen) with an average of 71.9 +-8.1. From a purely statistical point of view, the result is not clear-cut, but the trend does seem to be

emerging. This is even more visible if we take into account the difference in the basic level of the groups thanks to the graphical representation. On the x-axis, the pupils are positioned according to their basic level, and on the y-axis is the result of the 'Lec 1' test. As already mentioned, the green dots (group 2, reading on smartphones) tend to be on the left of the graph (lower basic level), while group 1 tends to be on the right, apart from one student who is a little out of the norm, whom we have excluded from the calculations. We can see that the reading results are comparable on average, as already mentioned, at around 70. On the other hand, we can see that the green triangles (Group 2 - paper) tend to be above the dotted line which indicates the pupils' basic level, whereas the orange squares (Group 1 - screen) tend to be below it. We can therefore deduce that Group 2 on paper did rather better in the test compared with their general basic level than Group 1.

Figure 4.4: Comparison between group 1 and group 2. First reading.



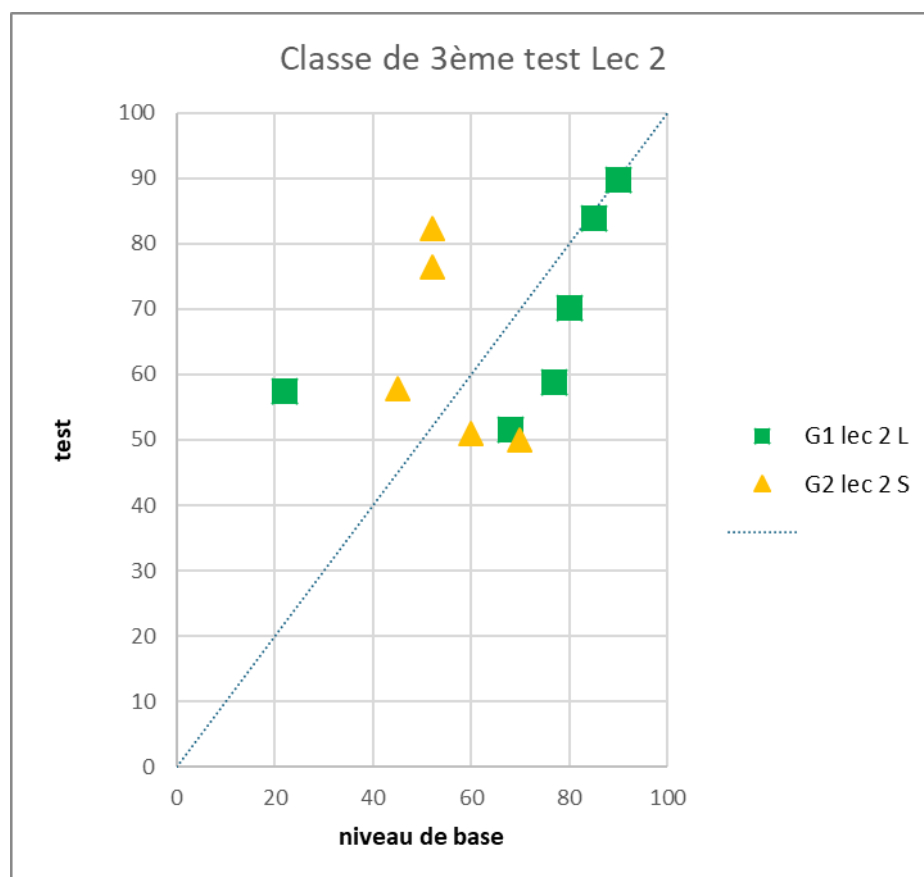
We can repeat the same exercise with the second 'read 2' test, where the groups have reversed their reading mode. Unfortunately, the trend observed is not

exactly reproduced. It would therefore be difficult to generalise the result. The level of the book had not changed, meaning that this variable cannot be considered as the one inducing any changes into the results. The length of the book, however, might have played a role in the motivation to read, as it was clearly explained that the students were more motivated by shorter books than longer ones.

This is confirmed by the Student's t test, which gives results at 30%, which rules out the possibility of having well-founded results.

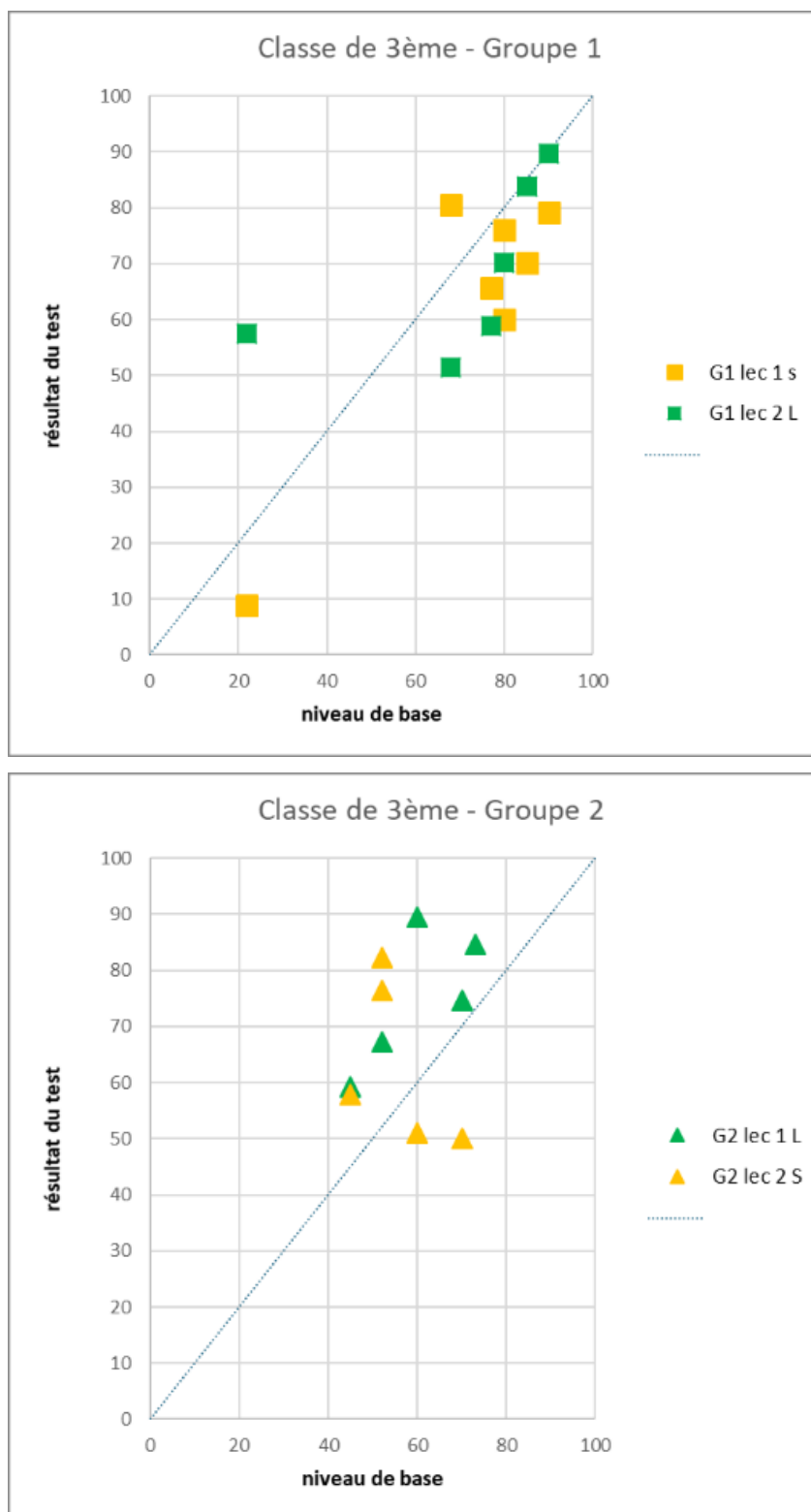
Further experiments on a larger number of students would be necessary to support our hypotheses statistically. With such a small number, we are dependent on the behaviour of individual students (tiredness, absence, motivation, etc.), which makes the analysis difficult. Therefore, those variables cannot be put aside and must be taken into account when reading the results. With a higher number of participants, those variables would have had less impact on the results.

Figure 4.5: Comparison between group 1 and group 2. Second reading.



Similarly, we can try to compare each group with itself according to whether it was read on paper or on screen. The graphs (fig. 4.6) below show the results.

Figure 4.6: Comparison of the results depending on the media used. 3rd grade



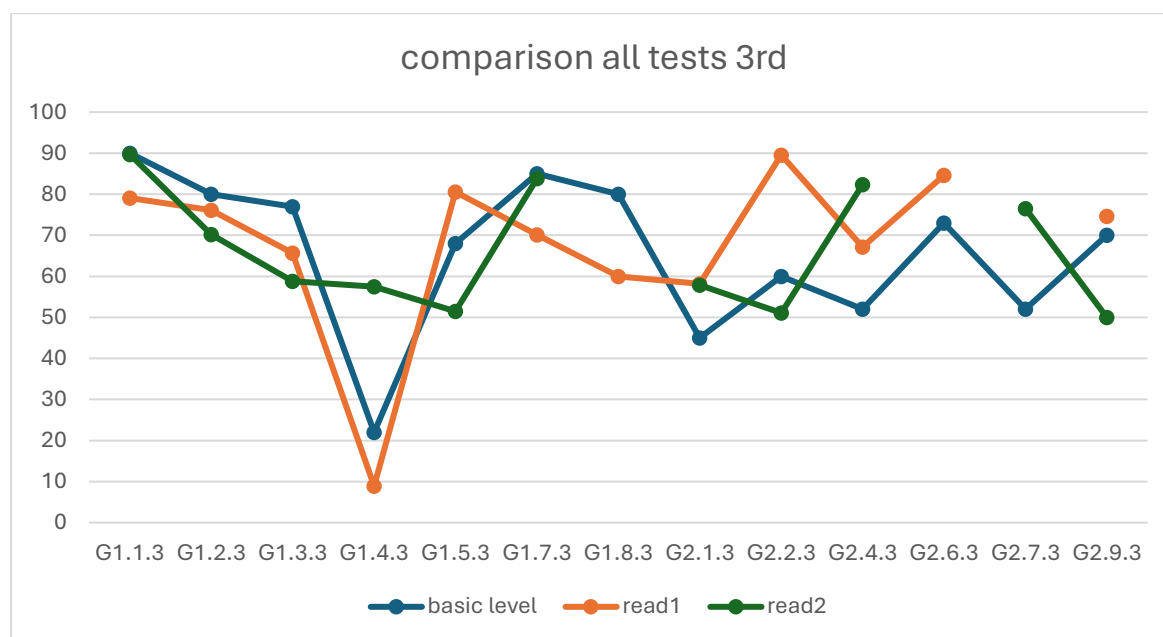
It is difficult to draw a law from them, other than a tendency for the green dots to line up better with the dotted curve, which would suggest that the baseline level is established with paper reading, like the test with the green dots (paper reading). Once again, the probability derived from the Student test does not allow us to statistically

confirm this trend. A higher number of participants would give more data to work with and would be a way to get more information on whether a trend can be drawn.

This hypothesis would need further study to be established, but it could make sense from a conceptual point of view.

One can still compare the evolution within the three readings that were graded on the same pattern (based on percentage), a question that could be answered is that the student understands better when reading a book than when reading a shorter text, based on a studied context seen in class. In this case, let's compare the results of the groups during the book readings with the results of the groups during the text reading (Figure 4.7).

Figure 4.7: Comparison between the three tests. 3rd grade.



In most cases, the basic grades used to create the groups do not highly differ from the grades obtained in the two book readings, however, we can see that in 5 cases, both book readings get lower points than the first text reading, which was not done in the same context as the book readings. Students are used to the settings of reading comprehension in class, they get some methodology advice in the first and second year on how to read a text for a reading comprehension test, however they had never read a book in English before, and if they already had to read books in French for their literature class, the exercise is definitely not the same. Most of the grades for the books reading are higher than 50% which means that the books were mostly understood in a general context, however they were not able to remember the details

or to remember more specific aspects in each chapter as they did not complete the forms one by one. Some methodology about what was expected of them when they read the books could have helped them to get better grades, and assuming that they could easily manage the tests when they had never done this exercise before can have impacted their results.

Student G.2.4.3 is the only one who has results that are always better than the previous ones. They might have learnt a lot and progressed a lot during the year, which means that they could get better grades at each test. In their case, time might have played a role, but this cannot be considered as representative results, since they are the only one who followed this learning curve. Some students also got a worse grade for the first reading and a better grade for the second one. Discovering the exercise might have played a role in getting a better grade, it can also be linked to the book itself. A look at their qualitative results would give more insights and will be done later in the section dedicated to the analysis of the qualitative results.

In figure 4.7 one can also see that in most cases, the second book reading was worse than the first book reading, indicating that an element influenced the quality of their answers, since the first thoughts would be that with the year going on, the students would have gotten better. In only 4 cases the second book reading was better than the first one, which is not representative of a law. On the contrary most of them have less understood the second book, therefore one can ask the question of boredom. Might have boredom created an atmosphere of lower attention to the details of the books? The reaction of the students at the beginning of the second reading were indicating that it was highly possible. Most of the students sighed when they received the second book, and they had to be reminded many times to complete the google forms, because on the due date, only 3 students had answered. Facing the reality of their absence of motivation had a high impact on the time spent on the experiment during the year, and on the time needed to complete the data and begin the analysis of the results. The challenge was the same with the fifth grade, whose results will be discussed in the coming part.

4.1.2 - 5th grade:

The 5th year class was also divided into 2 groups. The first group was larger (7 pupils) but more heterogeneous, as only two pupils took both tests. Group 2 was smaller (4 pupils) but everyone took both tests.

These differences complicate our analysis and the scope of the results. The groups had more or less the same basic level; 68.29 ± 15.72 for group 1 versus 76.25 ± 18.9 for group 2.

Figure 4.8: groups' basic level and results. 5th grade.

5e	Grp 1 niv base	G1 lec 1 S	G1 lec 2 L
G 1.1.5	50		71.11
G 1.3.5	80		86.66
G 1.4.5	55	54.16	73.33
G 1.5.5	55	62.5	
G 1.6.5	75		88.88
G 1.7.5	70	68.75	64.44
G 1.9.5	93		68.88
moyenne	68.29	61.80	75.55
ecartype	15.72	7.32	9.94
	Grp 2 niv base	G2 lec 1 L	G2 lec2 S
G 2.2.5	90	93.75	71.11
G 2.3.5	80	78	64.44
G 2.4.5	85	82.48	80
G 2.6.5	50	83.33	64.44
moyenne	76.25	84.39	69.9975
ecartype	18.93	6.66	7.37

Let's now look at the results of the first Lec1 test (figure 4.9)

Group 1, who read the text on screen, seemed to have comprehension results 61.8 ± 7.32 lower than those of the second group with results 84.39 ± 6.66 . This appears to be statistically significant, and we see here that comprehension by screen appears to be inferior to that by paper.

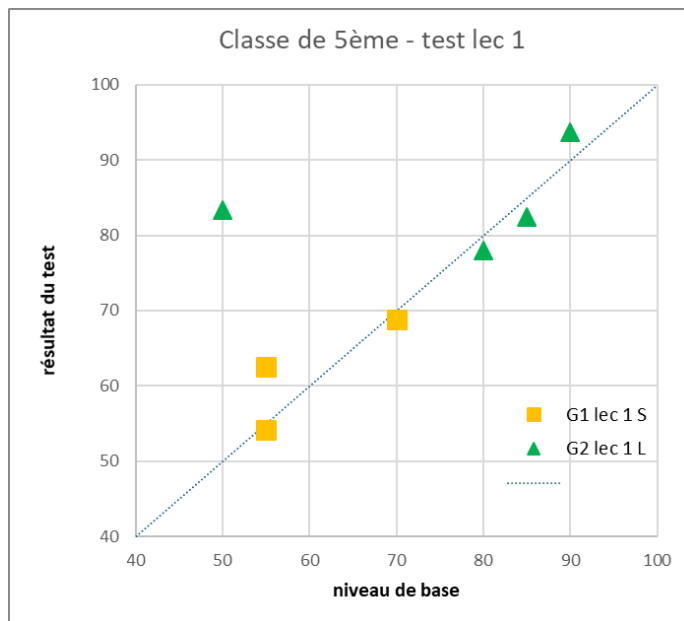


Figure 4.9: results first reading. 5th grade.

However, the graphical representation as a function of the basic level suggests that we should be cautious insofar as the comprehension results are in line with the basic level of the pupils and the differences in average between the reading methods can be interpreted as a reflection of the basic level. Furthermore, the variables that were pointed out in the analysis of the 3rd grade results (fatigue, stress, absence of motivation...) can also have a big impact on the results of the 5th grade students. The number of participants is lower, so the impact of each variable is higher on the results.



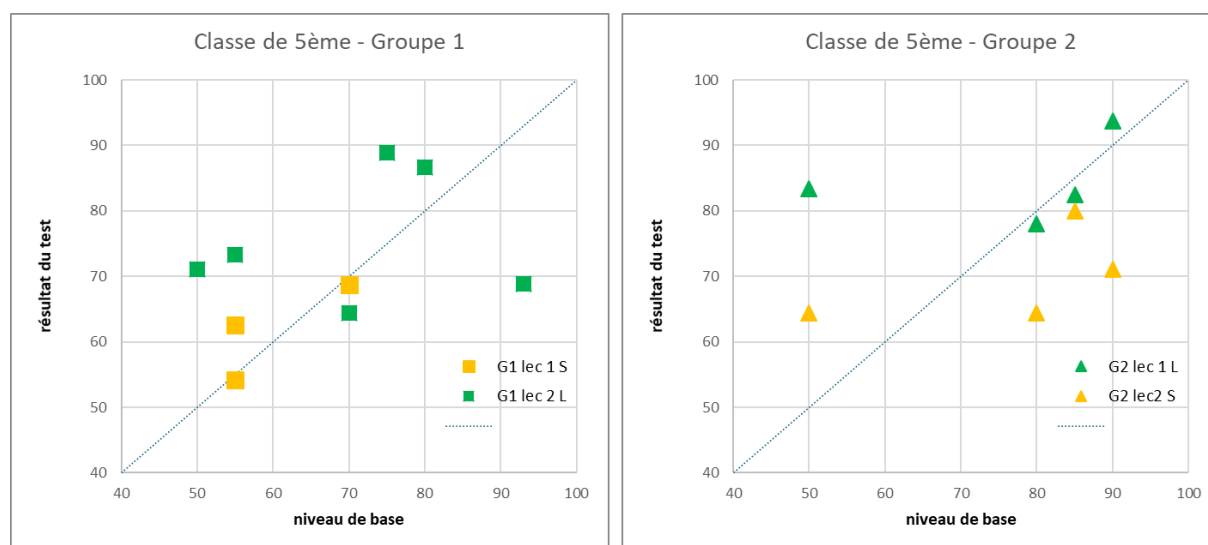
Figure 4.10: results second reading. 5th grade.

The second Lec 2 test reversed the reading averages of the groups (fig. 4.10). As with the 3rd, this second test is much less clear-cut, since the means of the comprehension tests do not differ. 75.55 ± 9.94 for group 1, with the paper close to 70

± 7.37 . The sample size would have to be increased to reduce the standard deviation. Analysis of the graph also leads us to put these differences into perspective, even if we tend to see the green triangles above the reference line, showing that the students in group 1 who read on paper tended to improve their level compared with their basic level, whereas the orange squares tended to be below, which would show that the comprehension of group 2 who read on paper was below the expected basic level.

Now if we compare the group with itself (figure 4.11).

Figure 4.11: Comparison of the results depending on the media used. 5th grade



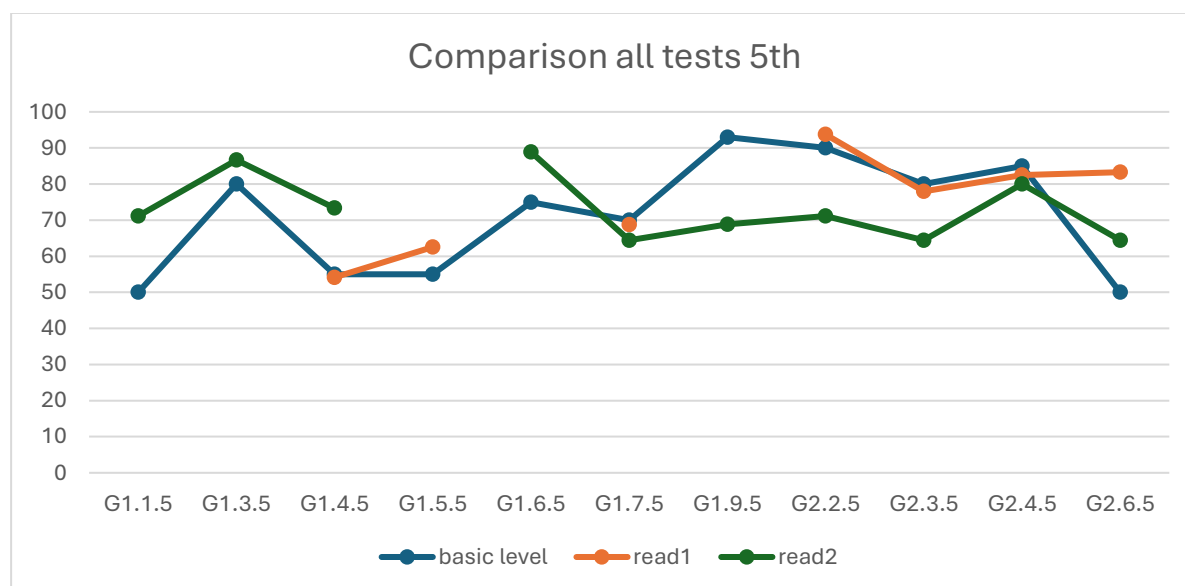
For both groups, we find that reading on paper (green symbols) is rather higher than the orange symbols representing students who read with a screen. These results correspond to the interpretation that can be deduced from the sample averages, which are sufficiently different to be significant.

The results for the 5th year therefore seem to give some indication of a poorer understanding of reading on a screen, even if the statistical results are not entirely conclusive. We note the importance of considering the basic level of pupils, even if we have shown that we must be vigilant about this indicator of basic level, which has mainly been acquired from reading on paper.

A comparison needs to be made between their basic level and their level while reading the books, to see if there is any augmentation of the level and of the comprehension. In figure 4.12 one can see that there is sometimes a gradation in the grades between the three readings indicating that the levels of the students might also have risen thanks to their general level increasing with the year going on. This variable

must be considered when comparing the results of the groups with the two different readings. The first reading took place in March whereas the second reading took place at the end of April 2024. With a month and a half in between the readings, this variable could have an impact on the results of the second reading, however it is hard to define as a general tendency with the low number of students who completed both readings. One needs to remember that in this figure the lines are not made based on the media which was used to read but based on the book they read. For 5 students out of the 11 that read at least one book, the results of the book reading are lower than the ones of the text reading from the beginning of the year. The level of the text was the same (B2) but the length of the text and the complexity of the details that needed to be remembered can be the problem. One other variable that can influence the results, is that they read the books from home and not at school, whereas the text reading was done in class, in a very different context (exam settings, silence in the room, 50 minutes to complete the reading...). No student shows a definite amelioration based on the increasing number of hours spent learning English. Student G.2.6.5 has the clearest results, showing improvement in both readings, however they cannot be due to time, since the first book reading is better than the second book reading.

Figure 4.12: Comparison between the three tests. 5th grade.

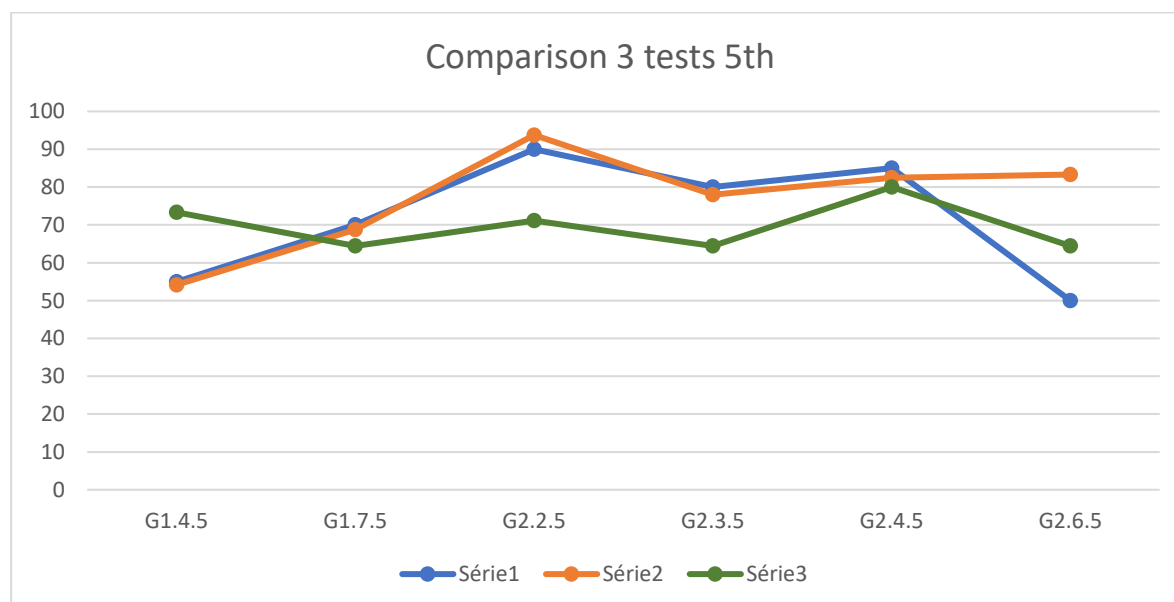


With those results, one can point out all the variables that could not be erased from the experiment: If one student enjoys more one book than another, it might impact the results, the fact that they did not use each form after each chapter also affects the number of details they remembered from the first chapters, compared to a shorter text,

that they only work 50 minutes on. It is also complex to generalize based on so little data, mostly not complete. Further research would need to be done, to ensure that those results are representative of an evolution. The bias of the difference between a text reading in class and a book reading at home was also known as not perfect to estimate the level of the students, therefore it might be interesting to create groups based on a text read at home, even if it is not a book, that could change the basic level of the students and therefore give a better base to work from.

Figure 4.16 is a focus on only the students who completed both readings correctly. We can see that in their case, there is no amelioration linked to time, since the first test is not worse than the second and the third in most cases. We can also identify that the second book reading was not well managed by most of them, since the grades are in majority lower than the first book reading. With a higher number of participants, this should be more representative, and the qualitative tests of these 5 students will surely give more insights about how they felt and what motivated them. The qualitative test could shed light on some variables that would explain why the first reading was mostly better than the second one.

Figure 4.13: Comparison of the 3 tests based on both readings. 5th grade.



4.1.3 - Discussion – quantitative results

The quantitative results from this study highlight several important aspects of the reading comprehension abilities of 3rd and 5th grade students, particularly in

relation to the medium of reading (paper vs. screen) and the context in which reading occurs. This section will discuss the reliability of the findings, the implications of observed trends, and the inherent limitations in the study design.

The initial differences between the groups, particularly in their basic reading levels, introduce a significant variable that impacts the interpretation of results. For the 3rd grade, despite both groups starting with equal reading levels, non-response from some students skewed the groups by the end of the experiment. Group 1 had a higher basic level compared to Group 2, making direct comparisons challenging without accounting for these initial disparities.

In the 3rd grade, although statistical analysis (including the Student's t-test) suggested no significant difference in reading comprehension between the groups reading on paper versus screens, there were notable trends. Group 2, which read on paper, tended to perform slightly better than Group 1, which read on screens. However, these differences were not statistically significant due to the small sample size and high standard deviations within groups.

The graphical analysis reinforced these trends, showing that students reading on paper often performed better relative to their basic levels compared to those reading on screens. However, the reversal of trends in the 'Read 2' test suggests that these results cannot be generalized without further research.

For the 5th grade, initial results indicated a significant difference in comprehension favouring paper reading over screen reading. Group 2 (paper) had higher comprehension scores than Group 1 (screen) in the first test. However, this difference was less clear in the second test when the groups switched reading mediums. The trends in the 5th grade also highlighted the impact of basic reading levels and the potential influence of other variables such as fatigue, motivation, and the context of reading.

Those results go against most of the research that have been done, and do not correspond to the results of Lin (2014) who studied both ER and reading on a mobile device. However, the experiment led by Lin (2014) was comparing reading on a computer and reading on a mobile device. Furthermore, in this study, no problem of participation or of representativity was found, therefore Lin's data (2014) seem more representative of the real results on reading comprehension in a foreign language.

Nonetheless, the study that was done for this master thesis was led in an authentic setting, which indicates that the quantitative results observed are representative of the reality which is faced by teachers, with real class, and students who must be in class.

Linca and Matei (2023) identified differences between students aged 16 and students aged 21 in their autonomy (see section 2.2), however no difference was found between students aged 15 and 16. The results from this experiment seem to contradict Linca and Matei's results (2023). Students in the 3rd grade participated more than students in the 5th grade. These results are the only one that do not lack representativity, since both groups were representative at the beginning, and the percentage of participants was not influenced by any other variables than the students themselves. Therefore, the question of how autonomy is influenced by age seems to be questionable regarding the fact that no difference was found between 15 and 16 years old.

Several limitations were identified in the study. The first one was the Sample Size. The small number of participants (particularly those who completed both readings) reduces the statistical power of the findings and makes it difficult to generalize results. This also leads to incomplete data from several students, which hindered the ability to draw robust conclusions. The study was also unable to control for all variables, such as the difference in students' enjoyment of the books, the varying contexts of reading (home vs. school), and differences in test-taking environments.

Despite the limitations, the study provides valuable insights into the reading comprehension abilities of young students and the potential impacts of reading medium and context. The findings suggest a possible advantage for paper reading, though this needs further validation with larger, more controlled studies.

4.2 - Qualitative results

In this section, the qualitative results will be analysed with the following goal: understand what impacted the lack of participation in the experiment, how the students felt about reading on their smartphones, and how motivated they were at the idea of participating in this project. The Likert scales and the justification will be used to shed light on some questions that were raised during the quantitative analysis and in the

methodology section. A general analysis on both classes will also be led on more general questions.

4.2.1 - General analysis

In figure 5.1, one can see that 10 students out of 16 completely read the book. 3 stopped during the reading and 2 did not read the book. 1 did not answer. This can explain why there were only 12 answers to the first test. Some might have decided not to answer based on the number of chapters they read, estimating that they had not read enough to get a good grade. Some might have totally forgotten to do both the reading and the test. This question was also followed by a justification to the reason why they didn't read it which can be seen in figure 5.1

Figure 5.1: question 2 of the qualitative questionnaire (3rd grade)

2 J'ai lu le livre / I read the book			
	1 (non, pas du tout / no not at all)	2 (quelques chapitres / some chapters)	3 (oui, j'ai tout lu/ yes everything)
3 rd	B1:2 B2:2	B1:3 B2:5	B1:10 B2:8
	G.1.4.3 "because I wanted to watch TV". (selected answer 1 for both books) G.2.6.3 "because I thought you were also going to send it by email, so I thought you'd forgotten and when I found out it was on classroom it was already too late". (Selected answer 1 for the second book and answer 3 for the first book.) G.2.7.3 (second answer) "because I don't like reading; I do the same in French". (selected answer 2 for both books) G.2.8.3 "I didn't have time; I was swamped, and I wasn't well at the time". (selected answer 1 for the first book and answer 3 for the second book) G.2.9.3 (second answer) because the chapters were not very interesting or even repetitive (selected answer 2 for both books) ²		

² (originally) G.1.4.3 "car je voulais regarder la TV" G.2.6.3 "car je croyais que vous alliez aussi l'envoyer par mail du coup j'ai cru que vous avez oublier et quant j'ai appris que c'était sur classroom c'était déjà trop tard" G.2.7.3 (rep2) "parce que je n'aime pas lire; je fais pareil en français" G.2.8.3 "Je n'ai pas eu

One can see that not every student that answered 1 or 2 justified their reasons not to read everything, however different variables can be drawn from those answers. The absence of motivation is clear in G.1.4.3 and G.2.7.3. They do not like reading and would rather do something else. This can correspond to the results obtained by Karpinski et al. (2012). The variable of liking the task is hence highly impacting the results. Another variable that can be seen is the psychological availability of the students. G.2.8.3 expressed that the situation that they were living in was weighing on them, therefore they did not read the book, not finding the time or the energy to do so. From what was explained in the literature review, we know that this can highly impact the performance of the readers (Tabata-Sandom, 2023). However, there is a difference that is perceived with the experiment of Tabata-Sandom (2023). It is that the participants in our experiments are younger, and they did not have the choice to participate to the experiment. This psychological unavailability was the reason for this student (G.2.8.3) not to read the first book.). Luo et al. (2019) stated that thoughts, concerns and feeling could impact the results of a student. Student G.2.8.3 seems to prove their point. Their reason for not answering the forms but reading the second book is more complex: this student has got limited access to their phone, and even with an email and a letter to the parents, nothing changed. Furthermore, instead of reading a little bit every day, they did not read the book until the end of the allotted time and therefore did not complete the forms for the due date. The reality of the access to smartphones has a definite impact on the teachers trying to implement reading in their classrooms, some parents do not accept to add any screen time to their children. This corresponds to what has been observed by Toto (2018) In some other cases like G.2.7.3's, the mother accepted to add screen time but only for the applications that were necessary to participate (google books and google forms). This only happened after an oral explanation, face to face with the teacher.

Another variable that is often heard in class is linked to miscomprehension and or inattention to what is being given as instructions. Student G.2.6.3 did not read the instructions carefully, nor did they take the time to send me an email in order to get the books since they thought I had forgotten to send it. This is where this experiment

le temps, j'étais débordée et je n'étais pas bien à ce moment là" G.2.9.3 (rep2) parce que les chapitres n'étaient très intéressants ou même répétitifs

corresponds to what had been observed by Lee (2023). It might be explained by the numbers presented by Briz-Ponce, stating that people did not feel ready to study on their smartphones. The average age of the students in the 3rd grade is 15 years old. At this age, autonomy is still a challenge (Linca & Matei, 2023), and to organize a reading at home using mobile technologies, repeating the instructions does not seem to be enough to ensure that every student will be doing their jobs. It is however an excellent exercise to help to learn how to work in autonomy.

Liking the book is also something that is important and influences the motivation to continue the reading. G.2.9.3 did not finish the second book because they were not interested by what they were reading. This variable is harder to control, since in this case the students already had a choice in the books they read, and it would have been too much for the teacher to let the students choose freely the books, then read them and create a test for each student. As it was explained in the methodology section of this MA Thesis, most of Day and Bamford's principle about ER were followed, however, some could not be followed in this experiment. These results reinforce the fact that free choice enhance largely the results regarding participation and how much students enjoyed reading. This also correspond to Ro's results (2013). In the fifth grade, G.1.1.5 expresses the same difficulty to continue reading while not liking the subject of the book. G.1.3.5 also mentions that the theme of the books did not interest them, but they also point out "motivation" as a whole, not as the more precise concept that was defined in the first part of this MA thesis. This corresponds to the results that were seen in the article by Robb and Kano (2013) where the students who did not like reading in their own language and who were not reading for themselves did not progress during their experiment.

In figure (5.2) is the same question but with the answer for the fifth grade.

Figure 5.1: question 2 of the qualitative questionnaire (5th grade)

2) J'ai lu le livre / I read the book			
	1 (non, pas du tout / no not at all)	2 (quelques chapitres / some chapters)	3 (oui, j'ai tout lu/ yes everything)
5th	B1:2 B2:2	B1:1 B2:2	B1:12 B2:10
	G.1.1.5 L1(rep2) "didn't like the subject, so I gave up". G.1.2.5 "because I didn't have time because of other subjects to study".		

	G.1.3.5 L1 "I forgot and didn't have the motivation to read it, the subject didn't interest me that much".	
	G.1.6.5 "I didn't read the first one because I was lazy and not bored, sorry :) " ³	

G.1.2.5 did not answer any of the forms, their reason being that there was too much homework to do, it might however be interesting to give a more personal opinion on this answer. This student did not participate in any tasks that had to be prepared at home, they were passive in class all year long. For example, each oral evaluation that needed preparation was not prepared and they did not even try to do it without preparation. This was strange since their English level was quite good and they definitely had a sufficient level to get good grades at this level. The question of an absence of general interest for the class could be raised, or even for school, since this student was behaving the same way in every class. Once more, the question of intrinsic motivation is raised, but to this can be added the question of psychological availability.

G.1.6.5's answer is harder to understand (in French more than in English, where the translation makes it clearer), this student has been diagnosed with dyslexia and read the second book. They were deeply proud of themselves when they saw the good grades they got for the second book reading and told me "It's the first time ever, that I finish a book, and it was in English, I am so happy!". This corresponds to Chang and Millet's results (2013). We can see here that the impact of the smartphone was important, the app allowing this student to read with a larger font and to adapt the font if necessary. This was already an advantage pointed out by Tabata-Sandom (2023). Furthermore, this student makes a difference between being lazy and being bored, which means that the theme of the book was not the problem but rather the engagement in the project. This student managed to make a distinction between general motivation and engagement.

³ G.1.1.5 L1(rep2)" pas aimé le sujet, j'ai donc abandonné" G.1.2.5 "car je n'ai pas eu me temps à cause des autres matières à étudier" G.1.3.5 L1 "j'ai oublié et je n'avais pas la motivation de le lire, le sujet ne m'intéressait pas plus que ça" G.1.6.5 "Je n'ai pas lu le premier par flemmardise et non par ennui desoler :) "

Out of all the students who wrote a justification for this question, 4 explained that the theme was not interesting enough for them. In figure 5.3 one can analyse the answer of both classes on this matter.

Figure 5.3: question 3 of the qualitative questionnaire

3) J'ai apprécié le livre / I liked the book

	1 no	2 rather no	3	4 rather yes	5 yes
3	B1:1	B1:3 B2:8	B1:4 B2:2	B1:4 B2:2	B1:3 B2:1
5	B1:1 B2:1	LB:3 B2:5	B1:7 B2:4	B1:2 B2:3	B1:1 B2:1

The answer to this question is rather positive for the first book in the third grade (7 answers in rather yes and yes) against 4 in rather no and no. The second book was not liked as much, and it can be linked to the fact that they did not want to choose the second time.

In the fifth grade, the answers are more negative than positive. For the first book, 11 answers were neutral to negative and for the second book 10 were neutral to negative. One could have expected to have more justifications containing a disinterest for the themes of the books however it is not the case. The fifth-grade students were rather disinterested in class, and the absence of real opinion on the books can be linked to this behaviour. It can also be linked to how they voted (see methodology section). They did not select the book for the theme but for the length. Even if the ER principles could not be fully followed when the project was created. This is where the availability of Extensive Reading programs instead of typical graded reading programs would have been interesting. Based on Ro's results (2013), ER is a solution to enhance the motivation to read books. It is however based on free choice and no grades and therefore could not have been done in this context. One can also point out that even with a relative choice, and after two books reading, their motivation to read was not improving, and that even if Ro (2013) observed improvement as time went by, this is not the case in this context. Furthermore, this raises the question of how the students follow the same principles. If a project is made following all the ER principles, but the ones participating to the project chose not to follow them, then the advantages of ER are lost.

This could also be linked to how they handled the time available for them to read. As can be seen in figure 5.4 and as it was already predicted in the quantitative section

based on how quickly the forms were answered, the students mostly read the book all at once.

Figure 5.4: question 5 of the qualitative questionnaire

5 J'ai lu le livre en... / I read the book in...

	1 chapter per chapter	2 five times	3 four times	4 two to three times	5 all at once
3			B1:3 B2:4	B1:3 B2:3	B1:7 B2:5
5		B1:1 B2:1	B1:2 B2:1	B1:4 B2:2	B1:5 B2:8

As it was expected in the quantitative results section, no students read the book chapter after chapter. Once more the question of the methodology can be raised, did they realize that it was a chance for them to understand better and get a better understanding of the events? Quite surely, they did not, and even if they did, the task was already long enough for them not to want to do it that way. The need of clear instructions about how to use the application is highly visible and could have changed these results. This correspond to what was pointed out by the UNESCO (2023). It is important to remember that students have a lot to do, and this can impact their participation. However, it creates a question around the realization of the advantages of MALL from their point of view, compared to what Pegrum (2014) stated. This answer also goes in this direction. It is also supported by the answer in figure 5.5

Figure 5.5: question 7 of the qualitative questionnaire

7 J'ai passé ... à lire / I spent reading

	1 around 10 hours	2 around 8 hours	3 around 6 hours	4 around 4 hours	5 max 2h
3				B1:1 B2:3	B1:11 B2:8
5		B1:2 B2:1	B1:1 B2:2	B1:3 B2:2	B1:6 B2:8

Most of the students read both books in less than 2 hours, which was the estimated reading time in case they understood without too many difficulties. No difference can be seen between reading on their smartphones or reading on paper. The difference of around 5000 words does not seem to have impacted the reading time

too much. The fact that the application used paging method corresponds to the affirmations of Sanchez and Branaghan (2011) explaining that this method is better than the scrolling method. It might also be linked to the fact that they read all at once and mostly did not take any notes (figure 5.6)

Figure 5.6: question 8 of the qualitative questionnaire

8 J'ai pris des notes / I took some notes

	1 no	2 yes
3	L1:12 L2:11	L1:1 L2:1
5	L1:12 L2:10	L1:1 L2:3

Taking notes would have added some time to the readings, however most of them did not take any notes, and once more it was not linked to the media used to read, since no major change can be seen between the first reading and the second one. It might have had an impact to give them some methodological advice but there is no insurance that they would have used them and taken some note since their implication in the experiment was not the best one. Regarding this through the ER principles, principle number 5 has been respected by the students, even if it was not stated clearly at the beginning. The questions of notes had been left opened to them, they were allowed to take some or not. It seems that they instinctively prefer reading for pleasure than reading to analyse the text. This corresponds to Lin (2014) results that were explained in section (x) reading in English as a foreign language.

Another interesting aspect to study was how they felt about their comprehension and how they would auto evaluate themselves. They filled out the qualitative forms without knowing their grades, so they were honest in their answers. In figure 5.7 we can see that they estimated that their comprehension was better than most of the final grades they got.

Figure 5.7: question 1 of the qualitative questionnaire

1 J'ai compris le livre dans sa globalité / I understood the book in its entirety:

	1 no	2	3	4	5 yes
3		B1:3 B2:1	B1:1 B2:3	B1:3 B2:5	B1:5 B2:3

5			B1:2 B2:3	B1:11 B2:9	B2:1
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The students in the third grade mostly estimated that they understood the book but were not definite. They understood the first book better than the second book. In the quantitative results it was visible that 7 students had had better grades on the first book than the second one, therefore their analyse can be estimated as correct). In the fifth grade they did not estimate that they had fully understood both books. The second book was also considered harder than the first one, even if the results are less extreme than in the third grade. The results in their grades are more difficult to compare with their answers, since they cheated a lot and even if 12 students estimated that they read the books, there were not 12 participants in the quantitative study. However, those results can explain why most of them did not ask for any help during the readings (see figure 5.8).

Figure 5.8: question 10 of the qualitative questionnaire

10 J'ai demandé de l'aide à quelqu'un d'exterieur pendant la lecture / I asked for help to someone else during the reading

	1 no	2 yes
3	B1:11 B2:13	B1:2 B2:1
5	B1:9 B2:9	B1:2 B2:4
		G.2.4.3 book 2 : to my dad when I had no wifi G.1.3.5 book 2 : to my dad on vocabulary words ⁴

Students did not estimate that they needed help, when they did, they mostly asked their parents, not a friend, not chat GPT or any AI. This can be explained if they mostly read at home or during the holidays with their family, but also because as it was explained by Toto (2018) students prefer human help to computer interactions (see section x (context linked to age)). With this answer, one can perceive that the principle number 9 of ER was not followed (Day & Bamford, 2002), since they could not ask

⁴G.2.4.3 livre 2: à mon père lorsque je n'avait pas de wifi G.1.3.5 livre 2: mon papa sur des mots de vocabulaire

their teacher for help. This could have influenced their behaviour and increased the fact that they did not ask for help at all.

Figure 5.9: question 12 of the qualitative questionnaire

12 J'ai trouvé que le projet lecture était agréable / I found the reading project enjoyable

	1	2	3	4	5
3	B1:1 B2:2	B1:2 B2:2	B1:7 B2:6	B1:4 B2:4	
5		B1:1 B2:1	B1:12 B2:10	B2:2	
3	G.1.2.3 (4) Because it was an interesting experience. It's very educational because reading can develop your spelling skills etc... G.1.3.3 (2) A bit boring, it was long and I couldn't concentrate. G.1.4.3 (4) It's useful for learning English G.1.5.3 (3) I don't mind, I like English G.1.7.3 (4) Yes, it has developed my vocabulary, my fluency in sentence formulation, both orally and in writing. G.1.9.3 (3) the books were easy to understand G.2.2.3 B1:3 it was okay, B2:1 I did not read G.2.4.3 (3) I don't like reading in French--> so even less in English G.2.6.3 (3) I'm not a big fan of reading, I find it hard to concentrate G.2.7.3 (1) just, I don't like reading G.2.8.3 (4) the story was interesting G.2.9.3 (3) it's not my kind of book⁵				
5	G.1.2.5 (2) because I don't like reading basically G.1.3.5 (4) The book I read on paper was very interesting and it wasn't a project that was too long and boring, on the contrary it educated me. G.1.5.5 (3) I don't particularly like reading but that didn't necessarily bother me too much. G.1.6.5 (4) it's the first time I've read a book for my English course G.1.7.5 (3) because the project was simple but sometimes long G.1.9.5 (3) I don't like reading but online quizzes are less boring G.2.1.5 (3) because it's a book I didn't really want to read, so it was quite complicated at first				

⁵ G.1.2.3 (4) Car c'était intéressant comme expérience. C'est très éducatif car lire peut développer nos compétences d'orthographe etc... G.1.3.3 (2) Un peu ennuyeux c'était long et je n'arrivais pas à me concentrer G.1.4.3 (4) C'est pratique pour apprendre l'anglais G.1.5.3 (3) ça me dérange pas, j'aime l'anglais G.1.7.3 (4) Oui, ça a développé mon vocabulaire, ma fluidité en parlant de la formulation de la phrase, même à l'orale comme à l'écrit. G.2.7.3 (3) les livres étaient faciles à comprendre G.2.2.3 B1:3 ça allait, B2:1 j'ai pas lu G.2.4.3 (3) J'aime pas lire en français--> donc en anglais encore moins G.2.6.3 (3) je suis pas fan de lecture j'ai du mal à me concentrer G.2.7.3 (1) juste, je n'aime pas lire G.2.8.3 (4) l'histoire était intéressante G.2.9.3 (3) ce n'est pas mon genre de livre

	G.2.2.5 (3)L1 it wasn't unpleasant but I didn't necessarily like it (2)L2 I didn't like the story told and I found it more complicated G.2.3.5 (3) it didn't necessarily bother me but it didn't amuse me either G.2.4.5 (3) the books weren't very boring but I preferred the second one G.2.6.5 (3) because the stories were interesting but rather slow G.2.7.5 (3) it's not the type of book that interests me G.2.8.5 (3) I don't necessarily like reading but the subjects of the books were original ⁶
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When comparing these results with the ones already existing in the literature, one can see that 2 students from the third grades mentioned difficulty to concentrate. Ro's results (2013) showed an amelioration in the capacity to focus however, the study was conducted in 2013, and since then, many aspects of the life have impacted the attention capacities of people. Social medias like TikTok have created shorter attention span and have therefore reduce the focused attention capacities of the learners (Bhosale & Minchekar, 2016). They have also increased the feeling of boredom, which appears 5 times in the qualitative answers of the students. It is sometimes linked to their ability to focus; however, it is also corresponding to what was found by Karpinski et al.'s study (2012, see section x).

None of the students selected the highest answer possible in both groups. However, 6 of those who gave justifications selected answer number 4 for at least one book. Their reasons were that it improved their English level and proficiency, even if the global tendency of the quantitative results does not show any representative results, the fact that some students perceived an amelioration is interesting on many aspects. However, the non-representativeness of the results in this master thesis creates a contradiction with many previous results (Sakurai, 2017; Krashen, 1989). This can be due to the settings of the experiments (high school learners, non-voluntary based experiment...). To get more information about this phenomenon and the non-compatible results, further experimentation would be needed. However, these

⁶ G.1.2.5 (2) car je n'aime pas lire à la base G.1.3.5 (4) Le livre que j'ai lu sur papier était très intéressant et ce n'était pas un projet qui était trop long et ennuyant, au contraire ça m'a instruit. G.1.5.5 (3) je n'aime pas spécialement lire mais cela ne m'a pas forcément trop dérangé G.1.6.5 (4) c'est la première fois que je lit un livre pour mon cours d'anglais G.1.7.5 (3) car le projet était simple mais parfois long G.1.9.5 (3) je n'aime pas lire mais questionnaire en ligne est moins chiant G.2.1.5 (3) parce que c'est un livre que j'avais pas spécialement envie de lire donc c'était assez compliqué au début G.2.2.5 (3)L1 ce n'était pas désagréable mais je n'ai pas forcément aimer (2)L2 je n'ai pas aimé l'histoire racontée et je l'ai trouver plus compliquer G.2.3.5 (3) ça ne m'a pas forcément déranger mais ça ne m'a pas non plus amusé G.2.4.5 (3) les livres n'étaient pas très ennuyant mais j'ai préféré le deuxième G.2.6.5 (3) parce que les histoires étaient intéressantes mais assez lentes G.2.7.5 (3) c'est pas le type de livre qui m'intéresse G.2.8.5 (3) J'aime pas forcément lire mais les sujets des livres étaient originale

qualitative answers show that the self-efficacy feeling was improved, and it gave them more confidence in English. Their motivation increased in class after the experiments, and they engaged more in their learning after reading the books than before. These results are coherent with Dong et al.'s results (2022), however in the case of this master thesis, they are not significant, whereas in Dong et al.'s study, they were. This might be due to many aspects such as the cultural differences, the age differences, the reading project itself...

Figure 5.10: question 13 of the qualitative questionnaire

13 J'ai trouvé que le projet lecture était stimulant / I found the reading project stimulating

	1	2	3	4	5
3	B1:3 B2:2	B1:2 B2:4	B1:5 B2:5	B1:4 B2:2	B2:1
5	B1:4 B2:3	B1:4 B2:2	B1:5 B2:6	B2:2	
	G.1.2.3(4) It helps a lot, it's very stimulating with the action etc... you have to choose the right book though. G.1.3.3 (4) I had to manage to concentrate G.1.4.3 (2) because it doesn't stimulate me I prefer to listen to music and it could teach us more G.1.5.3 (3) I don't really like reading in English and French and the books were good but not captivating. G.1.7.3B1:4 B2:2) I didn't like the 2nd book G.1.9.3 (3) mixed, I don't think anything of an assignment G.2.1.3 (3) no, because the story wasn't too interesting G.2.2.3 (1) because it was boring G.2.4.3 (5) B2: I read it during a journey G.2.6.3 (4) I was able to test my level of understanding G.2.7.3 (1) same as the previous one G.2.8.3 (3) I read the book because I was asked to, it was neither boring nor stimulating 3 G.2.9.3 (2) no, same as the previous question⁷				
	G.1.2.5 (1) because I'm not interested in reading, so it was more of a burden than anything else G.1.3.5 (4) There was a desire to find out what happened next G.1.5.5 L1 (1) the subject of the book didn't interest me at all so it didn't stimulate me. L2(4) G.1.6.5 (3) no specific opinion on the subject 5 G.1.7.5 (3) because it was fairly quick				

⁷ (4) Il aide beaucoup c'est très stimulant avec l'action etc... il faut bien choisir le livre par contre (4) j'ai du réussir à me concentrer (2) car ça ne me stimule pas je préfère écouter de la musique et ça pourrait nous en apprendre plus (3) j'aime pas trop lire en anglais et français et les livres étaient bien mais pas captivant L1:4 L2:2) Je n'ai pas aimé le 2ème livre (3) mitigé, je ne pense rien d'un devoir (3) non, parce que l'histoire n'était pas trop intéressante (1) car c'était ennuyant (5) L2 : Je l'ai lu durant un trajet (4) j'ai pu tester mon niveau de compréhension (1) idem que la précédente (3) j'ai lu le livre parce qu'on me l'a demandé, il n'était ni ennuyeux ni stimulant (2) non, même chose que la qst précédente

G.1.9.5 (1) reading doesn't stimulate me
G.2.1.5 (2) I don't really have an opinion on it
G.2.2.5 B1(2) Because I couldn't choose the book to read B2(1)I didn't like the story
G.2.3.5 (3) it depends whether the book is in paper or digital form
G.2.4.5 (3) I didn't mind reading these books
G.2.6.5 (3) because the stories were short but complete
G.2.8.5 (2) because reading a book where I have to concentrate doesn't really motivate me. ⁸

A difference between enjoyable and stimulating was made in the qualitative questions, some students could have found something not enjoyable but were stimulated by other reasons (grades, other learners, parents...), therefore a second question was asked to the students. In general, the results are lower than for the previous question, they were not stimulated by the project. This is a source of explanation for the low participation rate that was seen in the quantitative results section. This also corresponds to Ro and Chang's affirmations concerning motivation regarding reading projects in class (see section x, reading in EFL). G.1.4.3 really goes in this direction; music would teach them more than reading in their opinion. Any other project would be more enjoyable than reading. ER's principles are once more relevant when one looks at G.2.2.5's answer, they did not consider a vote between 4 books as a choice. Those who were stimulated were not stimulated by the project but by the books themselves (G.1.2.3, G.1.3.5, G.2.6.5).

The biggest question, however, is how they felt about reading on their smartphones, since it was the centre of this experiment and since no representative difference was found in the quantitative results between reading on a smartphone or with a book, their perception and the impact on their motivation is major for this analysis.

Figure 5.11: question 4 of the qualitative questionnaire

4 J'ai apprécié lire sur mon smartphone / I enjoyed reading on my smartphone.

⁸ G.1.2.5 (1) car lire ne m'intéresse pas donc c'était plus une charge qu'autre chose G.1.3.5 (4) Il y avait l'envie de connaître la suite G.1.5.5 L1 (1) le sujet du livre ne m'a pas du tout intéressé donc ça ne m'a pas stimulé. L2(4) G.1.6.5 (3) pas d'avis précis sur le sujet G.1.7.5 (3) car c'était assez rapide G.1.9.5 (1) lire ne me stimule pas G.2.1.5 (2) Je n'ai pas vraiment d'avis sur ça G.2.2.5 L1(2) Car je n'ai pas pu choisir le livre à lire L2(1) Je n'ai pas aimé l'histoire G.2.3.5 (3) ça dépend si le livre est en papier ou en digital G.2.4.5 (3) ça me dérangeait pas de lire ces livres G.2.6.5 (3) Parce que les histoires étaient courtes mais complètes G.2.8.5 (2) car lire un livre où je dois bien me concentrer ne me motive pas trop.

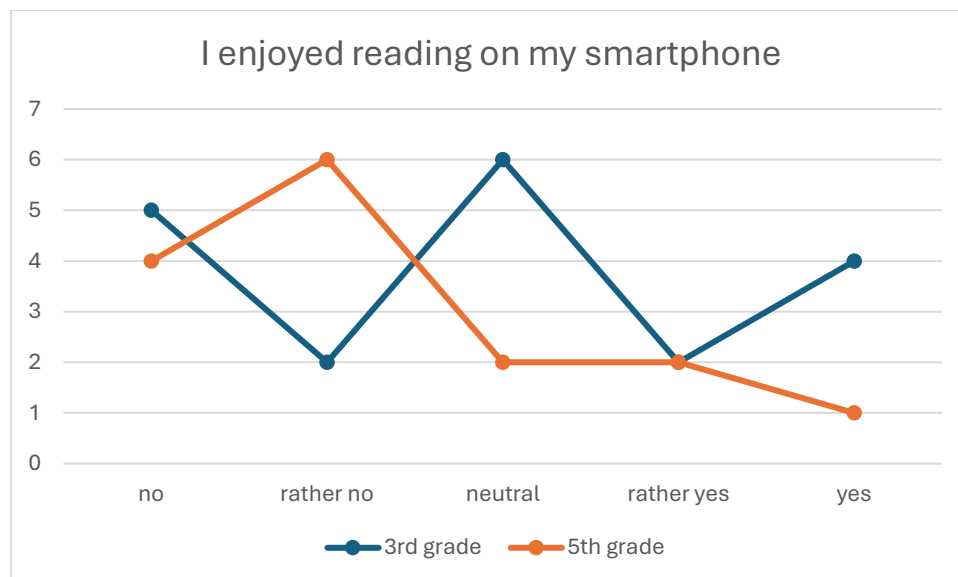
	1 (no)	2	3	4	5 (yes)
3	B1:2 B2:3	B2:2	B1:3 B2:3	B2:2	B1:3 B2:1
5	B1:2 B2:2	B1:3 B2:3	B1:1 B2:1	B2:2	B2:1
3	G.1.1.3 (2) I prefer to read books because I can concentrate better G.1.2.3 (5) the sheets get mixed up so I prefer to read on my phone G.1.3.3 (3) I found both long and boring G.1.4.3 (3) I still prefer paper G.1.5.3 (1) it distracts me because I get notifications every 10 minutes or more G.1.7.3 (5) I had trouble finding the information I needed to answer the questions, but I still prefer the phone and it's a change from the paper format G.1.8.3 (5) the book was better G.1.1.3 (2) for hope G.2.1.3 (2) because it's smaller G.2.2.3 (1) a book is better G.2.4.3 (2) easier to translate the words I didn't understand G.2.5.3 (1) I like reading book G.2.6.3 (1) too small, not very practical for reading and bad for the eyes G.2.7.3 'I didn't read on my phone, I took a book from someone else'. G.2.8.3 (4) It was quite fun and I'm used to reading on my smartphone with apps. G.2.9.3 (3) I was distracted by my notifications ⁹				
5	G.1.5.5 (3) it's less appealing to read but that doesn't stop me from reading it anyway G.1.6.5 (4) it's easier to hold and to scroll too. But the fact that it's in stages means I can see what's left to read, whereas on the phone you just scroll through, but I prefer by smartphone G.1.7.5 (2) because I prefer to read on paper G.1.9.5 (2) I don't like the texture of paper books G.2.1.5 (1) no because I prefer on paper because it's much more engaging and also allows us to detach ourselves from our mobile phones G.2.2.5 (1) I prefer to read on paper, I find it harder to follow on my phone as it hurts my eyes. G.2.3.5 (2) I find that reading on the phone takes away from the 'immersion' and therefore makes the story less interesting. G.2.4.5 (4) it was easier and less boring G.2.6.5 (2) reading a book on a smartphone is tiring on the eyes G.2.7.5 (5) a new experience that I enjoyed G.2.8.5 (1) I prefer to read physical books such as manga ¹⁰				

⁹ G.1.1.3 (2) Je préfère lire en livre car je suis plus concentrée G.1.2.3 (5) les feuilles se mélanges donc je préfère sur téléphone G.1.3.3 (3) Je trouve que les deux étaient longs et ennuyeux G.1.4.3 (3) j'ai quand même une préférence pour le papier G.1.5.3 (1) ça me déconcentre car j'ai des notifications toutes les 10 min même plus G.1.7.3 (5) j'ai eu du mal à retrouver des éléments pour répondre aux questions mais je préfère quand même sur téléphone et ça change du format papier G.1.8.3 (5) le livre était meilleur G.1.1.3 (2) pour la esperiance G.2.1.3 (2) parce que c'est plus petite G.2.2.3 (1) c'est mieux un livre G.2.4.3 (2) + simple à traduire les mots que je ne comprenais pas G.2.5.3 (1) J'aime bien lire livre G.2.6.3 (1) trop petit, pas très pratique pour lire et mauvais pour les yeux G.2.7.3 "J'ai pas lu sur mon tel, j'ai pris un livre à quelqu'un" G.2.8.3 (4) C'était assez ludique et j'ai l'habitude de lire sur smartphone avec des applications G.2.9.3 (3) Je me laissais distraire avec mes notifications

¹⁰ G.1.5.5 (3) ça donne moins envie à lire mais ça ne m'empêche pas de le lire quand même G.1.6.5 (4) c'est plus facile à tenir en main et pour défiler aussi. Mais le fait que ce soit par palier j'arrive à voire ce qu'il reste a lire alors que téléphone on fait que defiler mais je prefer par smartphone G.1.7.5 (2) parce que je préfère lire en papier G.1.9.5 (2) j'aime pas les textures papier des livres G.2.1.5 (1) non car je préfère

This is the curve corresponding to the results (fig 5.12)

Figure 5.12: Curve based on the answers to the question 4.



In the case of the third grade, most of the answer are neutral, in total there is one less answer in favour of reading on a smartphone. In the case of the fifth grade, the answers are more negative than positive. The difference between the two groups can be due to the age, or to the basic motivation to participate to the project. This has not been determined by the justifications that were given.

The justifications reveal diverse preferences and experiences. Analysing these responses, several key themes emerge. First, concentration was a general problem when reading on smartphones. Seven students expressed that reading on paper books allows them to concentrate better (G.1.1.3, G.1.4.3, G.2.1.5, G.2.2.5, G.2.3.5, G.1.5.3, G.2.9.3), in two cases they even pointed out the main distraction as being the notifications which is coherent with Karpinski et al.'s study (2012, see section MALL and attention span). The solution of stopping the notifications thanks to the "do not disturb" mode was not applied by the students, therefore they got distracted and this is also indicating that there are drawbacks when learning on a connected device, this

sur papier parce que c'est beaucoup plus accrochant et ça permet aussi de nous détacher de nos GSM
 G.2.2.5 (1) Je préfère lire sur papier, j'ai plus de mal à suivre sur téléphone ça fait mal aux yeux G.2.3.5 (2)
 Je trouve que lire sur le téléphone enlève "l'immersion" donc rend l'histoire moins intéressante G.2.4.5 (4)
 c'était plus facile et moins ennuyant G.2.6.5 (2) Lire un livre sur smartphone fatigue les yeux G.2.7.5 (5) une
 nouvelle expérience que j'ai apprécié G.2.8.5 (1) Je préfère lire en physique telle que les mangas

corresponds to what Barton et al. (2021) wrote, however, there is a difference in this case, since 7 students out of 23 noticed that this was an hindrance for them, which is a higher percentage of students being aware of this than in Barton et al.'s case. (see section x Mall and attention span). Pointing the same aspects than Morineau et al. (2005) and Chen and Lin (2016), three students G.2.6.3, G.2.2.5 and G.2.6.5 explained that reading on a smartphone was not comfortable. Apparently, one has not managed to find the feature to increase the font size, and the other felt that their eyes were tiring. This last aspect is relevant as an actual problem nowadays, the use of special glasses could potentially help.

Some students found reading on smartphones more practical and easier to handle (G.1.2.3, G.1.7.3, G.1.6.5, G.1.9.5, G.2.4.3), this result goes against what was said by Morineau et al. (2005) and Chen and Lin (2016). Smartphones nowadays have feature that are making reading easier for students.

Preferences were also influenced by personal comfort and enjoyment, in this case the answers were either a 1 or a 4/5 and never a 3 (G.2.8.3 (4), G.2.7.5 (5), G.2.8.5 (1)) G.2.8.3's answer is also corresponding to the concept of digital native introduced by Prensky (2001). Students who are used to reading on their smartphones enjoyed the readings more than the others.

The analysis shows that students have varied and nuanced preferences when it comes to reading on smartphones versus paper books. While many prefer paper books for better concentration and reduced distractions, others appreciate the practicality and novelty of reading on smartphones. However, the convenience of smartphones is often offset by issues like notifications and eye strain. Personal preferences, experiences, and the specific context of reading (such as translation needs) play significant roles in determining the preferred format. Therefore, both formats have their own advantages and drawbacks, suggesting that a hybrid approach might be beneficial to accommodate different reading preferences and situations.

4.2.2 - Discussion – qualitative results

There were a significant number of students who either did not read the books at all or only partially read them, this has highly impacted both quantitative and qualitative results. The primary reasons for not completing the readings were lack of

interest in the subject, lack of motivation, and other competing demands on the students' time. Students' interest in the books' themes played a significant role in their engagement. Those who found the topic uninteresting were less likely to complete the readings. This is coherent with Hiver et al.'s (2024) findings stating that engagement always has an object (see section 2.2.3). The lack of engagement might mean that the students didn't consider that the book was an engaging object for them.

Furthermore, the students' level of autonomy and understanding of the instructions also affected their participation. Some students did not fully grasp the instructions or lacked the initiative to seek help when needed. The findings suggest that clearer instructions, more engaging book selections, and better technological support could enhance the effectiveness of such reading projects. Nonetheless, it had a beneficial impact on some students, the use of smartphones and apps facilitated the reading process for some students, particularly those with special needs, like the dyslexic student who benefited from adjustable fonts and reading aids. Regarding the reading habits, most students read the books in one sitting rather than spreading the reading over several sessions, which may have affected their comprehension and retention. Moreover, very few students took notes, indicating a preference for reading for pleasure rather than for detailed analysis.

The project managed to impact positively some students, despite mixed results, some students felt that their English skills improved through the project, highlighting an increase in self-efficacy and confidence, however others found the project boring or burdensome and therefore could not share any beneficial opinion in their qualitative test.

In summary, the qualitative results highlight the complexity of implementing an extensive reading project in a diverse classroom setting. While many students recognized the benefits of the project, various factors, including motivation, interest, technology access, and instructional clarity, significantly influenced their engagement and performance. These insights suggest the need for tailored approaches that consider individual student needs and preferences to maximize the effectiveness of reading projects.

4.3 - Pedagogical tips

In this part, pedagogical tips will be given in order for any teacher to be able to create a similar project with better chances of success. The recommendations given by the students at the end of the project will also be discussed.

The students were asked for recommendation at the end of the qualitative questionnaire. This is a list of what was said by the 3rd grade students:

- I prefer the phone format because it's more flexible and practical. Books get mixed up and it's harder to get back into the story.
- You have to choose more exciting books
- Let the pupils choose the book and not always choose
- I prefer to read on my phone because it makes it easier if you forget your book, at least you have it on your phone. I also think we should do more reading in class with the teacher before reading the books.
- Let us choose the books to read
- Use another platform to read books because the one offered didn't work
- No more reading on mobile phones
- I don't really have a recommendation, it was quite good
- Let the pupils agree on a book

This is a list of what the 5th grade student wrote:

- Do a physical questionnaire rather than a digital one
- I was motivated to do the 2nd book because I wanted to make up for the fact that I hadn't read the 1st book and therefore hadn't respected your project. Everything was very well organised, and the questionnaires were very clear.
- I would have liked to have more time to read the book, print it out or have it delivered to us live from the library.
- I found the 2nd book interesting/ I read the first page of the book and then I got hooked and kept going. And I didn't want to rely on other people's answers, because that's what I did the first time and the teacher wasn't very happy, so I wasn't going to make the same mistake twice.
- The project is good but I hate reading
- Just give more books in hard copy because some people prefer that. + give suspense books like Sherlock Holmes.

- preference to paper books
- Put in much cooler books, because the first one sucked but the second one was very satisfying.
- I would like to read books that are a bit longer

Based on the students' feedback from both 3rd and 5th grades and on the quantitative and qualitative results, several practical recommendations and pedagogical tips can be drawn to enhance the success of similar reading projects. These insights can guide teachers in creating engaging, effective, and student-centred reading experiences. The first tip would be to give a choice to the students concerning the device they want to use to read. It is very clear regarding the quantitative and qualitative results, that some students hate reading on smartphone while other enjoy it.

- Offer multiple reading formats (digital and physical) to accommodate different preferences and ensure accessibility. Consider using platforms that are reliable and user-friendly.

Students expressed a desire to choose their books, which can increase their engagement and motivation, it is also coherent with the ER principles, however, if you are a new teacher, it is hard to prepare a reading project with a fully free choice about the books. Here are some tips to compensate this problem.

- Allow students to have a say in the book selection process. Provide a list of pre-approved books to choose from or let them suggest titles that interest them. This autonomy can boost their investment in the reading project. Once they have chosen the book, read it and prepare the questionnaire. Do not lose time reading 4 or 5 books that were preselected before they chose it.
- If you want to respect the second and third principle of ER, then you have to change the grading test. Allowing students to create an oral presentation explaining what their book was about can be a good way to ensure that they all read and understood their book. However, this is a heavier task for the teacher who needs to at least know the book they read in order to grade the student.

Some students wanted more reading sessions in class with teacher guidance. The need for more methodological tips was also raised in both the quantitative and qualitative results.

- Incorporate structured reading sessions within the classroom schedule. This allows for guided discussions, clarifications, and support, enhancing comprehension and engagement.

There were complaints about the digital platform not working properly, this led to less participants, and this could have been avoided if the instruction had been repeated.

- Test the platform beforehand and provide technical support as needed. Have a backup plan in case of technical issues. Make sure to create clear instructions, available at all times for the students. Give them in paper format and send them by email for example. Make sure that if there is a holiday week within the allotted reading time, the students have time to ask questions before leaving school.

Students requested a variety of books, including longer and more challenging ones. However, the ER principles advice not to make the reading material too hard.

- Offer a mix of book lengths and difficulties to cater to different reading levels and interests. Challenge advanced readers with longer, more complex texts while providing shorter, engaging books for less confident readers. Indicate the different level and let them choose. Let them change books if the one they selected was too difficult in the end.

Motivation was a significant factor affecting student participation and performance.

- Foster a motivational environment by setting clear goals, providing positive reinforcement, and showing enthusiasm for the reading project. Celebrate milestones and achievements to keep students engaged. Don't forget to follow principle 10 of ER and be a role model of a reader.
- You can also let them choose a comic book or a play, do not forget that the main goal is to have them be more in contact with the target language, and have them enjoy reading and learning. Do not set any "quality" standards over what they are reading. They are already learning how to analyse shorter text in your class and in their literature class, reading books in a foreign language is already a wonderful challenge!

Being disappointed because the majority of the class did not meet the expectation is a normal feeling. Sometimes, projects fail to some extent, and the time that was invested seems to be lost.

- Do not forget that the time spend on a project is never lost. You learn as a teacher, and if only one student begins to like reading, this is already winning. Having them try is already winning. All the projects can't be perfect, but each step towards a student learning the foreign language is a good step. Do not stop making projects if one project ends up in a "failure" in your eyes.

Implementing these tips, derived from direct student feedback and from the quantitative and qualitative analysis, can significantly enhance the effectiveness and enjoyment of reading projects. By prioritizing flexibility, student choice, engaging content, and supportive environments, teachers can create more successful and impactful reading experiences. Additionally, addressing technical issues, offering a variety of reading materials, and fostering motivation will further contribute to the success of similar projects in the future.

5 - Conclusion:

This study aimed to explore whether reading on a mobile device enhances reading comprehension and how it impacts motivation among 3rd and 5th grade students.

In chapter 2, an extended analysis of MALL and its advantages and disadvantages was conducted, giving an indication of the delicate balance that needs to be put into place when working with mobile devices and more precisely smartphones. A study of motivation in the context of learning was also made, in order to better understand the results concerning motivation that were later obtained. A major part of this chapter was centred around the already existing data on reading comprehension in a foreign language and on the results existing concerning reading on technological devices. This showed that the experiment conducted for this master thesis was set in a context that was not extensively studied by scientists to this day. The methodological explanation of how the experiments were conducted was explained in chapter 3. Both the quantitative and qualitative results were presented in chapter 4, followed by a discussion regarding what had been drawn from the data.

Through a combination of quantitative and qualitative analysis, several insights and recommendations have emerged. It also provides a comprehensive analysis of the reading comprehension abilities of 3rd and 5th grade students, comparing the effects of reading on paper versus screens, and considering the contexts in which reading occurs. The quantitative results indicate potential advantages for paper reading, though further research with larger sample sizes and controlled variables is needed to validate these findings. The qualitative results highlight the complexity of implementing an extensive reading project, revealing significant influences of motivation, interest, technology access, and instructional clarity on student engagement and performance.

Despite these challenges and limitations, this study offers valuable insights and practical recommendations for educators aiming to enhance reading projects. Key pedagogical tips include offering multiple reading formats, involving students in book selection, incorporating structured reading sessions, ensuring reliable technology, and fostering a motivational environment. By implementing these strategies, teachers can create more engaging and effective reading experiences that cater to diverse student needs and preferences.

In conclusion, while the study faced limitations such as small sample size and incomplete data, it underscores the importance of flexibility, student choice, and supportive environments in reading projects. The findings suggest that, with careful planning and adaptation to student feedback, educators can significantly improve reading comprehension and foster a love for reading among young students. Moving forward, continued research and iterative improvements based on direct student feedback will be essential in refining and optimizing extensive reading programs.

6 – Bibliography

In addition to the sources mentioned in the bibliography, the following generative AI tools were used to improve the writing quality of the present dissertation:

- ChatGPT for suggesting alternative formulations for a limited number of paragraphs; the suggestions from ChatGPT were then adapted to the style and spirit of this document.

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7. Appendices

7.1 Authorisation letter

Chers parents,

Je suis Sophie Cardin, la professeure d'anglais de vos enfants. L'an dernier, j'ai repris des études à l'université de Louvain la Neuve afin d'obtenir un nouveau master en didactique des langues et d'être mieux formée pour enseigner. Dans le cadre de ce second master, je rédige actuellement un mémoire sur le thème " Mobile Assisted Language Learning and improvement in reading comprehension" (L'apprentissage d'une langue assistée par des technologies mobiles et l'amélioration des compétences de compréhension à la lecture.)

Dans le cadre de mon mémoire, je dois effectuer des expériences et analyser les données récoltées pour observer comment la compréhension à la lecture évolue en fonction des supports et du soutien fourni par l'enseignant.e.

Je vais donc mettre en place une expérimentation auprès de tous mes élèves, dans un cadre qui respectera le programme, fera apprendre vos enfants, et me permettra de rédiger mon mémoire, sans que personne ne soit impacté négativement par ce projet.

J'ai donc besoin de votre accord pour pouvoir collecter et analyser les données obtenues dans le cadre des lectures de vos enfants. Ces données seront ensuite anonymisées et seules deux personnes auront accès aux données initiales : ma directrice de mémoire et moi-même. Seules les données liées aux lectures pour le cours d'anglais seront collectées (données des tests de lectures, temps passé sur l'application...) Vos enfants utiliseront l'application Google Livres sur leurs smartphones ou chromebooks, et les fichiers de lecture leur seront transmis gratuitement (tout prix potentiel de livres nécessaires à mon expérience sera pris en charge par l'UCL). S'ils n'ont pas de smartphones ou de chromebooks, ils feront partie du groupe témoin, et liront sur papier.

Je reste disponible par mail pour toutes questions, à ce sujet ou au sujet du cours d'anglais,
Merci d'avance pour votre accord,

Sophie Cardin.

Je soussigné.e ALAIN déclare que

☒ j'accepte que les données personnelles liées à la lecture de mon enfant

..... EVA soient collectées

☐ je n'accepte pas que les données personnelles liées à la lecture de mon enfant

..... soient collectées

Fait le : 12/12/2023 à TUBIZE

Signature :



7.2 Example of a google form

Reading Comprehension, Rainman, chapter 2

* Indique une question obligatoire

1. Adresse e-mail *

2. Vont ils aller voir Dr Bruner ? *

3. A quel âge Charlie a-t-il quitté la maison familiale ? H *

Une seule réponse possible.

☐ 15 ans

☐ 16 ans

☐ 17 ans

☐ 18 ans

4. Que s'est-il passé avec son père quand Charlie avait 16 ans ? *

5. Qui était rainman dans l'enfance de charlie ? *

Une seule réponse possible.

☐ son meilleur ami

☐ son père

☐ son ami imaginaire

☐ son instituteur

6. Que lisent-ils avec l'avocat après l'enterrement ? *

Une seule réponse possible.

- ☐ Une lettre
- ☐ le testament
- ☐ d'abord une lettre, puis le testament
- ☐ un papier qui déshérite complètement charlie

7. Que reçoit Charlie dans le testament ? *

8. Qui reçoit la maison et l'argent ? *

Une seule réponse possible.

- ☐ Une association
- ☐ Charlie, à condition qu'il prenne soin des roses et de la voiture
- ☐ Un inconnu qui ne pourra pas utiliser l'argent
- ☐ Le pire ennemi de Charlie

9. Comment réagit Charlie en apprenant cela ? *

Une seule réponse possible.

- ☐ Il rit
- ☐ Il pleure
- ☐ Il se met très en colère
- ☐ Il cherche à acheter le notaire pour qu'il change le testament

City of lights

Formulaire pour le livre ENTIER

* Indique une question obligatoire

1. Adresse e-mail *

2. Qui est la narratrice de l'histoire? *

1 point

Une seule réponse possible.

- ☐ Mary, la journaliste
- ☐ Helen, l'astronaute
- ☐ Cathy, la pilote
- ☐ Une personne extérieure à l'histoire
- ☐ Une rédactrice inconnue d'un article de journal

3. Quelle est la situation de départ ? *

1 point

Une seule réponse possible.

- ☐ Trois femmes vont faire voler la première fusée électrique
- ☐ Trois femmes vont faire voler le premier avion-fusée
- ☐ Trois femmes vont faire voler la première fusée fonctionnant à l'eau
- ☐ Trois femmes vont faire voler le premier avion capable d'aller en orbite basse et de revenir

4. Dans quel contexte vont elles décoller ? *

1 point

Une seule réponse possible.

- ☐ Elles passent sur toutes les chaînes de TV du monde
- ☐ La mission est totalement secrète, personne n'est au courant
- ☐ Il n'y a pas d'engouement ni de secret particulier autour de leur mission

5. Dans quel état d'esprit sont elles *

1 point

Une seule réponse possible.

- ☐ Elles sont très angoissées
- ☐ Elles sont très heureuses et impatientes
- ☐ Elles sont excitées mais d'apparence calme et posée

6. Qu'apprend on sur Mary Carter ? *

3 points

Plusieurs réponses possibles.

- ☐ Elle a grandi avec Helen
- ☐ Elle a grandi avec Cathy
- ☐ Elle a souvent l'air nerveuse lorsqu'elle découvre quelque chose, mais ensuite elle excelle dans cette discipline
- ☐ Elle a detesté faire du deltaplane
- ☐ Elle a adoré faire du deltaplane et est devenue l'une des meilleures pilotes
- ☐ Elle est devenue pilote professionnelle
- ☐ Elle est devenue journaliste
- ☐ Elle a voyagé a travers le monde entier
- ☐ Elle est toujours célibataire
- ☐ Elle est mariée et a 3 enfants
- ☐ Elle a créé un programme Tv avec son mari
- ☐ Elle a créé un programme TV avec ses 3 enfants

7.3 Qualitative study questionnaire

J'ai compris le livre dans sa globalité.

1 – Non, j'ai eu vraiment du mal à comprendre	2 – Peu, j'ai compris quelques éléments	3 – Moyen, j'ai compris environ la moitié du livre	4 - Bien, j'ai compris la majorité des événements	5 – Très bien, j'ai quasiment tout compris / j'ai tout compris.
---	---	--	---	---

J'ai lu le livre. Si non, pourquoi ?

Pas du tout, je ne l'ai pas ouvert	Quelques chapitres puis je me suis arrêté	J'ai tout lu.
------------------------------------	---	---------------

J'ai apprécié le livre.

1 – Non, ça ne m'a pas plus du tout	2 – Un peu, mais j'ai dû un peu me forcer à finir	3 – Moyen, j'ai aimé certains passages et d'autres moins	4 – plutôt oui, J'ai bien aimé le livre en général	5 – Oui, J'ai adoré le livre
-------------------------------------	---	--	--	------------------------------

J'ai apprécié lire sur mon smartphone.

1 – Non, ça ne m'a pas plus du tout	2 – Plutôt non, mais j'ai dû un peu me forcer à l'utiliser	3 – Moyen, je n'ai préféré ni l'un ni l'autre	4 – plutôt oui, j'ai aimé lire sur mon smartphone	5 – Oui, j'ai adoré lire sur mon smartphone
-------------------------------------	--	---	---	---

Pourquoi ?

J'ai lu le livre en :

10 fois ou plus	9 fois : un chapitre à la fois	6 fois : souvent 1 chapitre, parfois 2	3 fois : environ 3 chapitres à chaque fois	1 fois : tout d'un coup
-----------------	--------------------------------	--	--	-------------------------

J'ai trouvé que le livre était :

1 - Beaucoup trop long	2 – Assez long	3 – Ni trop long, ni trop court	4 – plutôt court	5 – trop court
------------------------	----------------	---------------------------------	------------------	----------------

J'ai passé ... à lire :

10 heures ou plus	8 heures : un peu moins d'une heure / chapitre	6 heures : une heure pour 1.5 chapitre	4 heures : +/- 2 chapitres par heure	2 heures : 4 chapitres par heure
-------------------	--	--	--------------------------------------	----------------------------------

J'ai pris des notes (préciser si c'est sur le livre ou sur une feuille annexe)

Non	Oui
-----	-----

J'ai cherché des mots de vocabulaire :

Dans un dictionnaire papier	Dans un dictionnaire en ligne	Je n'ai pas cherché de mots de vocabulaire
-----------------------------	-------------------------------	--

J'ai demandé de l'aide à quelqu'un d'extérieur pendant la lecture ? (Si oui préciser qui)

Non	Oui
-----	-----

Je recommanderai ce livre à un de mes camarades du même niveau que moi ?

Non	Oui
-----	-----

J'ai trouvé que le projet lecture était agréable.

1 – Non, ça ne m'a pas plu du tout	2 – Plutôt non, je n'ai pas spécialement aimé	3 – Moyen, je n'ai ni aimé ni détesté	4 – plutôt oui, j'ai bien aimé	5 – Oui, j'ai adoré
------------------------------------	---	---------------------------------------	--------------------------------	---------------------

Pourquoi ?

J'ai trouvé que le projet lecture était stimulant.

1 – Non, ça ne m'a pas stimulé du tout	2 – Plutôt non, je n'ai pas trouvé ça très stimulant	3 – Moyen, je n'ai ni été stimulé ni ennuyé	4 – plutôt oui, j'ai été un peu stimulé	5 – Oui, j'ai été très stimulé
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Pourquoi ?

As-tu des suggestions / conseils / remarques sur le projet et sur sa mise en place ?

.....

7.4 Qualitative questionnaires, global answers.

1 J'ai compris le livre dans sa globalité :

	1	2	3	4	5
3		B1:3 B2:1	B1:1 B2:3	B1:3 B2:5	B1:5 B2:3
5			B1:2 B2:3	B1:11 B2:9	B2:1

2 J'ai lu le livre

	1	2	3
3	B1:2 B2:2	B1:3 B2:5	B1:10 B2:8
5	B1:2 B2:2	B1:1 B2:2	B1:12 B2:10

3 J'ai apprécié le livre

	1	2	3	4	5
3	L1:1	L1:3 L2:8	L1:4 L2:2	L1:4 L2:2	L1:3 L2:1
5	L1:1 L2:1	L1:3 L2:5	L1:7 L2:4	L1:2 L2:3	L1:1 L2:1

4 J'ai apprécié lire sur mon smartphone

	1	2	3	4	5
3	L1:2 L2:3	L2:2	L1:3 L2:3	L2:2	L1:3 L2:1
5	L1:2 L2:2	L1:3 L2:3	L1:1 L2:1	L2:2	L2:1

5 J'ai lu le livre en

	1	2	3	4	5
3		L1:3 L2:4	L1:3 L2:3	L1:7 L2:5	
5	L1:1 L2:1	L1:2 L2:1	L1:4 L2:2	L1:5 L2:8	

6 J'ai trouvé que le livre était

	1	2	3	4	5
3		L1:3 L2:4	L1:3 L2:3	L1:7 L2:5	
5	L1:2 L2:2	L1:9 L2:10	L1:2 L2:4		

7 J'ai passé ... à lire

	1	2	3	4	5
3			L1:1 L2:3	L1:11 L2:8	
5	L1:2 L2:1	L1:1 L2:2	L1:3 L2:2	L1:6 L2:8	

8 J'ai pris des notes

	1	2
3	L1:12 L2:11	L1:1 L2:1
5	L1:12 L2:10	L1:1 L2:3

9 J'ai cherché des mots de vocabulaire

	1	2	3
3	L1:2 L2:1	L1:2 L2:4	L1:8 L2:7
5	L2:1	L1:8 L2:9	L1:4 L2:3

10 J'ai demandé de l'aide à quelqu'un d'extérieur pendant la lecture

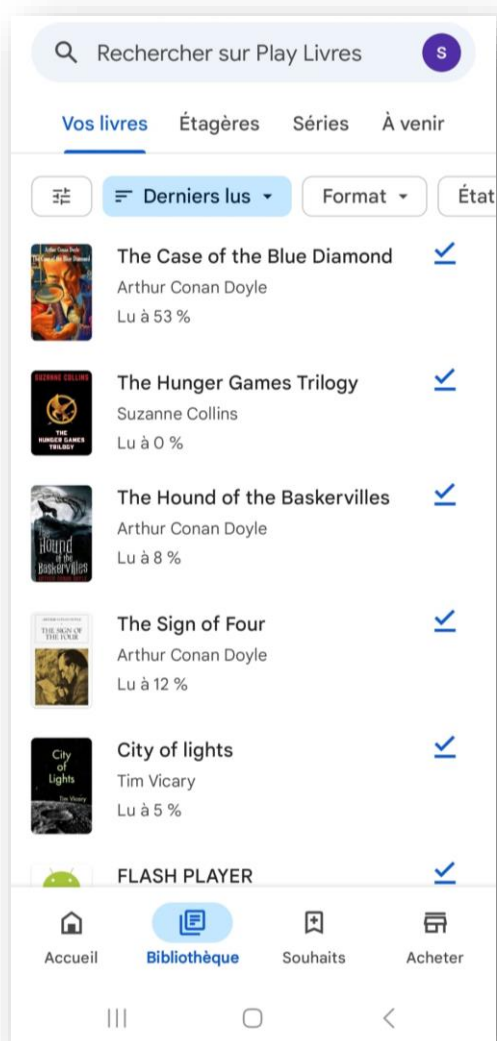
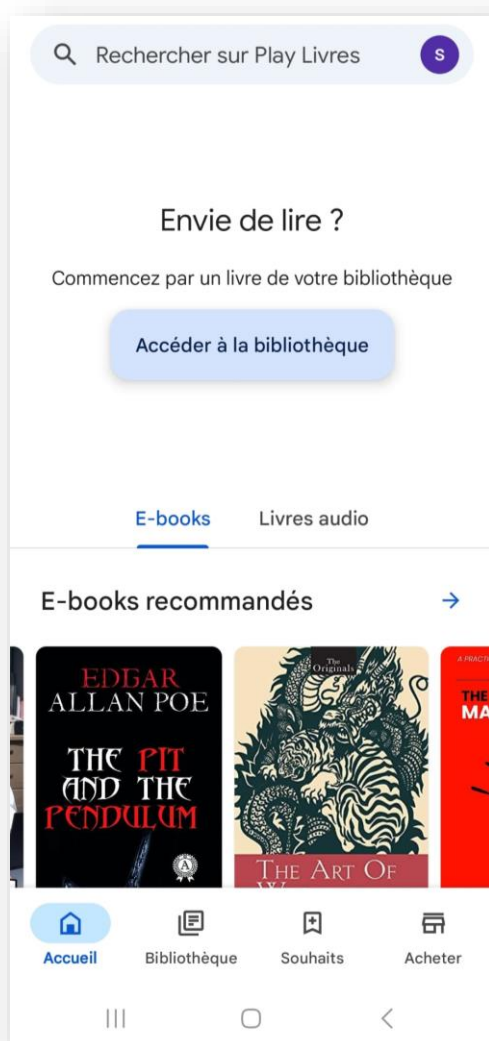
	1	2
3	L1:11 L2:13	L1:2 L2:1
5	L1:9 L2:9	L1:2 L2:4

11 Je recommanderai ce livre à un de mes camarades du même niveau que moi

	1	2
--	---	---

3	L1:6 L2:7	L1:8 L2:7			
5	L1:8 L2:8	L1:4 L2:3			
12 J'ai trouvé que le projet lecture était agréable					
	1	2	3	4	5
3	L1:1 L2:2	L1:2 L2:2	L1:7 L2:6	L1:4 L2:4	
5		L1:1 L2:1	L1:12 L2:10	L2:2	
13 J'ai trouvé que le projet lecture était stimulant					
	1	2	3	4	5
3	L1:3 L2:2	L1:2 L2:4	L1:5 L2:5	L1:4 L2:2	L2:1
5	L1:4 L2:3	L1:4 L2:2	L1:5 L2:6	L2:2	

7.5 Play Book



coats and hats and went out into the cold winter street. The sky was dark over our heads. We walked east, and in a quarter of an hour we stood in front of The Alpha. Holmes opened the door and we went in.

In the pub the owner, Mr Windigate, gave us some beer.

'Is this beer good?' Holmes asked him. 'I ask because I know your geese are very good. Mr Henry Baker told us all about your goose club.'

Ah, yes. But those geese weren't our geese. They came from a man with a little shop in Covent Garden. Breckinridge is his name.'

'Thank you, my good man,' said Holmes. We paid for our beer and drank it. Then we walked out of the warm pub and into the cold

8 pages restantes dans le livre

50 %

coats and hats and went out into the cold winter street. The sky was dark over our heads. We walked east, and in a quarter of an hour we stood in front of The Alpha. Holmes opened the door and we went in.

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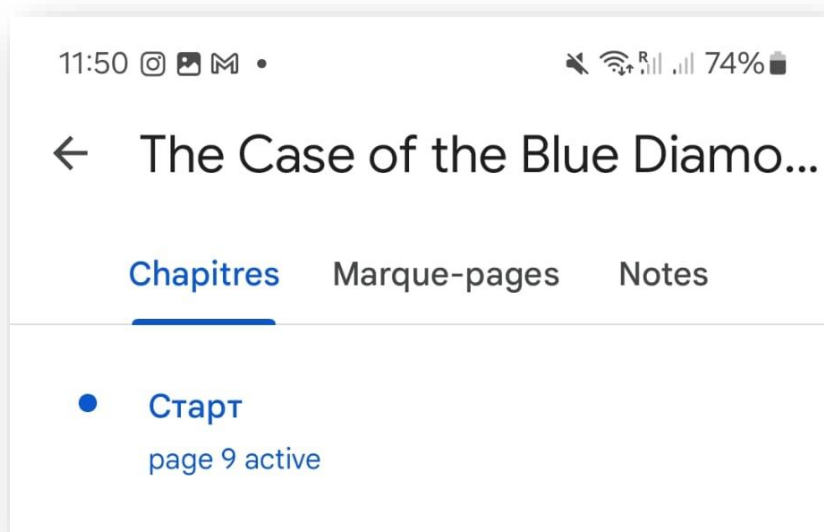
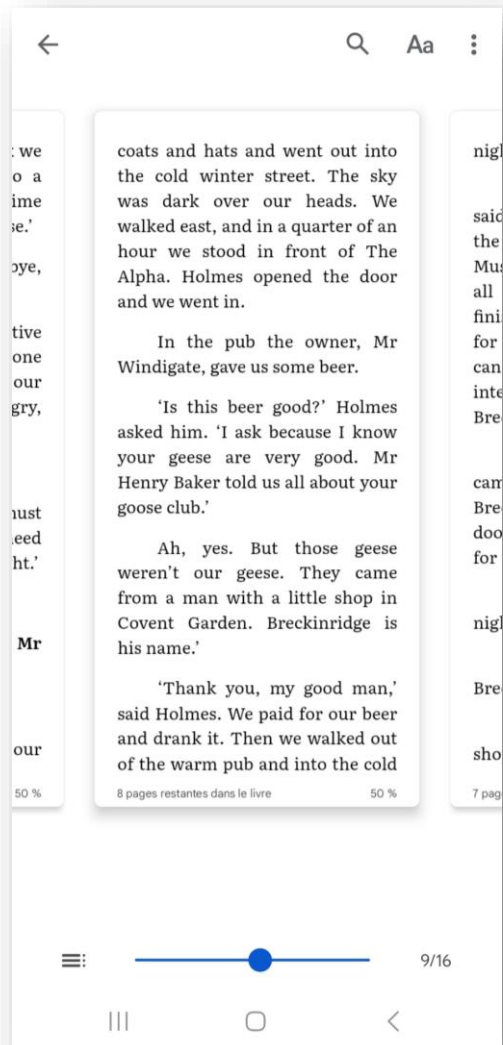
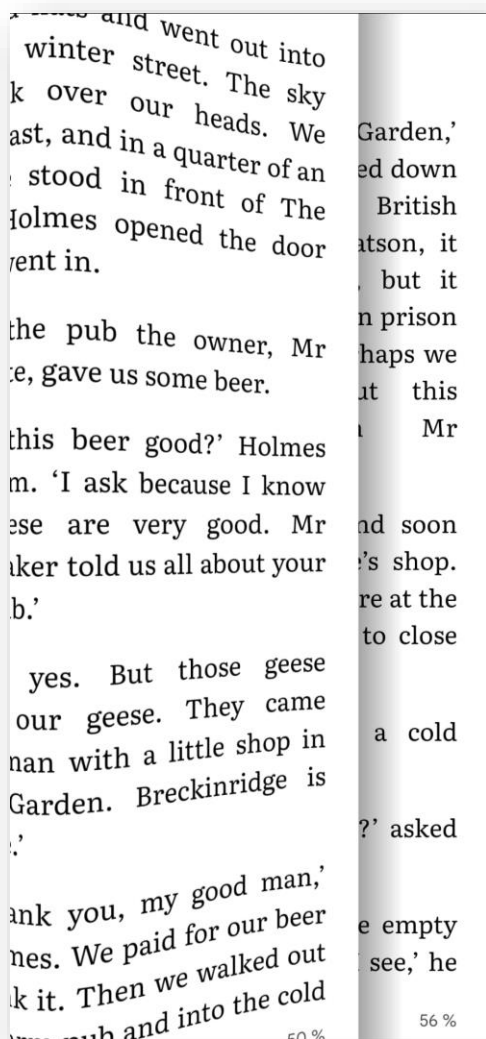
Ah, yes. But those geese weren't our geese. They came from a man with a little shop in Covent Garden. Breckinridge is his name.'

goose

gu:s

noun

1: a large waterbird with a long neck, short legs, webbed feet, and a short broad bill.



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