

An Emergency Shift from Paper to Digital Books in a Large-Scale Extensive Reading Program at a Japanese University: Effects on Learner Performance and Experience

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〈要旨〉

本稿は従来の紙ベースの書籍からオンライン書籍を使った多読プログラムへの移行に伴う全学的な学生の取り組みを考察する。コロナ禍で図書館の利用が制限され本学では紙ベースの図書館の本を用いた多読活動から電子書籍 (Xreading) を用いた多読活動に移行した。本研究の目的は以下の2点である。第一は、Xreading のデータと学生たちへの調査を元に彼らの学習経験を報告することである。第二は、M-Reader という学習管理システムを併用した図書館の本で行う多読活動と Xreading という電子書籍と学習管理システムを兼ねた教材を用いた多読活動の比較である。2019, 2020 年の学生たちの読書への姿勢、読書量 (word count)、二つのシステムの長所、短所も分析した。その結果、学生たちは紙ベースに比べて、オンラインでは読んだ語数はかなり減ったものの読んだ本の数は増えた。一方でオンラインでは読書への内発的動機が弱まった。結果の分析には、コロナ禍の学習環境も考慮する必要がある、コロナ後の安定した環境であらためて分析が必要だと考える。

Key words: Digital books, Physical books, Xreading, M-Reader, Large-scale extensive reading program, Questionnaire

Introduction

Extensive Reading (ER) has been widely adopted in tertiary-level English language learning programs across Asia as an integral part of a curriculum or individual English class. Numerous studies have shown that extensive reading offers a wide range of benefits to second language (L2) learners. In addition to the gains on reading fluency, automatized lexical access, listening proficiency, writing ability, and good reading habits, the positive influence of ER on the affective aspects has been also reported (e.g., Kondo-Brown, 2006; Takase, 2007; Yamashita, 2013).

Because of the significant benefits of ER, such as improvement in reading fluency for EFL learners whose exposure to English is limited, ideally ER programs should be designed to have

learners read large quantities of comprehensible and meaningful self-selected reading materials in a manner that encourages learners to develop a love for the act of reading. In addition to having motivated students and motivated teachers, successful implementation of an ER program at an institutional scale, however, requires certain external conditions to be met: the accessibility to appropriate materials, the availability of time in and out of class, a systematic assessment for teachers, and the manageability of the program for administrators. As a solution for automating the assessment process, the web-based management platform M-Reader has enabled many institutions to conduct ER programs on a larger scale.

Because of limited access to many university libraries under the COVID-19 pandemic, however, the accessibility to reading materials became a critical issue in 2020. Among several choices of screen-based (e-books or digitized) books by many publishers such as Oxford Reading Club, eSTATION, myON, Oxford Learners' Bookshelf, Book Fix, True Fix, and Literary Pro Library; Xreading, a pay-to-access, web-based, digital library of graded readers with a learner management platform for teachers has been adopted by some institutions, including Kyoto University of Foreign Studies (KUFS). Not only does it allow teachers to track student reading activity in a similar way as M-Reader, but it also enables the institution to maintain usage of their physical library, as Xreading also integrates with M-Reader to deliver its quizzes made for paper-based graded readers.

Although the positive impact of a paper-based ER program at KUFS was previously shown by Campbell et al. (2015), the impact of the digital-based ER program at KUFS on students' reading performance and attitudes had yet to be studied. There were not only external factors, such as the difference in the reading medium between paper-based books and digital ones, but there were also environmental factors unique to the year 2020 during the pandemic which affected reading performance, such as the ones related to online learning environments (e.g., tired eyes; the lack of teacher intervention). Although there have been some studies which show the differences in students' opinions and their reading performance between paper book-based ER and digital book-based ER (Sumida, 2018; Collet, 2018; Mizrachi, et al., 2018; Milliner & Cote, 2015; Nakanishi, 2015), studies that investigate how digital ER was carried out under the pandemic are still forthcoming.

Therefore, the present study was driven by the following research questions: 1) How did students carry out ER with the digital library in terms of their reading performance? and 2) What were students' opinions of the Xreading-based ER program?

Background

The Extensive Reading Program at KUFS

The extensive reading program at KUFS began with a series of pilots in the fall of 2010, where student reading was tracked by Moodle Reader, a plugin for the open-source Learning Management System (LMS) called Moodle. Then in 2013, the program switched to a more streamlined browser-based version of Moodle Reader, called M-Reader, which was used to track student reading until the end of the 2019–2020 academic year. Like Moodle Reader, M-Reader assesses student reading by delivering short, timed quizzes with randomized questions after they finish reading a book for ER.

Both Moodle Reader and M-Reader automate assessment, which allowed KUFS's program to scale rapidly. At present, the ER program at KUFS is composed of approximately 50 teachers and 2,200 students and is supported by a library of more than 20,000 copies of around 3,000 titles of graded and non-graded readers. All first and second year students throughout the university are required to participate as part of their course requirements. ER is integrated into one of the required classes for first- and second-year students majoring in English, as well as non-English majors in the Faculty of Foreign Languages, and students in the Junior College affiliated with the university. It is also a required part of the English language classes in the Faculty of Global Engagement for first-year students.

In general, at the beginning of the academic year, first-year students are assigned a reading level and are given minimum word count goals to reach per semester depending on their GTEC/TOEIC scores. As students move into their second year, word count goals are increased progressively depending on their English level. Although most reading takes place outside of class, many students engage regularly in Sustained Silent Reading (SSR) in the classroom, and 20–30% of their course grade is based on their ER performance. As a direct result of the onset of the COVID-19 pandemic, however, the physical library at KUFS was abruptly closed in April of 2020, making it impossible for students to check out books. Therefore, an immediate move to Xreading was made in order to give students access to its digital, web-based library of more than 1,350 graded reader titles at 14 different levels. This would allow students to access books on any internet-enabled device and would give teachers the ability to track their reading activity.

Literature Review

Digital books are now becoming more available and attractive to students as the speed with which students can access digital books makes them available anytime and anywhere. According to Xreading, its system was developed to make its graded readers more accessible to students as

digital books allow students to have unlimited access as “books are never checked out or unavailable” (Xreading, n.d., *About Xreading*, para. 1). Digital reading software also allows readers to customize their own reading experiences, for example, by adjusting the size of the font or looking up the meaning of a word in a dictionary with the press of a button or touch of the screen. In addition, the availability of digital books greatly impacts students’ reading behavior and choices in a positive way, not only for the native language reader but also for the L2 and ER reader (Johnston & Salaz, 2019). Students in 2021 are digital natives often having the perspective that “it feels more authentic and organic to use technology for everything” (McVicker, 2019, p. 739).

Research has shown that using digital books “boosts EFL learner motivation, reading comprehension, and vocabulary learning” (Chet et al., 2013, as cited in Milliner & Cote, 2015, p. 3). A study by Mesureur (2013) on students doing ER on their mobile devices, found that students would engage more with ER if they had access to digital books or an online library of digital books (as cited in Milliner & Cote, 2015) similar to those available from Xreading. Some studies suggest that Xreading motivated their students to read because students could choose the books they liked and according to their levels of English rather than having a paper-based textbook that the teacher chose (Matsumoto, 2019; Imura, 2020).

In a study from 2011, Foasberg gathered data on students at Queens College, City University of New York in which it was found that students were much more likely to use an e-book reader for recreational reading than for academic studies. Further studies at Northwest Missouri State University, Princeton University and Gettysburg College produced similar comments from students. Overall, they liked using an e-reader for their leisure reading, but not for textbooks. Another study by Zhang & Niu (2016) noted that library users often use digital books as online references for extracting information, but prefer printed books for leisure reading.

An online study of the general public in Japan examined reading preferences between print and digital in a variety of circumstances. The finding was that about 70% of total reading time was spent on digital media, but the readers favored print media (Kurata et al., 2017). Kurata’s study included not only reading books, newspapers or articles, but also reading within the “vast and complex digital reading in the web environment, which has no comparable print format” (p. 884). In a study of public library circulation data from the city of Chicago during the year 2015, Gao found that library patrons consistently selected print books over e-books for both fiction and nonfiction reading. A similar finding from a study of Taiwanese university students of science and engineering noted that many of the materials the students spent time reading are only available digitally, such as social networking sites and emails. The majority of the students participating in the survey preferred to read books and magazines in print (Liu, 2005).

As part of the Academic Reading Format International Study (ARFIS), investigating print and

digital reading preferences, Mizrachi et al. (2018) gathered self-reported data on reading format preferences from university and college students in 21 countries with 10,293 participants, finding that the majority (78.44%) of respondents preferred print format for reading academic course materials and only 10% preferred reading in an electronic format, while 11.5% had no preference. Respondents cited various reasons for preferring print materials, including using strategies such as highlighting and annotating; many strongly agreed that they remembered information best when reading in print. Johnston & Salaz (2019) provided analysis of student responses at an Australian university. The majority (71%) of the students believed that they remembered information best when reading from the printed page and thought they could focus on studying better from print. Some reasons for preferring print materials include the ability to write in the margins of a book, underline or highlight, and refer back easily to notes within the reading. Although electronic sources are portable and easy to store, they also require a device, charger and power as well as loading time and Wi-Fi connectivity. In contrast to this seeming convenience of electronic resources, respondents thought that print sources were always available, did not require any special knowledge to find or use, and did not carry the risk of being suddenly unavailable because of technical issues (Johnston & Salaz, 2019).

Another advantage of reading in print is the lack of distractions. When reading on a computer, tablet or mobile phone, respondents are subject to digital interruptions (Myrberg, 2017).

Reading assessment may also be influenced by print and digital reading choices. In a study of adolescent reading habits as predictors of reading comprehension success, Duncan et al. (2016) found that although student reading reflected “the growing tendency for more time to be spent with digital rather than traditional texts, nevertheless, more associations with reading comprehension, word identification, and fluency were observed for traditional than for digital literacies” (p. 230).

Sumida (2018) noted the importance of the word count that students are required to read. In his research, many students in the ER program using Xreading expressed that they can read faster and smoother than before. However, there were no differences in English test scores regarding their improvement of vocabulary, grammar, reading comprehension, and reading speed compared with the student group who did not use Xreading. He acknowledges the word count assigned was too low to make a difference and states that he should have set the goal for 200,000 words or more in a year. Also, he argues that it is necessary to set weekly or monthly achievable goals for students to continue reading and successfully accomplish their goals.

Matsumoto (2019) suggests that by combining Xreading activities with asking students to write a book report and to tell her what they have read and to express their opinions has proved to be an effective way to deepen the understanding of literature and improve the motivation of her students to read more.

Imura (2020) reports that although classes were provided online using the digital ER system Xreading, classes went smoothly without any trouble during the first year of the COVID-19 pandemic. In addition, according to questionnaire data by Milliner & Cote (2015) using Xreading with students, 93% agreed that the digital platform made reading in English more enjoyable.

Ridgway (2000) notes yet another important feature of digital books is audio on demand. This enables students doing ER to practice the reading-while-listening (RWL) approach. Winn et al. contend that RWL also enhances both comprehension skills and vocabulary acquisition (2006).

Reading Performance

This section compares reading data from the most recent year that M-Reader was used (2019) with the reading data for 2020, which was the first year Xreading was used for the KUFS ER program. It should be noted that because of several significant differences between the two programs, this is not a strict like-with-like comparison. One of the differences is that in 2020 there were more students in the program (see Table 1 below) because the 3rd year English majors joined the extensive reading program. There were also differences in the word count goals and how the reading levels were set up in the two different management systems (M-Reader and Xreading) used for the university's ER programs.

The contrast created by the transition from physical to digital reading was inevitably made greater by the emergency measures introduced to combat COVID-19. Throughout 2020, students were, in most cases, exclusively participating in remote learning and thus having to deal with a much higher number of hours online and in front of a variety of digital screens. While the effects of this situation would invariably differ from one student to the next, undoubtedly, some students may have found this to be an additional burden, which could have had a negative effect on their intrinsic motivation for doing additional hours of self-study, including online reading.

Another key difference that should be noted is that while M-Reader was a well-established system at KUFS with which most students and teachers were already familiar, Xreading was a newly introduced system that had only been running in one small faculty for two years. The university-wide roll out of Xreading was done under emergency circumstances, only given the go-ahead by the administration in March 2020, which only allowed one month for the system to then be configured before going live. This meant administrators, teachers, and 2nd-year students had very little time to familiarize themselves with its features. As a result, there were several technical and procedural issues, which resulted in students sometimes experiencing difficulties in accessing the system and the digital books. While the effects on overall reading progress and goals are largely unquantifiable, this circumstance should nevertheless be kept in mind when comparing the results

from 2019 with those in 2020.

Finally, one of the key differences between Xreading and M-Reader is the fact that because students log into Xreading to read books, Xreading can track their reading times for each book, total reading time for all books, and reading speeds, both average and for individual books. As M-Reader tracks word counts by the delivery of quizzes for physical books that were read offline, time-based reading data is not available. The comparison of students' performance is therefore limited to the summary data based on the number of words read and number of books read by the students. This data can be seen in Table 1 below.

Table 1 2019 and 2020 Summary Data of Students' ER Performance

	M-Reader 2019	%	Xreading 2020	%
Total number of words read	416,392,742		301,376,766	
Number of readers in program	1,701		2,211	
Average number of words read	244,793		136,307	
Average number of quizzes taken (M-Reader) or books read (Xreading)	49		74	
Top reader – words read	3,381,578		5,273,288	
Number of students who read:				
>1m words	6	0.35	1	0.05
500K ~ 1m words	115	6.76	10	0.45
300k ~ 500K words	372	21.87	43	1.94
200K ~300K words	298	17.52	340	15.38
100K ~200K words	580	34.10	1,031	46.63
50K ~100K words	271	15.93	569	25.73
>0 ~ 50K words	46	2.70	161	7.28
0 words	13	0.76	56	2.53

Word Count Differences

In general, the data shows that students achieved a higher rate of reading in 2019 under the established M-Reader management system than students in 2020, who were using the newly introduced Xreading system. The average number of words read in 2019 using M-Reader was significantly higher, with an average of 244,793 words per student. This compares to 136,307 words per student in 2020 under the new Xreading system. There are several possible contributing factors that explain this difference.

The Learning Curve

One of the contributing factors to this difference in average word counts may be the learning curve that teachers and administrators had to experience at the beginning of the academic year. In 2019, the program was being run as it had been for nine years, with a physical library and M-Reader

to deliver quizzes and track word counts. Everyone was accustomed to it, so the program functioned smoothly from the very first week. In contrast, with the rapid introduction of Xreading under emergency conditions at the start of the 2020 spring semester, most students and teachers were using the system for the very first time with little time to prepare. Add to that the pressure of adapting their courses to the remote learning environment and learning how to use all the new digital tools to deliver their classes, teachers were distracted to say the least. Inevitably, there were several teething problems, such as delays for some students being registered onto the system, and registered students not knowing how to access or use the system. In some cases, this resulted in students being unable to access books until the problems were rectified, setting these students back from the outset. Clearly, the introduction of Xreading to the pre-existing reading program did not have time to be properly and thoroughly executed.

Technical Issues

Another difference between running an ER program using a physical library with M-Reader and one that uses an entirely digital library like Xreading lies in the effects of any technical problems that could arise in terms of accessing either system. Since M-Reader's primary function is to deliver quizzes, any technical issues would only affect tracking student word counts; students could continue to read. In contrast, any access problems for students using an entirely digital library would necessarily limit their reading activity for that period.

Inevitably, because of the unexpected steep rise in the number of new institutions using Xreading during the first half of 2020, the system became overloaded and needed an upgrade during the middle of the spring semester. While system upgrades are normally done during holiday periods, the mid-semester upgrade was deemed essential because of the massive surge in usage, a direct result of the rapid expansion in online learning seen during the first half of 2020 as COVID-19 countermeasures were being introduced. The upgrade was not without its hiccups, understandably, which led to short periods of outage or not fully functioning features over the course of several weeks. This may have contributed in part to a reduction in the time students were able to access books and added to their reading time.

Emergency Remote Learning Challenges

The realities of online learning, especially when unexpected, can take a toll on students' physical and mental well-being. This could have had a negative effect on their intrinsic motivation to read, which may have resulted from the additional pressure on students of having to be online for so many hours. While these effects cannot at this stage be quantified, it is reasonable to predict that many students were reluctant to spend the additional time online to read digital books after having

stared at a screen all day in live MS Teams sessions. In the previous year, there were no significant factors which may have reduced the students' motivation to read the physical books which were part of that year's extensive reading program. But the significant number of hours that students had to look at a screen to get their education probably led to reduced reading time out of sheer fatigue.

Teachers were also affected in negative ways. Because of the additional burden of having to adapt their materials and methods to the online environment, many teachers may simply not have been able to dedicate as much time to monitoring and indeed, motivating the students to read on a regular basis compared to 2019. This is certainly an area where large improvements can be expected because teachers will now be more experienced with the Xreading system and hopefully no longer overburdened with emergency teaching conditions, at least, not as much as in 2020.

Average Number of Books Read

While the average number of words read was significantly higher in 2019, the average number of quizzes taken (representing books read) per student was lower when compared to 2020. This can largely be explained by looking at the percentages of students falling into the various word count ranges (e.g., 0 ~ 50,000 words; 50,000 ~ 100,000 words). As seen in Table 1, a higher proportion of students in 2020 fall into the lower word count ranges. This means students in 2020 were reading a higher number of lower-level books, which tend to carry a lower overall word count.

The primary factor in this difference in number of books read is the abundant existence of extremely short books in the lower reading levels from publishers like Sunshine Books, ELI, e-future, and WAO Corporation. There are a total of 336 titles on Xreading from those four publishers alone. Many of these books have word counts between 100 ~ 500, while some are even as short as 50 words. Such books are not commonly found in the physical library. Indeed, the average length of many Level 1 books in the KUFS physical library is roughly 500 ~ 1000 words.

The convenience and availability of the digital format compared with physical books may also have accounted for the higher number of books (albeit lower-level books) being read, and associated quizzes taken in 2020 than in 2019. It is far easier to access ten 500-word digital books with the click of a button on a smartphone than it is to check out the same books one-by-one in a physical library, keep track of them, carry them around, and then turn them back in on time. In addition, digital books are always available, while their physical counterparts could be missing from the shelves if other students have checked them out already, as the number of copies of any given title is limited. The ease of access afforded by a digital library must certainly play a role in this large difference in the number of books read.

Questionnaire: Attitudes Toward Extensive Reading

Method

A questionnaire was delivered to KUFU students toward the end of the 2020–2021 academic year in order to characterize their attitudes and experiences with extensive reading via Xreading (see Appendix). The results were used to: 1) compare their responses with a previous cohort of students who experienced an M-Reader-based program with a physical library; and 2) examine student attitudes and experiences reading via Xreading during the pandemic.

Participants

The questionnaire was delivered to all the participants in the program, out of which 801 students answered, consisting of 426 English majors, 49 Global Studies majors, 66 Tourism majors, 143 non-English majors (NEM), and 117 Junior College students. In terms of student opinions about the extensive reading program itself, responses from 517 first-year students of each major were compared and analyzed (215 English majors, 49 Global Studies majors, 66 Tourism majors, 87 NEMs, and 95 Junior College students). The questionnaire was not answered by the 3rd year students, who stopped compulsory extensive reading from the fall semester, and by other students who simply did not access the questionnaire.

In order to compare attitudes toward ER between first-year students experiencing ER with Xreading for the first time and those of second-year students who had experienced physical book-based ER with M-Reader the previous year (when they were first-year students), responses from 216 first-year and 225 second-year English majors, and responses from 68 second-year and 75 NEM first-year students were analyzed. Responses from students in other departments were not included because they did not meet the same condition as the English majors and NEM.

Finally, the differences in responses between the group which experienced a physical library-based ER in 2015, and the group which experienced a digital library-based ER in 2020, were compared. The reason for the 5-year gap is because the 2015 survey is the most recent survey delivered which contained many of the same items as the one conducted in 2020. The responses to the same items from the two cohorts (2015 & 2020) were also compared. There were 306 first-year English majors in the 2015 cohort and 216 first-year English majors (out of 512 freshmen altogether from all the departments) in the 2020 cohort.

Instruments

The questionnaire about the students' perceptions on reading in a foreign language, developed by Campbell, et al. (2015), was used with modifications of some items. There were 15 items includ-

ing 13 six-point Likert scale multiple choice questions and one free response question. Further questions (Q16 and 17) were included concerning the usage of audio and the preference between digital-reading and paper-based reading. Only those who experienced the two types of extensive reading were expected to answer these questions. The free response question (Q15) asked students to give reasons for their answers about motivation (See Appendix).

Analyses

According to the factor analyses carried out on the results of questionnaires in Yoshida (2018), the original 15 items were categorized into 4 factors: *autonomous learners* (e.g., “I read every day” and “I talk about books with my friends”), *fluency in reading* (e.g. “I forget about reading in an L2” and “I try to guess the meaning of unknown words”), *intrinsic motivation* (e.g., “ER is fun”, “ER is beneficial” and “ER is easy”), and *inefficiency in reading* (e.g., “I use dictionaries” and “I take memos”). Although a descriptive analysis was carried for individual items, as for the overall results, students’ responses were analyzed for each of the following three factors by department and grade: *fluency in reading*, *intrinsic motivation*, and *inefficiency in reading*. Because the survey could not include some items, which assumed the presence of physical books, and could have had a different meaning between 2015 and 2020 because of the availability of physical books such as “I always carry books” and “I talk about books with my friends”, no comparison was made about this factor. While there were numerous findings, only a few noteworthy results are reported in this paper.

Results

Attitudes of the 2020 Cohort Toward ER

Perceived Motivation toward Reading in a Foreign Language. Figure 1 shows the overall results of the students’ reactions to the question about whether they are motivated by ER. The distribution of frequency suggests that there are more students who think they are motivated by ER than those who don’t think they are motivated by ER.

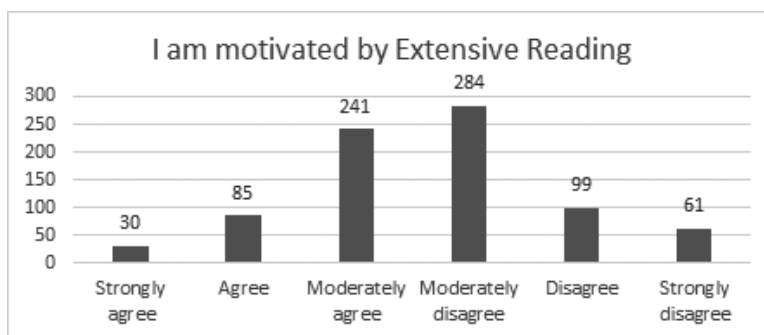


Figure 1 Results of Perceived Motivation for ER

The free response to the question asking for participants' reasons for answers about their motivation was first divided between those who gave positive answers (strongly agree, agree, and moderately agree) and those who gave negative answers (strongly disagree, disagree, moderately disagree). The individual responses were then classified by main categories: *Goal oriented* (they are motivated because clear goals are set); *Development of reading habits* (their reading habits have been established); *Interest in reading books*; *Interest in learning English*; and *Effectiveness of the program* (they feel improvement in their reading skills). Figure 2 shows the distribution of the main categories of the reasons for positive answers. The results suggest that most of those students who are motivated find the program effective to improve their English ability, and they are also interested in learning English or reading books in general.

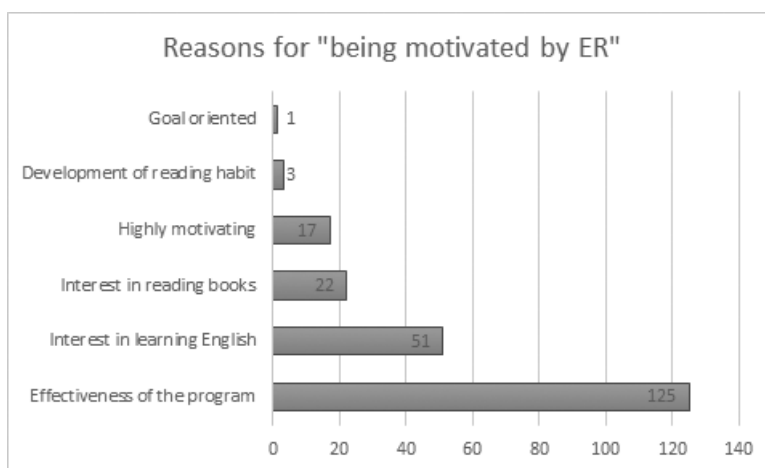


Figure 2 Reasons for the Positive Answers to the Questions About Motivation

Figure 3 shows the distribution of the main categories of the reasons for the negative answers: For those who answered they are not motivated, the lack of interest in reading books is the most common reason. Many of them answered that they prefer listening to audio or watching video and are not good at reading written text. The next most common reasons for not being motivated are that they find the task difficult, they failed to manage their learning, and they do not like to be pressured by the goals set by the program.



Figure 3 Reasons for the Negative Answers to the Questions About Motivation

Intrinsic Motivation of 2020 Cohort Toward ER

Students were also asked to answer three questions concerning their intrinsic motivation toward extensive reading. Figure 4 shows the overall results of the students' reactions to the item "Reading in English is Easy" and it was shown that more than half of the students agree. Figure 5 summarizes the overall results of the students' reactions to the item "Reading in English is Fun" and it was shown that more than 70% of the students agree. Figure 6 summarizes the overall results of the students' reactions to the item "Reading in English is Beneficial". There was one respondent who did not answer this item. It was shown that about 95% of the students agree.

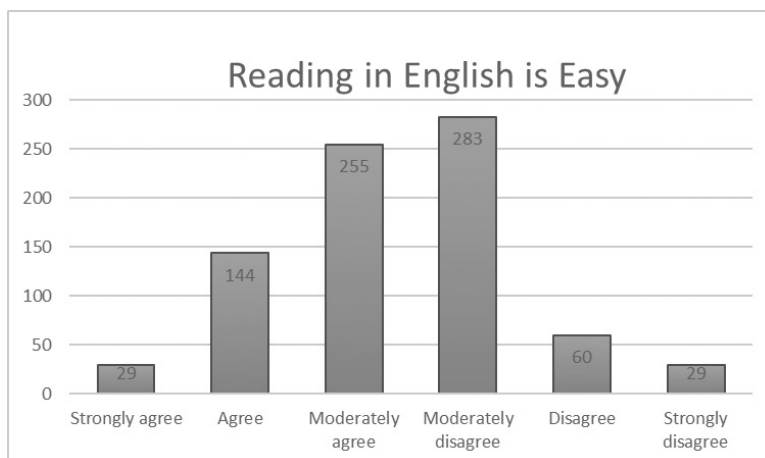


Figure 4 Reactions to "Reading in English is Easy"

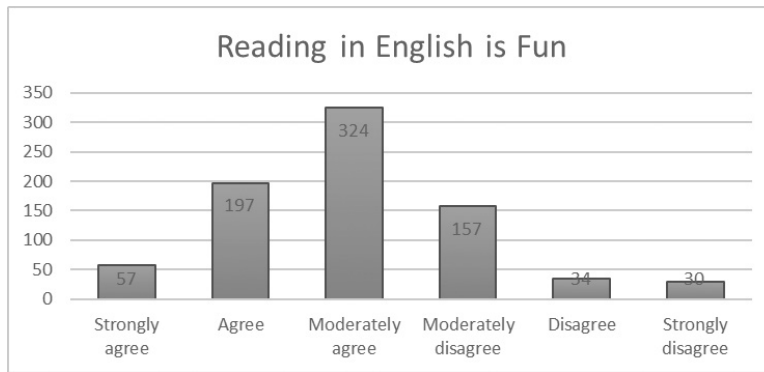


Figure 5 Reaction to “Reading in English is Fun”

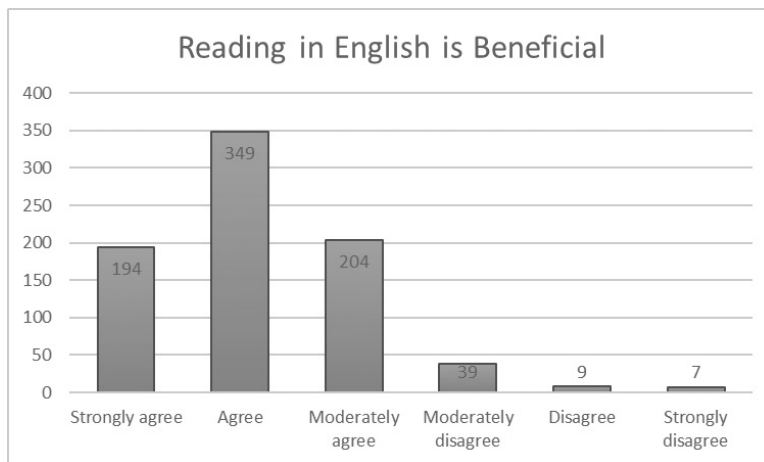


Figure 6 Reaction to “Reading in English is Beneficial”

Intrinsic Motivation by Major

The students’ responses to the factor “intrinsic motivation” which consists of the three items: “Reading in English is Easy”, “Reading in English is Fun”, and “Reading in English is Beneficial” were analyzed by department. Table 2 shows descriptive statistics. The result of a one-way ANOVA showed a statistically significant effect by major ($F = 2.97, p < .05, \eta^2 = .02$) but the effect size is very small.

The post hoc multiple comparison showed there were statistical differences between Global Studies (GS) and English majors, and the Tourism and the Junior College majors respectively. This suggests that GS majors’ perception about their intrinsic motivation toward ER (such as easiness, enjoyment, and their belief about the effectiveness of the activity) is lower compared with English majors’, and Tourism majors’ perception about their intrinsic motivation toward ER is lower than the

Junior College majors'. Other than that, there is no difference between majors on their perception about their intrinsic motivation toward ER.

Table 2 Mean (SD) for First Year Students' Reactions to "Intrinsic Motivation" Factor by Major

	Frequency	Average	SD
English	215	12.40	2.651
NEM	87	12.63	2.659
GS	49	11.71	2.731
Tourism	66	11.74	2.296
Junior College	95	12.91	2.556
Total	512	12.38	2.620

Note: GS=Global Studies, NEM=non-English major

Perceived Motivation by Grade and Major

It was also examined whether their reactions to "Intrinsic Motivation" differ by grade and major. Table 3 shows the descriptive statistics. In order to examine the effects of grade and major, a two-way ANOVA was carried out. The results showed a significant main effect of grade ($F = 14.51$, $p < .05$, $\eta^2 = .027$), and the effect size is medium. These results suggest that students' intrinsic motivation drops in their 2nd year of the program regardless of their major.

Table 3 Mean (SD) for the Reactions to "Intrinsic Motivation" Factor by Major and Grade

	1st year	2nd year
English	12.4 (2.7)	11.69 (2.9)
NEM	12.63 (2.7)	11.28 (2.6)

Note: Max = 18

Perceptions about Fluency of the 2020 Cohort

Figures 7 and 8 show the overall results of the students' responses to the items about fluency. There were two respondents who did not answer the first item and three respondents who did not answer the second item. Figure 7 shows that more than half of the respondents forgot that they were reading in a foreign language, at least occasionally.

Figure 8 shows that more than 80% of students answered, "I can imagine the situation, as if I am watching a movie", at least "once a while."

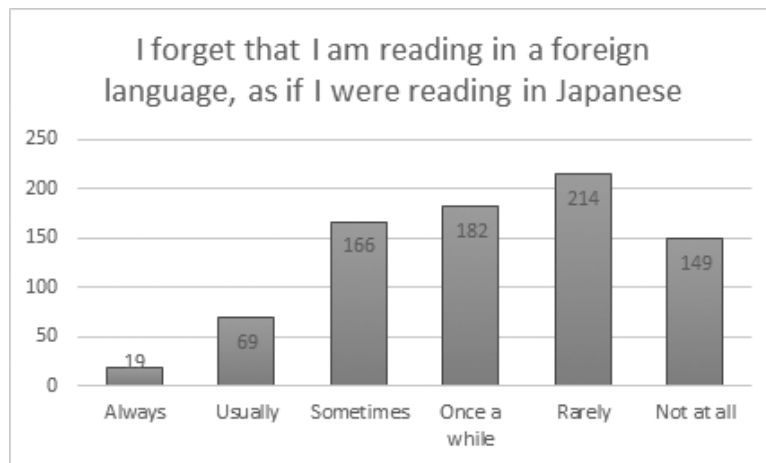


Figure 7 Reactions to “I forget that I am reading in a foreign language, as if I were reading in Japanese”

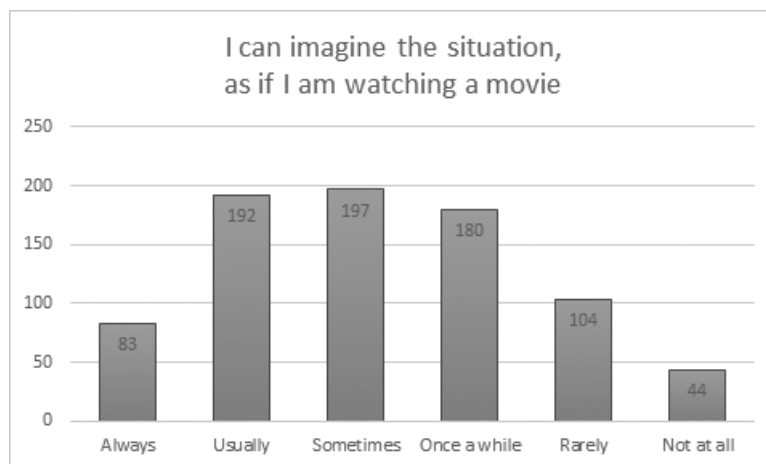
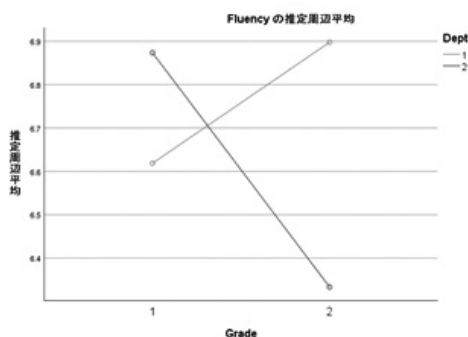


Figure 8 Reactions to: “I can imagine the situation, as if I am watching a movie”

Perceived Fluency by Grade and Major

Students’ responses to the factor concerning perceived fluency, which consists of the two items: “I forget that I am reading in a foreign language, as if I were reading in Japanese” and “I can imagine the situation, as if I am watching a movie” were analyzed in terms of the effects of grade and major, and two-way ANOVAs were carried out. The descriptive statistics are shown in Table 4. As shown by Figure 9, a significant interaction between grade and major ($F = 3.36, p < .05, \eta^2 = .005$) was found, but the effect size is small. Nevertheless, the significant interaction and descriptive statistics suggest the possibility that although they have similar responses to fluency factor items in

their first year, English majors' fluency increases, while non-English majors' fluency drops substantially in their 2nd year. This may suggest that English majors' reading skills in English improve as they continue ER throughout the year, while NEMs' reading skills do not improve or even become less fluent.



Note: 1 = English Majors, 2 = Non-English Majors

Figure 9 The Interaction Between Major and Grade on “Intrinsic Motivation” factor

Table 4 Means (SD) for the reactions to “Intrinsic Motivation” factor by department and grade

	1st year	2nd year
English	6.62 (2.13)	6.90 (2.08)
NEM	6.87(2.12)	6.33 (2.59)

Note: Max = 12

Inefficiency in Reading

The overall results of students' responses to the items related to “inefficiency in reading processes” are shown in Figure 10 and 11. There were two respondents who did not answer the first item. It was shown that more than 85% of students reported no use or infrequent use of a dictionary and more than 75% of students reported not taking notes while reading.

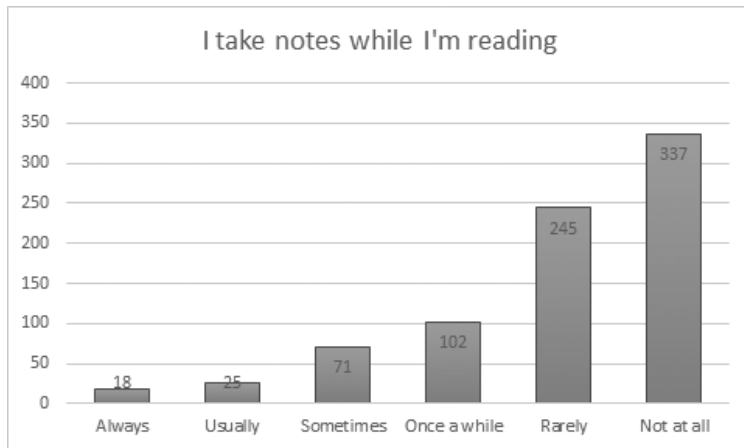


Figure 10 Reactions to "I take notes while I'm reading"

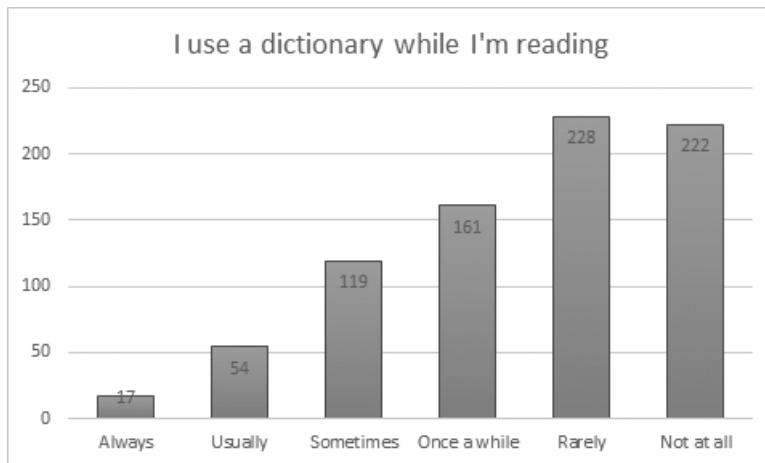


Figure 11 Reactions to "I use a dictionary while I'm reading"

Inefficiency in Reading by Grade and Major

Students' responses to the factors concerning inefficiency, which consists of two items, were analyzed by grade and department. The descriptive statistics are shown in Table 5. The result of a two-way ANOVA showed a significant interaction between grade and major ($F = 5.91, p < .05, \eta^2 = .011$) as shown by Figure 12, but the effect size was small. This result suggests the possibility that although they have similar responses to reading inefficiency factor items in their 1st year, there is a difference in how they change between grades. English majors' inefficiency decreases, while NEM's inefficiency increases. This may mean that English majors' reading efficiency improves while NEM's reading efficiency may not improve.

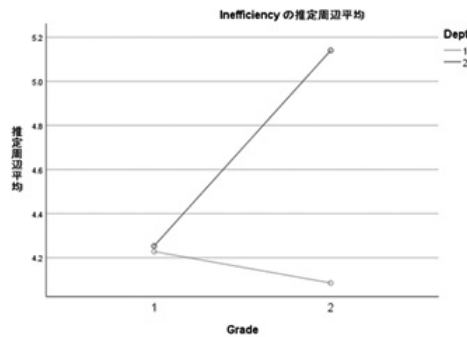


Figure 12 The Interaction Between Major and Grade on “Inefficiency Factor”

Table 5 Mean (SD) for the Reactions to the “Inefficiency Factor”

	1st year	2nd year
English	4.23 (2.21)	4.09 (2.03)
NEM	4.25 (2.15)	5.14 (2.17)

Note: Max = 12

Learning Styles of the 2020 Cohort

Figure 13 shows the overall results of the students’ reactions to the use of audio while reading. The results indicate more than 60% of the students do not or rarely listen to the audio while reading. This suggests that students are not taking advantage of the audio that accompanies each digital book in the Xreading library, possibly because they were not aware of its existence or benefits, or they simply preferred to read visually alone.

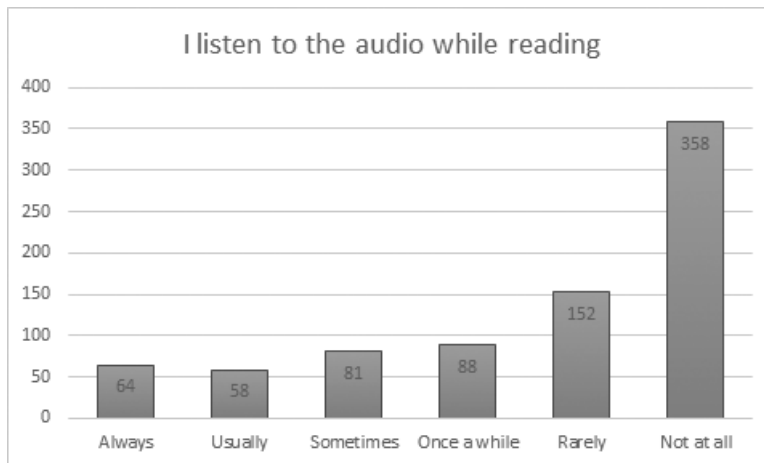


Figure 13 Reactions to “I listen to the audio while reading”

Students were also asked about their preferences between KUFUS' physical library and Xreading's digital library. Responses from the second-year students (173 second-year English majors, and responses from 57 second-year NEM) who had experienced physical book-based ER with M-Reader the previous year (when they were first-year students) were analyzed. As Figure 14 shows, 138 students preferred the digital library while 92 students preferred the physical library. Students were also asked to choose up to three reasons for their choices. Figure 15 shows the proportion of each reason by ER library type (physical library versus digital library) by dividing the frequency for each reason type by the total number of those who made a choice for that reason. It was shown that the main reasons for preferring Xreading's digital library are "convenient" and "easy to read" while the main reasons for those who prefer the physical library are that they feel the "English is easy" with physical books, and they feel that the physical library is "useful".

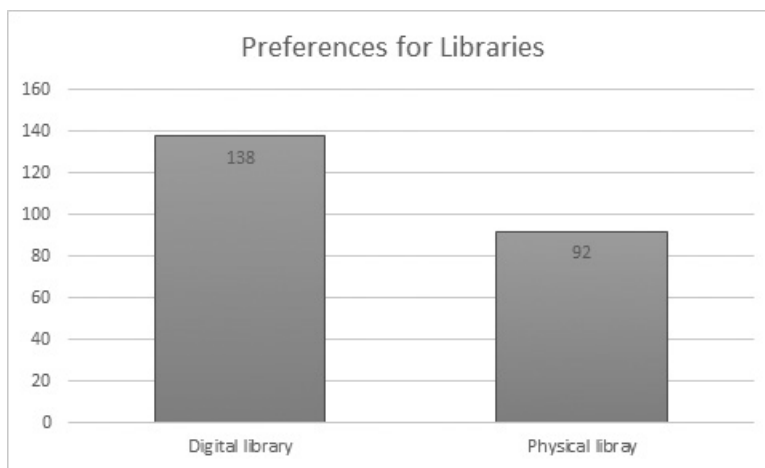


Figure 14 Preferences for Libraries

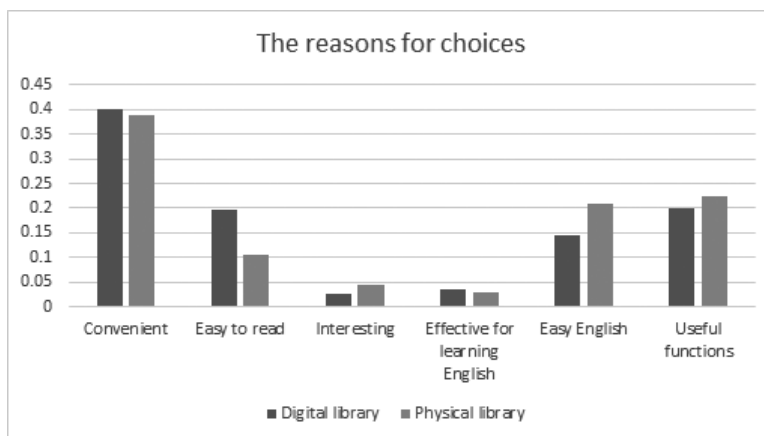


Figure 15 Reasons for Library Preferences

Comparison Between the 2015 Cohort and the 2020 Cohort

In order to compare the differences in responses between the group which experienced physical library-based ER in 2015, and the group which experienced digital library-based ER in 2020, their attitudes towards ER were compared. Table 6 shows descriptive statistics of attitudes toward ER from two cohorts: The 2015 cohort was a group of first-year students who experienced physical library-based ER and the 2020 cohort was a group who experienced digital library-based ER. T-tests were carried out to compare the reactions between the 2020 English majors and all majors in 2015 (only data from first-year students is available from 2015). Although the results showed statistically significant differences for three items: “Reading in English is fun”, “Reading in English is beneficial”, and “Intrinsic motivation factor”, the small effect sizes ($r = .13, .9$ and $.1$ respectively) make it difficult to conclude that students in 2015 show more positive attitude toward extensive reading than those in 2020. Although the results may suggest that more students from the 2015 cohort showed positive responses to the item “ER is beneficial” than the 2020 cohort did, it is possible to conclude that there are no substantial differences between the two cohorts in terms of responses to the question items about ER.

Table 6 Mean (SD) of the Responses from the 2015 Cohort and the 2020 Cohort

	2020 Group	2020 Eibe	2015 Eibe	P value
I am motivated by Extensive Reading	3.35(1.17)	3.50(1.18)	3.59(1.20)	
Reading in English is fun	4.19(1.07)	4.04(1.18)	4.32(1.00)	*
Reading in English is beneficial	5.08 (0.88)	4.86(0.88)	5.03(0.87)	*
<i>Intrinsic motivation factor</i>	<i>12.75(2.62)</i>	<i>12.37(2.62)</i>	<i>12.90(2.50)</i>	*
I forget that I am reading in a foreign language, as if I were reading in Japanese	2.83(1.32)	2.82(1.27)	2.90(1.24)	
I can imagine the situation, as if I am watching a movie	3.72(1.33)	3.77(1.29)	3.68(1.29)	
<i>Fluency factor</i>	<i>6.53(2.24)</i>	<i>6.59(1.20)</i>	<i>6.55 (2.21)</i>	
I use a dictionary while I'm reading	2.37(1.35)	2.31(1.30)	2.36(1.20)	
I take notes while I'm reading	2.23(1.29)	1.89(1.15)	1.81(1.15)	
<i>Inefficiency factor</i>	<i>4.58(2.32)</i>	<i>4.19(2.14)</i>	<i>4.17(2.32)</i>	

Note: Sample sizes of the 2020 cohort, 2020 English major cohort, and 2015 English major cohort are 512, 216, and 306 respectively. Maximum score for each item is 6 points. The intrinsic motivation factor is a total of 18 points, while the fluency and inefficiency factors total 12 points each.

Discussion

As can be seen in the survey results from the comparison in Table 6, the only significant difference in attitudes toward ER from a group of students reading books exclusively from a physical library to another one reading from a digital library on Xreading lies in the slight decrease in intrinsic motivation. With so many other complicating factors related to emergency remote learning, substantial amounts of screen time, technical issues, and teachers being new to Xreading, etc., it is unclear whether this decrease is attributable to Xreading or the use of digital books primarily or to these other factors. A comparison of post-pandemic responses in a more stable environment would be more reliable and informative.

The only other key difference noticed between reading physical books and reading digital books lay not in student attitudes, but rather in performance. Comparison of data from M-Reader in 2019 with data from Xreading in 2020 showed a 44% reduction in total average word counts per student, yet with a 50% increase in number of books read.

As previously discussed, the extent to which this significant reduction in total reading volume can be attributed solely to the new digital medium is unknown, but is likely to be caused by a variety of factors already suggested. Among these are the effects of pandemic-related remote learning, such as the lack of a shared physical space to practice SSR; the reduced presence of the teacher for

support, encouragement, and motivation; and the decrease in student-to-student communication about the books they are reading. Furthermore, the massive increase in screen time necessary for online, remote learning surely affected the amount of time students were willing to spend reading through the same screen. All of that, combined with several weeks of Xreading server problems in the spring semester, most likely explains the reduction in word counts, not the digital medium itself. If digital books exclusively were the main factor in a significantly reduced average word count per student, then it would make sense that this would be reflected in the questionnaire pertaining to student attitudes toward ER. Since the one and only significant difference was related to intrinsic motivational factors, perhaps this difference is due to the extraordinary conditions created by the pandemic more than anything else.

As discussed earlier, the increase in the number of books read on Xreading is undoubtedly directly associated with the digital medium, especially pertaining to graded readers at the lowest levels. Since the entire Xreading library is accessible at any time, it is far easier to read a series of ten low-level books at the click of a button than it is to find those books in a physical library, check out each one individually, carry them around in one's bag for a week, and make the effort to turn them all back in on time without losing or damaging any. It is simpler to choose two or three longer books and read those. That, in addition to the substantial number of extremely short digital books at the lowest levels, makes for a much higher number of books read on Xreading than we ever saw from the use of the physical library.

In fact, as seen in Figure 14 above, students reported a strong preference for digital books over physical ones, mostly due to convenience and ease of reading. Indeed, digital books offer several advantages to students and teachers alike. The entire library can travel with the student in their pocket wherever they go, making access to any book possible at any moment. Students can also listen to audio at different speeds as they read and can change font size to suit their needs and comfort level. Teachers can also assign a single book for all students to read, even thousands of students at once, thus removing the limitations of a physical library. Furthermore, teachers can track time spent reading and listening, along with reading speeds, and can message students within Xreading. It is no surprise that digital natives like university students in the year 2020 prefer digital books over physical ones.

Having access to both a digital library and a physical library of graded readers offers students the best of both worlds. It caters to differing preferences while offering a wider range of titles to choose from. In the case of KUFS, years were spent investing time, money, and energy into building a substantial collection of over 20,000 copies of more than 3,000 titles of physical graded readers for its library. To throw all that away in a rash move toward a digital library would be wasteful. Fortunately, Xreading has a partnership with M-Reader to give its users access to M-Reader

quizzes, all of which were written for physical books. This means that not only can students read digital books on Xreading and take quizzes, but they can do the same for books from the extensive reading library at KUFS. In this way, students can benefit from both libraries once the pandemic is over.

Conclusion

This study described the shift of a large extensive reading program from physical to digital books and characterized the effects on reading performance and students' attitudes toward extensive reading. It found that in the digital environment, students read more books but fewer overall words. They also had neutral-to-positive overall attitudes toward extensive reading, preferring to read digital books over physical ones.

Having an ample collection of graded readers along with access to a growing digital library of graded readers with audio presents multiple opportunities to learn more about student reading habits, strategies, and attitudes, especially as it pertains to the two different mediums. For example, how do students select their books in the two environments, and are there any differences in the reading strategies they employ in each? Also of interest are pedagogical approaches that leverage the advantages of both mediums to maximize reader motivation, interest, and performance. In addition, what role can the presence of audio recordings of each text play in this process? Better characterizing student use of audio in extensive reading can lead to the development of more effective and enjoyable approaches.

Finally, to what extent were the differences observed in word counts, number of books read, and the slight decrease in motivation related to the digital medium or to the effects of the pandemic? A future post-pandemic study in a more stable environment may shed some light on this issue.

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APPENDIX: Reading Survey Questions

1. Student number: _____
2. Reading in English is easy.
3. Reading in English is enjoyable.
4. Reading in English is beneficial.
5. I feel confident reading in English.

When I read in English...

6. I choose easy books.
7. I often use a dictionary.
8. I often take notes.
9. I guess the meanings of words I don't know, without using a dictionary.
10. I forget that I am reading in a foreign language, as if I were reading in Japanese.
11. I can imagine the situation, as if I am watching a movie.
12. I listen to the audio when I read.
13. I talk about the books I read in English with my friends. Motivation
14. I am motivated to read in English.

Open Question

15. Explain your answer to Q14.

For the 2nd year students

16. Which do you prefer, a digital library-based reading or a physical library-based reading?
17. Indicate reasons for your choice for Q16

Convenient

Easy to read

Effective for English learning

Easy books

Useful functions

Healthy

Others