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English Teachers' Post-COVID-19 Adoption of Digital Textbooks and Their Prospects for Future Learning Platforms and Textbook Formats*

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* This study is a revised analysis of KICE (2023) report.

ABSTRACT

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Since the introduction of a prototype in 2007, English digital textbooks have improved the quality, increasing the types across primary and secondary education. Supported by educational policies for digital-driven learning, the expansion of English digital textbooks in public education has been accelerated by the enforced online education due to the COVID-19 pandemic. For understanding of current usage of English digital textbooks and prospecting future learning, this study examines English teachers' practice of digital textbooks and explores the teachers' prospects for future learning platforms and textbook formats. A survey was conducted for 211 English teachers in primary and secondary schools to ask their experiences, perceptions, and prospects of digital textbooks and future learning. Statistical analysis examined teachers' experiences, perceptions, and expectations by gender, school levels, years of teaching, and regions. The results reveal that majority of English teachers use digital textbook in post COVID-19 classes while teachers in high schools or rural areas are less likely to use digital textbooks than others. Teachers think English digital textbooks are beneficial for online and blended learning to arouse students' interest and encourage their participation. Multimedia contents and additional learning materials are commented most as useful features of digital textbooks. Frequent failure of digital devices or Wi-Fi network is the major problem using digital textbooks. Teachers suggest to develop digital-specific features and to enhance digital literacy in public schools. For the future education, the teachers prospect that blended learning will be prevalent and the use of digital textbooks will be commonplace. The findings are presented with implications and suggestions for future education and research.

KEYWORDS

digital textbook, paper textbook, English digital textbooks, AI digital textbook, online learning, teachers' perception, future learning, post COVID-19

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1. Introduction

Providing learning contents and methods for interactive and effective classes, learning materials are perceived as a strong predictor of successful language learning in English classrooms (Im 2011, Lee 2002). H. D. Kim (2013) defines English learning materials as all types of educational aids to enhance English learning, including textbooks, reference books, workbooks, multimedia contents, realia, authentic English texts, etc. Among the materials, English textbooks are the core in that they deliver learning and assessment contents and tools in accordance with educational standards regulated by the national curriculum (Lee 2014). English education in Korea is led by the educational government implementing the national curriculum. English textbooks are authored, authorized, or approved by Korean Ministry of Education (MOE) to embody the national curriculum in public schools (Lee 2014). Drawing on the national curriculum, English textbooks provide criteria and contents for English education, practices for communication in English, and tools and supports to enhance interactive and student-centered learning (H. D. Kim 2015).

The authorized English textbooks are published in two formats: paper and digital. The needs for digital textbooks have arisen globally with the advent of innovative information technologies and the knowledge-based society. In Korea, the development and diffusion of digital textbooks in classrooms has been initiated and driven by the government to enhance smart education, which encourages technology-integrated learning in K-12 education (MEST: Ministry of Education, Science and Technology 2011). Currently, digital textbooks have been developed and authorized for several subjects. For the authorized English textbooks, 2015 National Curriculum elucidated first the adoption of digital textbooks from elementary to high school English and presented authorization guidelines (MOE 2015). As of 2024, a total of 98 English digital textbooks are authorized by MOE including 30 books for elementary, 39 books for middle school, and 29 books for high school (KERIS, 2024). While most textbook publishers develop both types of textbooks which are almost identical to each other, English digital textbooks provide additional learning materials and functions, such as multimedia and realistic contents, a glossary, test items, materials for supplementary and enriched learning, learning management system, and access to other web-based educational resources (KERIS, 2024). The role of digital textbooks is expanded in the 2022 National Curriculum which embodies the educational policy for digital-driven education reform introducing AI digital textbooks (MOE 2022). The digital textbook is the core of education reform as it functions as a tutor, an advisor, an assistant, and a school staff providing AI Q & A, learner analytics data, the individualized curriculum, and teaching resources to students, teachers, and parents (MOE 2023b).

Research on the digital textbook presents both concern and expectation about its application in classrooms. Early studies reported limited or negative effects of digital textbooks. For instance, T. H. Kim (2004) confirmed no significant effects of digital textbooks to improve attitude and value of students. Hong et al. (2013) raised issues of technical and systemic malfunctions, physical and psychological problems, distraction and reduced interactions, and difficulties of adaptation to digitized environment. However, with the benefits of technical development of digital textbooks and digital competencies of students and teachers, the positive use of digital textbooks has been reported as well. In general, the positive effects of digital textbooks have been evidenced on future competencies, such as self-directed learning, creativity, information literacy, and collaboration skills (Cha et al. 2017, Jeong et al. 2018, Park and Ryu 2019, Suh et al. 2009), on affective aspects of motivation, attitudes, satisfaction, and confidence (Kim and Kim 2015, Seo and Gong 2021, Yoon et al. 2014), and on academic achievement (Byun et al. 2011, Kim and Kim 2015, Seo and Gong 2021). While other subjects can benefit from digital textbooks, English is a preferred subject for digital textbooks by teachers (Kim et al. 2013). Studies on English digital textbooks have confirmed the positive effects on English achievement, learning attitude, motivation, and self-directed learning (Han 2014, Han and Ihm 2011, C. Park and Kim 2015).

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In terms of practical application in classrooms, teachers' attitude and perception have been researched to predict the usage of digital textbooks in class time. Teachers' competence and attitudes are important predictors of adoption of new technology (Kluever et al. 1994). Y. Kim's (2013) study confirmed the effects of teachers' perceptions of usability and interests on adoption of digital textbooks in elementary schools. Thus, the successful integration of English digital textbooks is heavily dependent on teachers' perceptions and attitude. However, early studies reported teachers' negative perceptions of and attitude towards integrating digital textbooks in classes (Y. Kim 2013, Kim and Cha 2013, Lim 2012). Similarly, studies on English digital textbooks also reported difficulties to use digital textbooks and insufficient knowledge and skills of teachers (Kim and Ahn 2020, H. J. Kim and E. Kim 2016). Kim and Ahn (2020) found that the implementation of English digital textbooks was challenging for teachers, and many teachers did not show confidence or experiences of using English digital textbooks.

For the successful digital transition in education, we need to understand teachers' competence of and attitude to digital textbooks in that digital textbook will take a critical role to reform education as pronounced by MOE (2023a). However, studies on teachers' perceptions and attitude were done mostly with elementary teachers and before the COVID-19 pandemic outbreak. The enforced online education during the COVID-19 is likely to increase interactions via online and the opportunities to use digital contents, which may influence teachers' perceptions of and attitude to digital-based learning, specifically integration of digital textbooks in classes. For instance, H. Choi (2022) reports the increased use of English digital textbooks among elementary teachers after the COVID-19.

Ahead of imminent introduction of AI digital textbooks in public education in 2025, it is urgent to understand overall teachers' perceptions of and attitude to digital textbooks across gender, years of teaching experience, levels of school, and regions. In addition, it needs to research teachers' post COVID-19 practices of digital textbooks and their prospects for the future education formats and textbook types. Teachers' current practices and forecast for future classes will be correlated with their perceptions and attitude due to the fact that the decision to choose and utilize the type of a textbook is primarily up to teachers in schools. Therefore, this study aims to explore English teachers' practices and perceptions of digital textbooks in primary and secondary education in the post COVID-19 era. Additionally, the teachers' prospects for the future learning platforms and textbook formats are examined as well. Research questions are as follows;

1. What types of textbooks do English teachers use in post COVID-19 classes? And do their choices of textbooks relate with their backgrounds such as gender, years of teaching, school levels, and regions?
2. What are teachers' perceptions about advantages, obstacles, and useful materials of English digital textbooks?
3. What are teachers' suggestions for effective use of English digital textbooks?
4. What are teachers' prospects for the future learning platforms and textbook formats? And are the prospects influenced by their backgrounds and their experiences of textbooks?

2. Literature Review

2.1 Digital Textbooks and Educational Policies

The digital textbook is the expansion of a paper textbook, which provides various learning materials and activities, learning management, and assessment tools as well as the access to external web resources (Kim and Ahn 2020). Digital textbook has several distinct features from e-book, e-textbooks, or digital contents. First, the contents and tools of digital textbook are organized to enhance student-centered learning. Jeong (2008) identifies

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specific contents and tools for this purpose: integrative multimedia materials, diverse interactions, and self-directed learning. The expanded accessibility is another feature of digital textbooks. Digital textbooks, which are available via Internet using smart devices as well as computers, enable prompt and ubiquitous learning (Sakine and Mehmet 2017). In addition, Capita and Capita (2016) suggest that digital textbooks utilize learner analytics to provide individualized learning contents, activities, and assessment.

In Korea, research on digital textbooks was initiated by the Ministry of Education, Science and Technology (MEST) in 1997, and follow-up studies have developed prototypes of digital textbooks for classrooms (Leem et al. 2008, Min 1999). In 2007, national projects to develop prototypes of digital textbooks were launched for elementary education (Leem et al. 2008). MEST (2011) pronounced "Smart Education Promotion Strategy Action Plan," in 2011 and specified the critical role of digital textbooks to enhance smart education for the 21st century. The contents and functions of digital textbooks were specified with development schedules (MEST, 2011). In 2014, 17 types of digital textbooks were developed for various subjects and school years and tested in 163 research schools (H. S. Kim 2015). Then, as proclaimed by 2015 National Curriculum (MOE 2015), digital textbooks have been developed and authorized for the subjects of Social Science and Science in elementary and middle schools and for English in elementary, middle, and high schools. MOE and KERIS (2019) defined the characteristics of digital textbook as a model of the future textbook: student-centered, interactive, heuristic, and individualized. In 2024, the number of authorized English digital textbooks is 98 (KERIS, 2024). The role of digital textbooks has been reinforced by the 2022 National Curriculum which emphasizes the integration of up-to-date information technology in education. The follow-up announcement by MOE (2023a) specified a promotion plan for artificial intelligence (AI) digital textbook which is the facilitation of AI in digital textbooks. According to the plan, AI digital textbooks are developed and authorized for the initial use in classrooms in 2025. With ongoing development and supportive policies, digital textbooks will assume the role as standard textbooks for K-12 education in Korea.

2.2 Effects and Perceptions of Digital Textbook

Research found that digital textbooks are effective to foster 21st century skills. Choi and Seo (2009) reported the positive effects of digital textbooks on problem solving in science class at an elementary school. Students with a digital textbook were more successful to solve a problem than ones with a paper textbook. Lee and Kim (2015) also examined the effects of digital textbooks on the development of 21st century skills and student satisfaction. The study conducted pre-post comparison between the 4th graders of a research school with a digital textbook and ones of a comparison school without a digital textbook. For the 21st skills, seven skills were identified, and satisfaction was measured in five domains. The study reported that the effects of digital textbooks were evident to develop most 21st skills except communication competence. The most distinctive growth was found in the domains of creative thinking, problem solving, creativity, and innovative competence. In addition, students of the research school were satisfied with digital textbooks. The students were satisfied with diverse and interesting learning activities and had flow experiences, which yielded students' concentration.

The advantages of digital textbooks for academic achievement and learning attitude have been evidenced. Yoon et al. (2014) examined the interactivity of digital textbooks to find its impact on learning attitude. The target population was elementary students using tablet PC-based digital textbooks of Social Studies and Science. The interactive features of digital textbooks positively influenced students' learning attitude: active control, two-way communication, and synchronicity. Seo and Lee's (2011) meta-analysis also concluded the positive effects on learning attitude in the subjects of Language, Science, and Social Studies. The delayed effects of digital textbooks were explored by Song and Kang (2011). Their study presented that the use of digital textbooks contributed to learning achievement more than paper textbook use after two-year's use (Song and Kang 2011). The benefits of

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digital textbooks on affective aspects of learning are partially supported by the previous studies on the effects of computer-based and technology-integrated learning activities. The studies by O'Hara (1998), Richards (1996), and Chessler et al. (1998) evidenced that technology-integration may foster learner's motivation and positive learning attitude.

However, some studies reported reserved results for the effects of digital textbooks. Ryu and Byun (2012) reported uneven effects of digital textbooks depending on subjects of elementary schools, and Noh et al. (2011) found limited effects on affective aspects, not on academic achievement. Hong et al. (2013) proposed developmental issues of physical and psychological health. Kim and Kim (2015) explored the use of digital textbooks in elementary science classes. Digital textbook had partial effects on academic achievement of science subject and no effects on scientific attitude. While Song and Park (2009) found its positive effects on academic achievement in elementary mathematics, students' attitude and motivation were not different between digital and paper textbook groups.

Recent synthesizing studies suggest overall benefits of digital textbooks. Jeong et al. (2018) conducted a longitudinal study for three years with 1,510 students in 36 elementary schools across regions. The study tracked the effects of digital textbooks on overall educational domains including cognitive, affective, social, and psychomotor domains and learning competency. Results showed that digital textbooks were effective in most domains except psychomotor, the longer use of digital textbooks was more effective, high academic achievers were more benefited by digital textbooks, digital textbooks were more effective than paper books, and teachers' smart education competency positively influenced the effects of digital textbooks. Seo and Gong's (2021) meta-analysis of effects of digital textbooks in classes presented congruent results with Jeong et al.'s (2018). Meta-analysis revealed that the positive effects were observed on students' affective and cognitive competencies and academic achievement. For the stable effects of digital textbooks, class time of 16 classes was required.

To suggest practical advices for successful implication of digital textbooks in schools, several studies have focused on the perceptions of teachers and students. Choi (2011) questioned teachers and students of elementary and middle schools about using digital textbooks to find ways for sustainable use of digital textbooks in classes. The teachers doubt the benefits of digital textbooks and requested additional supports and efforts for better implication of digital textbooks in classrooms. Han (2012) and Kim and Cha (2013) also confirmed teachers' distrust of digital textbooks and the needs of infrastructure and institutional supports for successful adoption of digital textbooks in school settings. Lim (2012) interviewed elementary school teachers and presented congruent results with the previous studies. In addition, the limited usage of digital textbooks was partly attributed to the lack of chances for teachers to participate in development of digital textbooks (Lim 2012), and Han (2012) emphasized the role of teachers for successful integration of digital textbooks in class. However, unlike the early studies on teachers' perceptions, the later studies found changes of teachers' attitude for a digital textbook. In the study with middle and high school teachers, H. J. Kim and E. Kim (2016) reported that most teachers agreed the necessity of digital textbooks and expected its positive effects on motivation, attitude, and academic achievement even though they seldom used a digital textbook in classes.

In general, digital textbook research has agreed on the positive effects on learning while some studies withdraw the support for digital textbooks. In terms of teachers' attitude to and perceptions of digital textbooks, research suggests transitions among teachers, requesting further investigation of current teachers' perceptions.

2.3 Digital Textbook for English

Kim et al. (2013) reported teachers' perception that digital textbooks are most beneficial for the subject, English. Drawing on the 2015 National Curriculum, 98 English digital textbooks have been developed and authorized for

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primary and secondary English in 2024, maintaining the contents and organization of paper textbooks. Digital textbooks are serviced through Edu.net to students and teachers (KERIS 2024).

As an educational aid for language learning, English digital textbook has been highly appreciated in terms of interactivity (Kim and Kim 2022). The interactivity of English digital textbooks can be interpreted in two aspects: language learning and learning management. In language learning, interactions are vital for the language acquisition through the process of meaning negotiation and the incidental focuses on language forms (Gass and Mackey 2007). Interactions for language learning include meaningful input, demand for output, comprehensible output, corrective feedback, and adjusted output (Mackey, 2012). English digital textbooks promote synchronous interactions via computer-mediated real time communication and asynchronous interactions between learners, teachers, and contents through bulletin boards and multimedia materials (Jang 2007). In addition, AI-based chatbot, which will be available in AI digital textbooks from 2025, allows interactions between human and AI imitating the communication between people (MOE 2023b).

Another aspect of interactivity derives from educational interactions to manage learning and teaching. The interactivity of digital media including website, computers, and online learning is evidenced to have significant impacts on academic achievement, satisfaction, learning hours, and flow experience. (Brady, 2004, cited by Yoon et al. 2014). The interactivity of digital textbooks is decomposed into perceived user control, two-way communication, and synchronicity (Yoon et al. 2014). Research on digital textbooks suggests that the interactivity of digital textbooks contributes to cultivate positive learning attitude (Yoon et al. 2014) and increase learning satisfaction (Lee et al. 2012). The educational interactions improve the quality and effectiveness of learning (Kang et al. 2016). Kim and Kim (2022) highlighted both aspects of interactivity, language learning and learning management, as the key features of English digital textbooks.

The positive effects of English digital textbooks are documented on language skills, affective aspects, and learning strategies. Han and Ihm (2011) suggested positive effects of English digital textbooks in online and offline blended classes. The use of digital textbooks improved reading achievement and self-directed learning of elementary students. For meta-analysis of effects of English digital textbooks, Park and Kim (2015) examined 13 studies on English digital textbooks across school levels. The results of the meta-analysis indicated positive effects on English achievement, attitude, and self-directed learning. The effect sizes were larger in attitude and self-directed learning than in English language achievement. Likewise, Kim (2019) also found positive effects to foster English writing and self-directed learning, and learning interest of 4th graders. She designed 12-week writing lessons utilizing an English digital textbook for 4th grade students. Data were collected from pre- and post-tests of writing, survey questionnaire, and teacher observation. Significant improvement was observed in writing skills, intrinsic motivation, and self-directed learning strategies of "looking up materials" and "continuous study after completing a task." In addition, students showed interest in using a digital textbook. Han's (2014) study showed the positive attitude of students towards digital textbooks while the effects on English achievement were not found. Kim and Ahn (2020) confirmed elementary school students' interest on English digital textbooks. The effects on willingness to communicate (WTC) and English confidence were examined. Kim and Kim (2021) adopted AI chatbot-embeded English digital textbooks for task-based English classes for 4th graders. Students had performed given communication tasks using AI chatbot for eight class lessons. Pre- and post-measure of WTC and English confidence and a survey on student interest were conducted. Analysis of collected data showed significant increase of WTC and confidence and high level of interest.

Additionally, research has investigated teachers' experiences of and their attitudes towards English digital textbooks. H. J. Kim and E. Kim's (2016) study, which was done with middle and high school English teachers, reported that the English teachers did not have sufficient experiences of digital textbooks, but the teachers expected the benefits of English digital textbooks for motivation, learning attitude, and English academic achievement. Kim

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and Ahn (2020) also identified high level of interest and intension to use English digital textbooks among elementary teachers. The teachers perceived that listening skills can be benefited most by utilizing multimedia materials of English digital textbooks. In spite of positive attitude, most teachers lacked the experience and understanding of digital textbooks. Choi's (2022) study, a recent research inquiry, shows considerable changes of teachers' perceptions and attitude, as well as practices of digital textbooks among elementary school teachers. In her study, the teachers were highly confident with English digital textbooks, and about 60% of them were using digital textbooks in classes. An interesting finding is that more than 50% of digital textbook users started to use digital textbook after the outbreak of COVID-19. Suggesting substantial changes of teachers' competence, perceptions, and practices of English digital textbooks in the post COVID-19 era, Choi's (2022) study requests further investigation with teachers of diverse school levels, experiences, and regions.

In conclusion, research on English digital textbooks has supported positive effects of digital textbooks on language skills, motivation, English confidence, interest, and self-regulated learning. In addition, teachers perceive the benefits of English digital textbooks in classes. However, the findings are not conclusive in that most studies have been done with limited population, mostly elementary school teachers or students, and research on teachers' perceptions and practices has not examined post COVID-19 changes sufficiently. As Kim and Ahn (2020) and Choi (2022) suggest, online learning forced by COVID-19 is likely to increase opportunities to integrate digital textbooks in classes.

3. Method

3.1 Participants

As a part of a national-wide research on textbook use in primary and secondary schools in Korea, this study examines English teachers' experiences of textbooks and prospects for the future classes. For a representative sampling of primary and secondary public school teachers, 477 schools (215 elementary, 114 middle, and 93 high schools), 3.5% of elementary, middle, and high schools in Korea, were randomly selected and contacted for the survey research. An official letter was sent to each school requesting to recommend an English teacher to participate in the survey. A total of 211 English teachers agreed to participate in the research and responded to a survey developed for this study. The composition of the participants is shown in the Table 1 by gender, years to teach, school levels, and regions.

Table 1. Distribution of Participants Across School Levels, Gender, Years, and Regions

		Elementary(%)	Middle (%)	High(%)	Total(%)
Total		67 (32%)	70 (33%)	74 (35%)	211 (100%)
Gender	Male	14 (32%)	9 (20%)	21 (48%)	44 (100%)
	Female	53 (32%)	61 (37%)	53 (32%)	167 (100%)
Years	Under 6 years	12 (29%)	11 (26%)	19 (45%)	42 (100%)
	6-10 years	11 (34%)	9 (28%)	12 (38%)	32 (100%)
	11-20 years	31 (35%)	32 (36%)	25 (28%)	88 (100%)
	Over 20 years	13 (27%)	18 (37%)	18 (37%)	49 (100%)
Region	Big City	31 (33%)	27 (28%)	37 (39%)	95 (100%)
	Small City	26 (32%)	31 (38%)	24 (30%)	81 (100%)
	Rural	10 (29%)	12 (34%)	13 (37%)	35 (100%)

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3.2 Survey

The survey was devised to examine teachers' use of textbooks in primary and secondary schools in Korea. Researchers drafted a survey referring to the advice of the teachers and professors, who had written or examined authorized textbooks, and the professors majoring in research methodology. Then, the drafted survey was reviewed by three teachers and a professor majoring in education. Referring to the review feedback, the draft was revised.

The finalized survey comprises three sections: Section 1 for teachers' background information, Section 2 about their experiences and perceptions of English textbooks, and Section 3 questioning teachers' outlooks for the future education. The basic information includes gender, years of teaching, school levels, and regions. Sections 2 explores the type of English textbooks teachers use, their perceptions of obstacles, advantages, and useful materials of digital textbooks, and suggestions for digital textbooks. Questions of Section 3 investigate teachers' prospects of the predominant format of learning between online and offline classes and types of textbooks between paper and digital textbooks in the future. The questions are shown in Table 2.

Table 2. Survey Questions

Section	Questions
Section 1: Basic Information	• What is your gender? • How many years have you been teaching? • What is the school level you are working at? • Which region does your school locate in?
Section 2: Experiences & Perceptions	• What types of textbooks do you use in class? Paper and/or digital textbooks? • What obstacles have you experienced using digital textbooks? • What are advantages of using digital textbooks? • What materials of digital textbooks are useful and/or beneficial? • What do you suggest for effective use of digital textbooks?
Section 3: Future Prospects	• What type of learning platforms will prevail in the future? Online and/or offline? • What type of textbooks will prevail in the future? Paper and/or digital format?

The survey, which was distributed in web-based and mobile phone-based formats, was conducted for 16 days in April, 2023. The collected data were analyzed using SPSS 21 to explore research questions.

4. Results

Frequency analysis was conducted mainly to explore teachers' practices, perceptions, and prospects of English textbooks in class. The relations between variables of backgrounds, practices, perceptions, and prospects were examined using cross tabulation and regression analysis. The results are presented by research question.

4.1 Types of Textbooks

Four options are given for the question about the type of textbook use: Paper textbook only, digital textbook only, both of paper and digital textbooks, and materials other than textbooks. Among 211 participants, 40 teachers exclusively use paper textbooks while 5 teachers exclusively use digital textbooks. On the other hand, 126 teachers reported using both paper and digital textbooks, and 40 teachers preferred learning materials other than textbooks.

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The results show that almost 60% of the teachers have used both digital and paper textbooks, and paper textbook only and other material groups are same in size, around 20%.

Cross tabulation analysis was conducted to explore the relations between teachers' choices of textbooks and their backgrounds including gender, years of teaching, school levels, and regions. For the cross tabulation analysis, the group of Digital textbook only was excluded because the number of respondents is five, which is too small for the statistical comparison with other groups. Thus, the impacts of backgrounds were assessed for the other three groups: Paper textbook only, both of textbooks, and other materials. The result indicates that there is no significant correlation between types of textbook use and teachers' gender ($\chi^2 = 2.934$, $p = .231$) or years of teaching ($\chi^2 = 5.580$, $p = .472$). However, school levels ($\chi^2 = 13.275$, $p = .010$) and regions ($\chi^2 = 12.131$, $p = .016$) demonstrate a significant association with types of textbook use.

In terms of school levels, 28% of high school teachers, 20 individuals, actively use additional materials other than textbooks, showing a significantly higher portion compared to elementary (9 individuals, 14%) and middle school teachers (11 individuals, 16%). In the use of both paper and digital formats, high school teachers (32 individuals, 44%) show a notably lower utilization rate compared to elementary (47 individuals, 72%) and middle school teachers (47 individuals, 68%). Furthermore, high school teachers exhibit a relatively high rate of paper textbook use of 28%, nearly twice as high as those of elementary (14%) and middle school teachers (16%). Regionally, teachers in rural areas display the lower rate of simultaneous usage of paper and digital textbooks and the higher rate of other material use compared to teachers in other regions. The results are shown in Table 3.

In conclusion, the teachers in elementary and middle schools have shown similar preference for the blended use of paper and digital textbooks, marking 72.3% and 68.1% respectively. On the other hand, high school teachers deviate the tendency by taking only paper textbooks or other materials more, and using digital textbooks less than the elementary and middle school teachers do. The diversion of preference is also evidenced between rural areas and the other regions. Teachers in rural areas show the less dependency on digital textbooks by taking more other materials than the teachers in other regions.

Table 3. The Number of Teachers by the Types of Textbook Use and Backgrounds

Backgrounds		Paper only(%)	Both(%)	Others(%)	Sum(%)	$\chi^2(p)$*
Total		40 (19.4)	126 (61.2)	40 (19.4)	206 (100)	
Gender	Male	12 (27.9)	25 (58.1)	6 (14)	43 (100)	2.934
	Female	28 (17.2)	101 (62)	34 (20.9)	163 (100)	(.231)
Years of Teaching	Under 6 years	10 (24.4)	25 (61.0)	6 (14.6)	41 (100)	
	6-10 years	9 (29.0)	17 (54.8)	5 (16.1)	31 (100)	5.580
	11-20 years	12 (14.0)	53 (61.6)	21 (24.4)	86 (100)	(.472)
	Over 20 years	9 (18.8)	31 (64.6)	8 (16.7)	48 (100)	
School Level	Elementary	9 (13.8)	47 (72.3)	9 (13.8)	65 (100)	13.275 (.010)
	Middle	11 (15.9)	47 (68.1)	11 (15.9)	69 (100)	
	High	20 (27.8)	32 (44.4)	20 (27.8)	72 (100)	
Region	Big City	13 (14.0)	65 (69.9)	15 (16.1)	93 (100)	12.131 (.016)
	Small City	19 (23.8)	48 (60.0)	13 (16.3)	80 (100)	
	Rural	8 (24.2)	13 (39.4)	12 (36.4)	33 (100)	

*Cross tabulation analysis was done for three types of textbook use excluding the digital only group.

4.2 Perceptions of Digital Textbooks

Questions for teachers' perceptions of digital textbooks allowed multiple selections of options. Some teachers chose more than five options, while some did not select any option. For this study, the count of each option is the

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sum of whole markings rather than the number of respondents. The count and percentage of each option for a question are presented in Table 4.

For the question about advantages of digital textbooks, nine options are given. The whole count of all selected options is 344. The most marked option is "useful for online or blended classes" counting 85, 24.7% of the whole, and the next ones are "interesting and encouraging students' participation (76 count, 22.1%) and "diverse materials for teaching, learning, and assessing" (48 count, 14.0%). Other options which take the portions of about 10% are "competence-based materials" (39 count), "helpful for interactions" (34 count), and "useful for self-directed learning" (33 count). The least one is "faithful to represent the national curriculum" (9 count, 2.6%) except the "Others," which counts 3, 0.9%.

The whole count of obstacles is 323. The count of selection is similar across options in general. The most chosen option is "the failure of devices or Wi-Fi network" (69 count, 21.4%). "Lack of individual devices" is the secondly selected option (55 count, 17.0%). The others are from 7.1% to 14.2% including "deterioration of student immersion in learning," "inexperience in digital devices," "psychological resistance of parents," "lack of knowledge about digital textbook," and "indifferent contents with paper textbooks."

The whole count of useful materials of digital textbooks is 283. The most marked material is "multimedia contents" counting 132, which is 46.6% of the whole, followed by "additional expository materials by level" (54 count, 19.1%), "realistic contents such as virtual or augmented realities" (43 count, 15.2%), "a vocabulary and glossary" (33 count, 11.7%), "assessment items" (19 count, 6.7&), and "Others" (2 counts, 0.7%).

Table 4. Teachers' Perceptions of Digital Textbooks

Questions	Options	Counts	%
Advantages	Useful for online or online and offline blended classes	85	24.7
	Interesting and encouraging students' participation	76	22.1
	Diverse materials for teaching, learning, and assessment	48	14
	Competence-based learning and teaching materials	39	11.3
	Helpful for interactions between students and a teacher, and between peers	34	9.9
	Useful for self-directed learning	33	9.6
	Diverse tasks to assess the level of achievement by criteria	17	4.9
	Faithful to represent the national curriculum	9	2.6
	Others	3	0.9
	Total	344	100.0
Obstacles	Devices or Wi-Fi network failure	69	21.4
	Lack of individual devices for students	55	17
	Possibility of deteriorating students' immersion	46	14.2
	Inexperience in using digital devices	43	13.3
	Psychological resistance of parents	43	13.3
	Lack of understanding how to use a digital textbook	40	12.4
	Absence of distinction from the contents of paper textbooks	23	7.1
	Others	4	1.3
	Total	323	100.0
Useful Materials	Multimedia contents	132	46.6
	Additional and descriptive materials by level	54	19.1
	Realistic contents such as virtual or augmented realities	43	15.2
	A vocabulary and glossary	33	11.7
	Assessment items	19	6.7
	Others	2	0.7
	Total	283	100.0

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4.3 Suggestions for Digital Textbooks

Respondents were asked to select suggestions for the effective use of English digital textbooks. They were allowed to choose multiple options, and the count of each option is the sum of whole markings rather than the number of respondents. A total of 358 responses were counted. The frequency and proportion of each suggestion are presented in Table 5. Notably, the most frequently chosen suggestion is "differentiated features from paper textbook" (107 count, 29.9%), while the lowest-ranked suggestion is "classes for utilization of digital devices" (40 count, 11.2%). "Digital literacy education" (77 count, 21.5%), "teacher training" (75 count, 20.9%), and "assistant personnel" (59 count, 16.5%) are also mentioned. Currently, the authorized digital textbooks are almost identical with paper textbooks in contents and organization. Teachers' request for unique features of digital textbooks implies that teachers want to use digital textbooks complementarily with paper textbooks.

Table 5. Suggestions for Digital Textbooks

Questions	Options	Counts	%
Suggestions for effective use in class	Differentiated features from paper textbooks	107	29.9
	Education to enhance digital literacy	77	21.5
	Teacher trainings and supports for using digital textbooks	75	20.9
	Assistant personnel for device management and class preparation	59	16.5
	Classes for utilization of digital devices	40	11.2
	Total	358	100.0

4.4 Prospects for Learning Platforms and Textbook Formats

Drawing on the distinction between online and offline, the survey examined the teachers' prospects for the future classrooms suggesting four types of learning platforms: offline-centric blended, online-centric blended, offline-centric, or other teaching approaches. The survey results showed that 123 out of 211 teachers (58.3%) anticipate the offline-centric blended format, followed by 51 teachers (24.2%) predicting the online-centric blended format, 36 teachers (17.1%) forecasting the offline-centric approach, and one teacher for others (0.5%). For the future textbook types, teachers were given four options: the hybrid centered on paper textbooks, the hybrid centered on digital textbooks, digital textbooks only, and others. The results show that 110 teachers (52.1%) prospect the hybrid centered on digital textbook approach in the future, followed by the hybrid centered on paper textbooks (83 counts, 39.3%), digital-only choices (13 counts, 6.2%), and others (5 counts, 2.4%). In general, teachers agree the blended learning will be the major learning method in the future. However, they believe the offline learning will continue to be the major learning platform while online will be utilized to support learning. In addition, the digital textbook is expected to be the standard format of textbooks overshadowing paper textbooks in the future classes.

Cross tabulation analysis was conducted to examine the relations between teachers' prospects and their backgrounds and the types of textbook use in class. Due to the small number of digital only group cases, the types of textbooks use included three groups exclusively in the analysis: paper textbook only, both of textbooks, and other materials. The backgrounds of teachers include gender, years of teaching, school levels, and regions.

As shown in Table 6 and 7, results indicate that teachers' backgrounds do not influence their prospects for future learning platforms and textbook formats. However, the type of textbook use has significant impact on teachers' prospects for future textbook formats ($\chi^2 = 14.479$, $p = .025$) while it does not significantly influence the future learning platforms ($\chi^2 = 4.916$, $p = .555$).

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Teachers who use paper textbooks only have strong inclination for paper textbooks as a future textbook type. In Paper textbook only group, 60% of the group members prospected "the hybrid but centered on paper textbook" will be prevail in the future while "centered on digital textbook" was chosen by only 35% of the group. However, in the other two groups, "centered on digital textbook" was chosen by 56.3% of Both textbooks users and 57.5% of Other material users, and "centered on paper textbook" was selected by 35.7% of Both textbook group and 32.5% of Other material group.

Table 6. Teachers' Prospects for Future Class Format

Factors		Offline(%)	Blended Off-Centric(%)	Blended On-Centric(%)	Others(%)	Sum(%)	$\chi^2(p)$
Total		36 (17.5)	119 (57.8)	50 (24.3)	1 (0.5)	206 (100)	
Gender	Male	7 (16.3)	24 (55.8)	11 (25.6)	1 (2.3)	43 (100)	3.910
	Female	29 (17.8)	95 (58.3)	39 (23.9)	0 (0.0)	163 (100)	(.271)
Years of Teaching	Under 6	9 (22.0)	28 (68.3)	4 (9.8)	0 (0.0)	41 (100)	15.815 (.071)
	6-10 years	6 (19.4)	16 (51.6)	9 (29.0)	0 (0.0)	31 (100)	
	11-20 years	16 (18.6)	52 (60.5)	17 (19.8)	1 (1.2)	86 (100)	
	Over 20	5 (10.4)	23 (47.9)	20 (41.7)	0 (0.0)	48 (100)	
School Level	Elementary	15 (23.1)	36 (55.4)	14 (21.5)	0 (0.0)	65 (100)	4.883 (.559)
	Middle	12 (17.4)	40 (58.0)	16 (23.2)	1 (1.4)	69 (100)	
	High	9 (12.5)	43 (59.7)	20 (27.8)	0 (0.0)	72 (100)	
Region	Big City	16 (17.2)	52 (55.9)	25 (26.9)	0 (0.0)	93 (100)	3.537 (.739)
	Small City	14 (17.5)	45 (56.3)	20 (25.0)	1 (1.3)	80 (100)	
	Rural	6 (18.2)	22 (66.7)	5 (15.2)	0 (0.0)	33 (100)	
Type of Textbook Use	Paper only	9 (22.5)	22 (55.0)	9 (22.5)	0 (0.0)	40 (100)	4.916 (.555)
	Both	17 (13.5)	74 (58.7)	34 (27.0)	1 (0.8)	126 (100)	
	Others	10 (25.0)	23 (57.5)	7 (17.5)	0 (0.0)	40 (100)	

Table 7. Teachers' Prospects for Future Textbook Type

Factors		Paper Centric(%)	Digital Centric(%)	Digital Only(%)	Others(%)	Sum(%)	$\chi^2(p)$
Total		82 (39.8)	108 (52.4)	11 (5.4)	5 (2.4)	206 (100)	
Gender	Male	20 (46.5)	18 (41.9)	4 (9.3)	1 (2.3)	43 (100)	3.372 (.338)
	Female	62 (38.0)	90 (55.2)	7 (4.3)	4 (2.5)	163 (100)	
Years of Teaching	Under 6	21 (51.2)	19 (46.3)	1 (2.4)	0 (0.0)	41 (100)	15.572 (.076)
	6-10 years	14 (45.2)	14 (45.2)	3 (9.6)	0 (0.0)	31 (100)	
	11-20 years	34 (39.5)	44 (51.2)	3 (3.5)	5 (5.8)	86 (100)	
	Over 20	13 (27.1)	31 (64.6)	4 (8.3)	0 (0.0)	48 (100)	
School Level	Elementary	30 (46.2)	30 (46.2)	3 (4.6)	2 (3.1)	65 (100)	4.408 (*.622)*
	Middle	25 (36.2)	40 (58.0)	2 (2.9)	2 (2.9)	69 (100)	
	High	27 (37.5)	38 (52.8)	6 (8.3)	1 (1.4)	72 (100)	
Region	Big City	40 (43.0)	47 (50.5)	4 (4.3)	2 (2.2)	93 (100)	3.349 (.764)
	Small City	29 (36.3)	42 (52.5)	6 (7.5)	3 (3.8)	80 (100)	
	Rural	13 (39.4)	19 (57.6)	1 (3.0)	0 (0.0)	33 (100)	
Type of Textbook Use	Paper only	24 (60.0)	14 (35.0)	2 (5.0)	0 (0.0)	40 (100)	14.479 (.025)
	Both	45 (35.7)	71 (56.3)	8 (6.3)	2 (1.6)	126 (100)	
	Others	13 (32.5)	23 (57.5)	1 (2.5)	3 (7.5)	40 (100)	

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5. Discussion

This study explored types of textbooks English teachers use and their perceptions of digital textbooks. Additionally, the teachers' prospects for the future class and textbooks were examined in relation with their background and the type of textbooks they use.

5.1 Types of Textbooks

The results indicate that more than 60% of the teachers use digital textbooks in classes while the inclination towards using digital textbooks more evident in elementary and middle schools than in high schools, and in big and small cities than in rural areas. The higher preference for digital textbooks in elementary and middle schools than high schools can be attributed to the different major learning goals between school levels. With continuing emphasis on communicative competence in 2015 and 2022 National curriculum, English classes have focused to provide opportunities to communicate in English assisted by various learning aids and activities, such as AI Chatbot, multimedia, and authentic English input. The focus on communication is more obvious in elementary and middle schools than high schools where English for academic and professional purposes are introduced and practiced. In addition, many high school English classes are likely to focus on preparation of the high stake test, Korean Scholastic Ability Test (KSAT) which is a national-wide standardized written test. The higher portion of other materials in high schools than in other school levels could be attributed to increasing needs for supplementary learning materials for diverse purposes and proficiency levels in high schools. Kim et al.'s (2021) study introduced the common learning materials other than textbooks. For instances, video content web-sites, EBS contents, teacher-developed materials were favored by teachers. Specifically, high school teachers preferred the materials they developed by themselves to textbooks (Kim et al. 2021).

The significantly low portion of digital textbooks use in rural areas may imply insufficient contents or learning materials for rural students in digital textbooks. Thus, further investigation is requested to find any causes or specific conditions through rigorous research processes including the sufficient number of teachers in rural areas in that the small sample size may cause distorted results rather than represent the population reliably.

Although there is difference in degree among school levels and regions, the use of digital textbooks has become common in classrooms regardless of teachers' gender or years of teaching. Unlike the previous studies (Kim and Ahn 2020, H. J. Kim and E. Kim 2016) that presented lack of teachers' experiences with digital textbooks, this study shows the prevalent use of digital textbook in public education, suggesting teachers' transition towards digitized learning environment post COVID-19. As a result of the forced online classes in full-scale during COVID-19 pandemic and ubiquitous learning environments brought by innovative information technologies and smart mobility, teachers and students have experienced various aspects of digitized learning and alleviated their anxiety about and psychological resistance against technology integrated learning (Schenker 2020), including digital textbooks.

5.2 Perceptions of Digital Textbooks

Teachers' perceptions of advantages, obstacles, and useful contents reflect current practice of digital textbooks in classrooms. Teachers comment most that digital textbooks are useful for online or blended classes and effective to encourage students' participation. Other advantages mentioned are "diverse and supportive learning materials" and "customized assessment items and tools by level." Those benefits are closely related with digitized learning

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and student-centered classes. First, the textbooks are most favored for online or blended learning in that digital textbooks are easy to share and present contents and learning activities via online in classes due to the digitized format of data. The results confirm that the spread of online learning and increase of digital textbook use among teachers are connected to each other, evidencing the effects of the COVID-19 pandemic on the diffusion of digital textbooks in schools. In addition, diverse learning and assessment materials are helpful to foster language competence, increase communicative interactions in classrooms, and promote the engaging and self-directed learning, which are major educational goals of the 2015 and 2022 national curriculums for English.

In spite of the advantages of digital textbooks, several obstacles hinder teachers' adoption of digital textbooks. The most frequently mentioned obstacle is the failure of learning devices or Wi-Fi network connection, and the secondly commented one is the lack of individual student devices. Those two most frequent problems concern with the infrastructure and overall educational environments in schools. Although Korea is a leading country in online networking and smart education, teachers often experience technical problems and shortage of hardware for digitized classes. In addition, insufficient knowledge or skills to use digital programs and devices are problematic issues in classes. Psychological resistance of parents and distraction of students' attention are also suggested. The aforementioned obstacles are commonly suggested when we discuss digital programs or devices, not specific for digital textbook only. Thus, persistent efforts for smart learning elucidated by MOE (2023) are expected to resolve the issues of digital textbooks directly or indirectly.

In the teachers' responses about useful materials, multimedia contents are markedly favored. The multimedia contents have been an important learning material in English in that oral language inputs and authentic communication contexts are available in multimedia contents. In the same vein, realistic contents are commented useful for communicative and authentic language learning. The usefulness of those contents is yielded by the availability of authentic communication contents. The additional learning materials by level are another effective contents of digital textbooks. The importance of individualized contents by level will increase as individualized learning drawing on learner analytics will be reinforced by AI digital textbooks promoted by 2022 national curriculum.

5.3 Suggestions for Digital Textbooks

Because the usage of paper and digital textbook is mainly dependent on teachers' decisions, it is meaningful to examine teachers' opinions to improve textbook use. For digital textbooks, teachers require unique features of digital textbooks differing from paper textbooks. The result can be explained by the current format of digital textbooks. Since 2015 curriculum, digital textbooks have been developed as the digital version of paper textbooks, which the symmetrical of paper textbooks in terms of contents and organization. The request for unique features of digital textbooks may indicate teachers' preference to use digital textbooks complementarily with paper textbooks, not exclusively.

As the digital textbook is redefined to include AI technology in 2022 national curriculum, the format, contents, functions, and structures of digital textbooks will diverge from ones of paper versions. In addition, training and education to enhance digital literacy and knowledge of digital textbooks are also proposed for both students and teachers. Rather than the practical lessons on digital devices, teachers request education for overall digital literacy and teachers training about how to integrate digital textbooks in classes. Due to the frequent exposures to and experiences with digital devices in their daily lives, the teachers may not need additional training for operating digital devices. In terms of diffusion phases, utmost issues of digitized learning are shifting from the facilitation and adoption of hardware in schools to utilization and optimization of digital technology in classes.

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5.4 Prospects for Learning Platforms and Textbook Formats

Most teachers foresee that blended classes and joint use of digital textbooks with paper textbooks will be common in the future classes. More than 80% of the teachers expected the blended learning platform including offline-centric and online-centric for the future education. The expansion of blended learning will yield the increase of digital textbook use in that digital textbooks are perceived by the teachers to be more suitable for blended learning. Teachers' prospects for the future textbook format confirm the expectation. Over 90% of teachers prospect the use of digital textbooks along with paper textbooks in classes. The digital-centric hybrid textbook use is the more prevalent prospect than paper-centric hybrid use. The teachers' inclination towards blended learning and hybrid textbook use is common across gender, years of teaching, school levels, and regions. Teachers' prospects for digital-based learning platforms and materials represent their preparation for the coming digital-driven education led by the AI digital textbook.

However, most teachers expect the offline classes will continue to be the major learning format in spite of increasing chances of online learning in that about 75% of the teachers foresee offline only or offline-centric blended classrooms as the future learning platforms. Thus, teachers' prospects for the digitized learning and textbooks are anchored in face-to-face classroom learning, not in private or individual learning out of schools.

6. Conclusion

This study explored current English teachers' perceptions and use of digital textbooks and their prospects for the future learning to track the changes in the post COVID era. As MOE (2023) highlighted the role of teachers for digital-driven education, teacher training and supports will be focused on integrating digital textbooks in classes. In designing the teacher training courses and developing learning contents, the results of this study provide useful information about teachers' needs for digital-driven education and their preparation for the future classrooms of AI digital textbooks.

In details, the results indicate that the regulation of online education during the COVID-19 has accelerated the transitions from offline- to online-learning and from paper textbooks to digital textbooks. Contrary to previous studies (Kim and Ahn 2020, H. J. Kim and E. Kim 2016) that reported lack of teachers' experience of English digital textbook before the COVID-19, almost 60% of teacher participants use English digital textbooks in their classes in the post COVID era, and most of the English teachers predict that blended learning and digital textbooks will prevail in the future classrooms. The linkage between the expansion of online learning and increasing use of digital textbooks is assured as the teachers highlight the usability and effectiveness of digital textbook for online or blended learning (Kim et al. 2021).

The research results also reveal that we have gone beyond the early stage of introducing smart devices and digital materials and reached the next stage that focuses on utilization of digital devices for learning on the way to smart education. It is evidenced by the high portion of teachers who use digital textbooks, their interests in teaching methods for digital textbooks, and the requests to develop digital specific features for digital textbooks. While the problems of hardware, such as insufficient individual devices and failure of network and devices, are still major concerns in utilizing digital textbooks, teachers also perceive the importance of software including digital literacy, teachers' smart education competence, and professional trainings for digital textbooks.

However, in spite of wide application of English digital textbooks in schools, the favored contents and materials are multimedia contents and additional learning and assessment materials, which are already introduced in

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traditional classrooms in forms of a language lab, audio or video tapes, TVs, or realia. In other words, current use of digital textbooks is concentrated to assist paper textbooks with supplementary language learning materials. However, as shown in the teachers' requests for digital textbooks, the unique features of digital textbooks need to be developed. In this context, defining the concept of AI digital textbook, 2022 National Curriculum proposes advanced functions of digital textbooks integrating learning analytics, individualized learning and assessments, one-on-one AI tutor, and data-driven learning management (MOE 2022). Therefore, on-going development of digital textbooks will expand the usability of English digital textbooks to meet the needs of teachers, students, parents, and educational administration.

The findings of this study have implications for educational policy making and program development of teacher training. For the digital-driven public education, MOE (2023) pronounced to set forward smart teacher training, facilitation of smart devices in schools, construction of large education database, and instruction of AI digital textbooks in 2025. Current teachers' practices and perceptions of digital textbooks need to be considered in designing teacher training and instruction supports for AI digital textbooks and digital-driven education. In addition, their perceptions of advantages, obstacles and suggestions provide developers and educational administration with meaningful information for the development and evaluation of AI digital textbooks.

While this study present overall teachers' experience, perceptions, and prospects for digital textbooks and future learning, detailed approaches are requested to focus on patterns of usage, students' aspects, and curriculum design. For instance, future studies need to examine divided roles between paper and digital textbooks, instructional designs for digital textbooks, and learners' attitude, perceptions, and learning achievement.

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Examples in: English
Applicable Languages: English
Applicable Level: Primary and Secondary

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