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Korean Elementary English Teachers' Professionalism Development in Using EdTech: A Grounded Theory Study

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This study explores the development of professionalism in using Educational Technology (EdTech) among Korean elementary English teachers amid the increasing integration of technology in English education. Employing the Grounded Theory methodology, the study involved in-depth interviews with nine Korean elementary English teachers experienced in using EdTech. It aims to identify their EdTech experiences, the elements constituting EdTech professionalism, and its developmental process. The study reveals that teachers' EdTech professionalism encompasses a proactive approach towards technology, continuous professional growth based on practice and reflection, and adaptation of teaching methods in response to evolving technologies and learner needs. It highlights the importance of teachers' self-directed approach, collaboration with other teachers, and the integration of pedagogical, content, and technological knowledge into their English teaching. The findings have implications for teacher education and the advancement of EdTech-utilized English education, suggesting new processes and directions for developing elementary English teachers' professionalism in the rapidly evolving landscape of educational technology.

Key words: educational technology (EdTech), elementary English teacher, teacher professionalism, professionalism development

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1. INTRODUCTION

Building on a long-standing interest in the use of technology in education, the rapid development of artificial intelligence (AI) and numerous instances of online learning during the COVID-19 pandemic are driving a shift towards English education that utilizes various digital technologies. This trend is linked to the Korean 2022 revised national curriculum, which emphasizes the cultivation of digital technology skills in the process of nurturing future talents, which is being materialized in the field of English education through such as the development of AI PengTalk, sharing the cases of using educational technology, plans for developing AI digital textbooks, and so forth (Ministry of Education, 2022; Seong & Lee, 2021).

In this context, Educational Technology (EdTech) - the integration of education and technology - is increasingly recognized for enhancing teaching methods and content. Particularly in elementary English education, EdTech is useful for offering varied English interaction opportunities and enabling personalized, adaptive learning suitable for each learner's background (Choi, 2022). It plays a vital role for young learners, who are forming their initial perceptions of English learning, by fostering long-term engagement and English proficiency. Given their receptiveness to interactive and visually stimulating methods, EdTech is particularly effective in engaging these younger learners compared to older learners (Taghizadeh & Hasani Yourdshahi, 2020). With this in mind, EdTech is an area where it can be effective at elementary level compared to other school levels like middle or high school. Additionally, in Korea's elementary education system, where an interdisciplinary approach and integrating different subjects are common, elementary English teachers often encounter much EdTech utilization across various disciplines.

Such utilization of EdTech in elementary English education inevitably demands the development of related professionalism among teachers. In fact, around the COVID-19 era, elementary English teachers have been applying various EdTech tools in their classes in response to the evolving educational environment and address the learning challenges faced by slower learners, highlighting the need for their professional development in this area (Ku, 2022; Min, 2022). At this point, with the growing significance of EdTech and its impact on teacher professionalism in elementary English education, it's essential to understand the nature of EdTech-based teacher professionalism and examine practical examples of its development. Such an analysis could provide valuable insights for enhancing key educational areas affected by changes in content, methodology, and environments due to EdTech (Hyeon & Ko, 2021).

Particularly, by interpretatively examining the experiences of elementary English teachers in perceiving and implementing EdTech-utilized English classes, we can reveal the process of continuous professional development based on reflection and practice in the context of

EdTech use. This interpretive approach to EdTech-based teacher professionalism may also enable the identification of specific aspects of this professionalism, thereby facilitating the exploration of directions for Korean elementary English teacher education in the era of EdTech. [1]

However, despite the diversification in the scope of EdTech use in English education, there is still a lack of empirical studies that concretely address the experiences of elementary English teachers in adopting these tools or the multifaceted outcomes leading to professional development. Previous studies have mainly focused on a quantitative analysis of the perceptions and levels of factors related to elementary English teachers' ability to use technology (e.g., Kim, 2017). Moreover, they have not adequately reflected the current state of EdTech utilization, including the advancement of AI technology.

This highlights the need for an in-depth, interpretive understanding of Korean elementary English teachers' EdTech professionalism and a systematic exploration of its complexities. Additionally, research should focus on enhancing teachers' English teaching skills to broaden access to English education, moving beyond mere instrumental use of EdTech (Christopoulos & Sprangers, 2021). Therefore, this study seeks to develop a comprehensive theory on how Korean elementary English teachers build professionalism in EdTech use, employing Grounded Theory and drawing from their experiences. The research questions include:

1) What are the characteristics of English teachers' experiences with using EdTech?
2) What are the elements of EdTech professionalism for English teachers?
3) How do English teachers develop professionalism in using EdTech?

2. LITERATURE REVIEW

2.1. Professionalism of Elementary English Teachers

Early on, Freeman (1989) defined the elements of English teacher professionalism in foreign language education environments as 'knowledge, skills, attitude, and awareness.' He emphasized the teacher's agency in the decision-making process based on attitudes and awareness, in addition to knowledge and skills. Complementing this, Freeman and Johnson (1998) introduced three interdependent areas for the development of teacher professionalism: the teacher as a learner, the social context, and the pedagogical process. This implies that teachers must be equipped with content and pedagogical knowledge and be aware of the

[1] The interpretive approach in this study refers to a methodological individualistic approach, which implies that the meaning is generalized through the interpretation and access of individual teachers' meanings in new teacher professional development.

social context of their teaching acts. Moreover, it indicates the need to explore the social context in understanding teacher professionalism, particularly in pedagogical situations such as actual teaching.

This aspect of teacher professionalism has also been addressed in various studies within the context of elementary English education in Korea. For example, Ha and Min (2008), in their research on perceptions and beliefs about English teacher professionalism, revealed that English education experts and teachers perceive factors related to teaching skills as central to professionalism. Lee (2010), through a qualitative study on the enhancement of professionalism of two elementary English teachers, observed that the learning theories known to the teacher are applied and readjusted in the process of solving problems in teaching situations, thereby acquiring practical knowledge. Additionally, Ju and Ahn (2015), in their study on the professional development of three excellent elementary English teachers, identified the identity as a teacher-learner, the ability to implement theory in practice, and a reflective attitude and open-mindedness towards teaching as core elements of teacher professionalism.

However, it is important to note that these discussions are based on traditional classroom teaching situations and not on recent developments like online teaching or expanded use of EdTech. Therefore, a new discourse on elementary English teacher professionalism in the context of these changing environments is necessary. Indeed, recent survey research targeting elementary English teachers has revealed that teachers perceive future English classes will significantly differ from traditional ones due to the utilization of various EdTech tools (Sim, Jo, Lee, & Sim, 2022). This suggests that teacher professionalism related to the use of EdTech needs to be newly explored, building upon existing research on English teacher professionalism.

2.2. EdTech in Elementary English Education

Recent advancements in technology and the normalization of online teaching due to COVID-19 have heightened interest in EdTech-utilized English education (Ku, 2022). This interest is discussed in the context of future-oriented English teaching, involving the use of digital materials, smart devices, virtual and augmented reality, and AI technology (Kim & Lee, 2020; Yoon, 2022). Additionally, the effects of EdTech in expanding learner interaction opportunities and enhancing learner attitudes, such as learner engagement and confidence, in English learning are being empirically addressed (Jin, 2022; Min, 2022)

In the field of elementary English education, discussions on teacher and learner perceptions of AI chatbots, AI-based translators, and digital textbooks, as well as the effectiveness of such EdTech, are prevalent (Seo & Kim, 2023; Yoon, 2022). Notably, studies on learner perceptions and learning effects of AI PengTalk, developed for enhancing

public elementary English education, have been conducted extensively (e.g., Seong & Lee, 2021; Yoon, 2022). These studies consistently report that EdTech, in the context of limited English exposure and usage in Korea, can overcome spatiotemporal constraints, provide individualized English interaction opportunities, and effectively influence cognitive and affective learner domains.

More recently, the use and effects of generative AI, like ChatGPT and DALL-E, in English education have attracted significant attention. Studies like the validity analysis of communication function examples in the revised 2022 curriculum using ChatGPT (Sung & Jo, 2023), and the emphasis on prompt literacy for the use of generative AI in English education (Hwang, 2023), indicate the ongoing expansion and transformation of EdTech in educational settings. At this juncture, it is crucial not to overlook the real experiences, new roles, and professionalism of teachers planning and implementing EdTech in actual English lessons. This stems from the fact that most previous research in elementary English education focusing on EdTech has primarily addressed its use and effectiveness. Moreover, the introduction of new EdTech, like generative AI, necessitates new approaches to aspects like AI utilization ethics and critical thinking about AI-generated information (Kasneci et al., 2023), further demanding exploration of detailed elements of teacher professionalism in such contexts. Therefore, analyzing the experiences and professional development processes of elementary English teachers currently using EdTech in the field is essential, as it will form a vital foundation for future research and teacher education in the increasingly common realm of EdTech.

2.3. Elementary English Teachers' Professionalism of Using EdTech

In the context of unprecedented levels of technology development and application, EdTech is being newly defined, building upon discourses on teacher professionalism such as TPACK (Technological Pedagogical And Content Knowledge) proposed by Mishra and Koehler (2006). TPACK signifies the integrated professional knowledge of teachers encompassing Pedagogical Knowledge (PK), Content Knowledge (CK), and Technological Knowledge (TK). Discussions on TPACK have been actively conducted in the context of English education in Korea, commonly emphasizing the need for teachers to actively incorporate advancing technology into English lessons (Kim, 2022; Oh, 2021). Specifically, Oh (2021), aiming to enhance English teachers' technological knowledge in post-COVID-19 environments, examined the influence of TPACK components like technological pedagogical content knowledge, technological readiness, self-efficacy, and infrastructure perception, identifying the most pronounced influence of pedagogical knowledge. Kim (2022) compared the perceived importance and actual use of TPACK among pre-service teachers, reporting that while the pre-service teachers belong to a department of English

language education rated the importance and capability of technology use higher compared to other majors, they lacked the ability to implement it in actual teaching.

What these studies on TPACK have in common is that they mainly utilized quantitative research methods such as measuring relevant teacher competencies and surveying teacher perceptions (Kim, 2017). This suggests the need for a qualitative approach to the development of related competencies and teacher experiences, even though the concept of TPACK and its components are well-defined in existing studies. Indeed, with the recent redefinition and emphasis on 'EdTech' during COVID-19, discussions on teacher professionalism in elementary English education based on EdTech are emerging anew (Sim et al., 2022). For instance, Son (2020) categorizes this professionalism into four areas: exploration (learning about digital tools), communication (connecting with peers and students), collaboration (sharing information), and reflection (evaluating digital tool usage). Similarly, Basri and Musdariah (2022) emphasize the integration of educational and technological aspects in Computer-Assisted Language Learning (CALL), noting the importance of TPACK knowledge, beliefs, and self-determination for English teachers.

In summary, EdTech professionalism for elementary English teachers involves the skillful exploration and application of EdTech, grounded in educational beliefs and reflective practices, to deliver effective English lessons. In today's tech-centric society, expectations on English teachers to enhance technology use in education are rising. They are tasked with integrating technology to foster students' digital literacy, and meeting curricular demands. Despite these expectations, teachers encounter difficulties in adapting to these expanded roles and mastering EdTech (Ji & Shin, 2020; Min, 2022). Understanding the facets of EdTech professionalism is essential for teacher training and the successful integration of technology in teaching. As the educational environment evolves, examining teacher professionalism in EdTech necessitates a holistic approach that includes knowledge, attitudes, and awareness.

3. METHODOLOGY

3.1. Participants

This study applied Grounded Theory to investigate how Korean elementary English teachers adapt to educational changes through EdTech, aiming to identify professionalism elements and develop a theory on this development. Selecting participants through theoretical sampling, it focused on teachers expected to provide valuable insights on their development of professionalism in using EdTech.

Interviews were conducted until theoretical saturation, meaning no new information was

added to the study's main focus (Ryu, 2022): developing elementary English teachers' professionalism using EdTech. Nine teachers with extensive EdTech experience in elementary English were chosen based on specific criteria: those who implemented EdTech lessons and published results as academic papers (Category 1), presented EdTech practices at academic conferences (Category 2), won the contest for the best classroom practices using AI PengTalk (Category 3), and conducted research in EdTech-related teacher community (Category 4). Their detailed profiles are in Table 1.

TABLE 1

General Information of the Participants

Category	Participant	Gender	Years of Teaching English	Region	Key Information
1	Teacher 1	F	1.5	Busan	M.A. in English education
	Teacher 2	F	7.0	Seoul	M.A. in English education
2	Teacher 3	F	3.6	Gangwon	M.A. in English education
	Teacher 4	M	9.0	Gwangju	M.A. in English education
3	Teacher 5	M	6.0	Jeonbuk	M.A. in English education
	Teacher 6	F	8.0	Ulsan	Member of an EdTech expert group
	Teacher 7	F	2.0	Seoul	M.A. in English education
4	Teacher 8	F	15.0	Incheon	M.A. in English education
	Teacher 9	F	2.0	Incheon	Instructor of an EdTech research group

3.2. Research Design

3.2.1. Grounded theory

Grounded Theory, a qualitative research method, develops theory from data rather than formulating hypotheses. This approach is ideal for understanding the complex interactions and temporal progression of phenomena, focusing on generating rather than testing theories (Strauss & Corbin, 1998). This study applies Grounded Theory to deeply understand elementary English teachers' experiences with recent EdTech, an emerging area previously focused more on tool characteristics and learning effectiveness. It aims to explore the lesser-known experiences of the teachers using EdTech in their classes, investigating their professional development process. Based on this, the study is to systematically examine their experiences and develops a theory to elucidate Korean elementary English teachers' professionalism development in using EdTech. Applying Grounded Theory in this way was expected to provide an opportunity, from a methodological perspective, to distinctively

explore the process of developing teacher professionalism, differentiating it from previous studies.

3.2.2. Data collection

In this study, data were collected through in-depth interviews with the participating teachers. To facilitate efficient interviews, a list of questions was prepared in advance as shown in Table 2, which was reviewed and revised after consultation with one expert in elementary English education and another expert in sociology of education.

TABLE 2
Interview Questions

Key Questions	Specific Questions
1. What prompted the use of EdTech in English teaching?	1-1. How did you initially encounter and engage with EdTech tools? 1-2. What motivated you to incorporate EdTech into your teaching practices? 1-3. How did you explore and research EdTech into your teaching practices?
2. What has been your experience with using EdTech in English teaching?	2-1. What were the preparatory steps involved in integrating EdTech? 2-2. What interactions occurred among teachers and students, as well as between students, while using EdTech during your English teaching? 2-3. What changes did you observe before, during, and after your English teaching when utilizing EdTech? 2-4. What challenges did you encounter while implementing EdTech? 2-5. What advantages did you perceive from incorporating EdTech? 2-6. How did the use of EdTech impact the utilization of English textbooks? 2-7. How did you conduct assessments when utilizing EdTech?
3. What is the role of the teacher in using EdTech in English teaching?	3-1. How did the role of the teacher in English teaching change with EdTech? 3-2. What aspects of curriculum design were needed to integrate EdTech? 3-3. How did the role of the teacher change when EdTech is incorporated in terms of textbook utilization?
4. How will the generative AI (e.g., ChatGPT) impact English teaching?	4-1. What competencies should be nurtured in elementary learners when using generative AI in English teaching? 4-2. What competencies should elementary English teachers develop to effectively utilize generative AI in English teaching?

Teachers were selected for the study and sent an online consent form to confirm their voluntary participation. Semi-structured interviews, led by the first author, included main questions and additional follow-up questions based on responses. Participants received an email about the study and interview topics two weeks prior to the first interview. Conducted virtually via Zoom, each interview lasted 40-60 minutes, was recorded, transcribed with consent. Anonymity was maintained in reporting results to protect personal information and uphold research ethics.

3.2.3. Data analysis

In this Grounded Theory study, data analysis involved transcribing audio data into transcripts and generating theory through staged coding. Even though theory generation through staged coding of data is the key method of grounded theory, researchers have proposed a variety of methods regarding the coding stages of grounded theory (Ryu, 2022). Among these various methods, this study chose to follow Strauss and Corbin's (1998) coding method, which is one of the most conventional methods of grounded theory, given the nature of the data in this study, which is interviews with teachers.

The process included three stages: open coding, axial coding, and selective coding. In open coding, teachers' responses were conceptualized into abstract, meaningful data clusters, involving a systematic, in-depth analysis of their experiences using EdTech in elementary English classes. Axial coding then categorized these concepts into classes based on similar characteristics, applying Creswell's (2015) paradigm model to analyze processual relationships and achieve theoretical saturation. The final selective coding stage integrated these categories to derive a core category, leading to a theoretical model on elementary English teachers' experiences with EdTech and related professionalism elements. Notably, in the final selective coding phase, a matrix analysis was conducted as suggested by Strauss and Corbin (1998) to diagram and present micro and macro related concepts for the core categories. Next, the authors sought to synthesize the findings to derive as objective a theory as possible about the professional development process of elementary English teachers using EdTech.

3.3. Research Procedure

Between March and May 2023, the first author of this study conducted data collection through online surveys and interviews, each repeated nine times in the first two months. In the following month, an additional nine interviews were carried out to clarify initial responses. The study aimed for theoretical saturation by repeatedly comparing and analyzing responses from both interview rounds. The authors constructed abstract concepts and categories by comparing and analyzing teacher responses for each survey item and attempted to analyze the relationships between these concepts. Throughout this process, the authors focused on eliminating biases in interpreting the interview results, basing theory derivation solely on the content of the interviews.

4. RESULTS AND DISCUSSION

4.1. Concepts and Categories Derived from Experiences with EdTech and the Development of Professionalism

In Section 3, individual interviews were conducted with nine elementary English teachers to delve into their professionalism in EdTech-utilized classes. The interviews focused on their first experiences with EdTech, expected outcomes from using EdTech, the development of their professional skills in such contexts, in-class experiences, views on using EdTech, and teachers' roles in EdTech and generative AI-enabled environments. All of these interviews were transcribed and then subjected to initial open coding to identify representative and meaningful concepts and to group similar concepts into categories. Through open coding, key concepts were pinpointed and categorized, leading to the formation of main categories, upper and sub-categories, and specific concepts, which are systematically presented in Table 3.

TABLE 3

Concepts and Categories Derived from English Teachers' Experience of Using EdTech

Upper-categories	Sub-categories	Concepts
Engaging with EdTech tools[1]	Voluntary adoption through personal efforts	· Discovering new EdTech during the teacher's personal English learning and teaching journey in other subjects · Finding during the EdTech-related research and web source · Making proactive efforts for the adoption of new EdTech
	Adoption influenced by the learning community and society	· Discovering through a professional learning community · Discovering through exchange with colleagues at the school · Learning through materials provided by education authority · Discovering through participation in office teacher training and TESOL workshops
Expecting effects of EdTech utilization for English learning[1]	Effects on English learning outcomes	· Expecting correcting pronunciation · Expecting personalized feedback on learning outcomes · Expecting acquiring literary and communicative skills
	Effects on the English learning process	· Overcoming individual differences in English learning · Establishing a foundation for lifelong English learning · Forming ideal English learning habits
Expecting effects of EdTech utilization in affects[1]	Reducing the burden of English learning	· Reducing the burden of English writing by online activities · Decreasing affective burdens related to English speaking by providing EdTech-utilized activities (e.g., AI PengTalk)
	Positive impact on attitudes for English learning	· Improving students' engagement and participation · Ensuring continuous learner autonomy in English learning · Increasing student interest in English learning
Expecting effects of EdTech	Expanding opportunities for exposure	· Expanding opportunities for learning outside the classroom · Providing various pronunciation of English as a global language using EdTech

utilization in the English learning environment[1]	Expanding opportunities for communication	· Increasing the frequency of communication in English · Expanding individual opportunities for speaking English · Utilizing EdTech as a tool for learning English based on the digital native characteristic of students
Expecting effects of EdTech utilization in the classroom[1]	Ease of classroom management	· Cumulating and managing learning outcomes · Providing assignments and various visual materials · Providing game-based English learning opportunities
	Ease of providing feedback	· Providing immediate feedback in on/offline teaching · Overcoming time constraints for providing feedback · Instructing students with learning difficulties
Expecting effects of EdTech for teachers' professional-ism[1]	Effects for enhancing English teaching	· Utilizing EdTech as a tool for teachers to research English teaching methods
	Effects for improving English fluency	· Utilizing EdTech as a tool to improve teachers' overall English proficiency and pronunciation in particular
Making efforts to cultivate related professional-ism[2]	Research on EdTech tools	· Engaging actively in exploration through the web resources · Exploring manuals for effective use of EdTech for teaching · Maintaining continuous interest in new EdTech tools · Practicing for EdTech familiarity
	Research on classroom strategies	· Participating in contests to teach English using EdTech · Exploring the creative use of EdTech for teaching · Exploring classroom practices using EdTech
Utilizing resources to build related professional-ism[2]	Efforts for building teacher community	· Forming and operating networks for teacher community · Sharing cross-school EdTech teaching practices · Running a leading school in the use of EdTech
	Utilizing teacher support systems	· Attending district-level EdTech-related teacher training · Creating an EdTech-enabled English learning environment with support from school administrators
Expanding the need for systematic lesson planning[3]	Integration of EdTech tools in teaching	· Adopting process for the familiarity with the EdTech · Establishing a physical environment for EdTech · Addressing issues that arise when utilizing EdTech
	English lesson planning	· Finding ways to provide feedback in EdTech-enabled class · Making connections between teaching content and EdTech · Exploring the complementary roles of EdTech to textbooks
Expanding the interactions during lesson implementa-tion[3]	Increase interactions between learners	· Increasing conversations between learners through EdTech · Expanding opportunities for collaboration among learners with online EdTech tools · Expanding peer review by sharing learning outcomes
	Expansion of teacher-student interaction	· Building a new paradigm of communication (student ↔ AI ↔ teacher) · Expanding opportunities for teacher-learner communication · Providing continuous and one-on-one corrective feedback
Noticing changes during the reflective phase[3]	Changes in assessments	· Increasing individualized and process-oriented assessment · Conducting data-driven assessments
	Changes in reflection	· Using EdTech tools to write a lesson reflection journal
Recognizing the benefits	Meeting students'	· Expanding motivation for English learning · Reducing burdens related to learning and assessment

of using EdTech[4]	expectations and effects	· Increasing autonomy, participation, and satisfaction · Perceiving connection of English learning to real-life
	Meeting teachers' expectations and effects	· Moving away from skill-based English language teaching · Enabling personalized and student-centered learning · Providing instant, individualized and better feedback · Reducing reliance on textbooks
Recognizing the limitations of using EdTech[4]	Limitations of setting up environment	· Challenges of securing student personal devices · Long, tedious EdTech familiarization process · Administrative complexity (e.g., collecting consent forms) · Wi-Fi network and technical limitations of EdTech tools
	Limitations of relational aspects	· Conflict with teachers who do not use EdTech · Conflict with teachers over smart devices · Conflict with parents concerned about overuse of EdTech
	Limitations of teacher support	· Limited district-level English teacher training · Lack of models and cases of English lessons using EdTech
Developing elements of English teacher professional-ism in using EdTech[5]	Demand for new competencies	· Guiding EdTech tools and learning contents to students · Designing compelling classroom tasks using EdTech · Risk-taking of actively integrating EdTech into teaching · Mapping EdTech tools and English curriculum
	Demand for the expansion of existing competencies	· Increasing demand for identifying individual learner levels and designing personalized lessons (e.g., slow learners) · Emphasis on general English fluency · Expanding adaptability in teaching English
Considering use of generative AI[5]	Competencies for learners	· Generating prompts and autonomously utilizing chatbots · Enhancing learner metacognition and agency in learning
	Competencies for teachers	· Empowering skills for using generative AI for lesson design · Expanding collaborative digital communication

Note. Five main categories: Reasons and background for encountering EdTech[1], Professional development using EdTech[2], Experience and changes in classes using EdTech[3], Evaluation of classes using EdTech[4], Elements of professionalism for English teachers using EdTech[5]

The initial open coding process yielded 86 concepts, 31 sub-categories, and 15 upper-categories, culminating in five main categories. This coding effectively summarized the participating teachers' motivations and backgrounds for engaging with EdTech, their journey in developing professional expertise with EdTech, their experiences and changes in using EdTech for elementary English classes, and their perceived elements of professionalism in EdTech-utilized teaching.

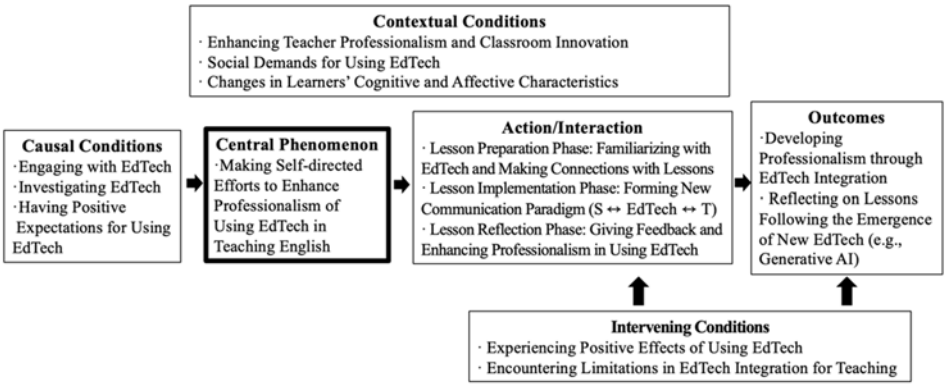
4.2. Paradigm Model of Experience and Professionalism Development Process in Using EdTech

Strauss and Corbin (1998) recommended using a paradigm model in Grounded Theory to connect context and actions of a study's main phenomenon. This model provides a systematic approach to understanding processes by linking category relationships identified in primary open coding. Creswell (2015) further simplified this model, comprising central

phenomena, contextual conditions, causal conditions, intervening conditions, actions/interactions, and outcomes. This study, considering Byun and Kim's (2020) critique on indiscriminate use of the model in educational research, focused on the 'central phenomenon,' exploring its conceptual properties. This approach aids in deeply understanding lesser-explored phenomena. 'Context' was interpreted not just as a factor affecting 'action/interaction strategies' or the 'central phenomenon,' but as an environmental characteristic impacting the overall pattern among various influencing factors. The study used this model to explore how elementary English teachers develop professionalism in using EdTech, as shown in Figure 1.

FIGURE 1

Paradigm Model of English Teachers' Professional Development in Using EdTech



4.2.1. Central phenomenon

In this study, the key experience identified among elementary English teachers utilizing EdTech was their 'Making self-directed efforts to enhance professionalism of using EdTech.' This phenomenon is shaped by their experiences in action and interaction. Teachers' professional development in using EdTech was also related to their willingness to explore various ways to use Edtech as a teaching tool and to try it out in practice.

In detail, teachers actively engaged in researching EdTech tools for classroom use. This involved personal research efforts, such as internet searches and reading, along with practical application trials to understand these tools better. They also explored the creative application of EdTech by analyzing lesson videos and case studies. This innovative approach played a crucial role in their professional growth. Teacher 3's experience highlighted this:

> Teacher 3: “Managing many students as an English teacher, I face challenges with EdTech classes... Despite this, my determination to keep using various EdTech to tackle the challenges in my lessons is essential.”

From a methodological perspective, teachers invested in building communities and leveraging support systems. They established teacher networks to share practices and participated in district-level EdTech training programs. This approach, aligning with Tsui’s (2003) claim, suggests that teacher professionalism develops from diverse knowledge acquisition and community engagement. Teacher 5 described this experience:

> Teacher 5: “During the EBS AI PengTalk workshop, we (teachers) shared experiences and resources of using EdTech. Collaborating with other teachers really enriched my lesson ideas beyond individual research.”

4.2.2. Causal conditions

In this research, the ‘causal conditions’ are the underlying reasons prompting teachers to engage in actions leading to the central phenomenon. These conditions determine why certain behaviors occur, as explained by Strauss and Corbin (1998). For this study, the causal conditions are related to why teachers implemented EdTech in their English classes. Identified causal conditions include ‘Engaging with EdTech tools’ and ‘Having positive expectations for using EdTech in English teaching.’

English teachers initially engaged with EdTech tools through their own personal and voluntary efforts, demonstrating a strong intention to enhance their technology utilization skills. They conducted personal research, comparing various EdTech tools to enrich their teaching. Additionally, interactions within teaching communities, where common challenges were discussed, led to a more positive reception of new tools. Teachers also gained exposure to EdTech through social and institutional support, participating in professional development programs tailored for English teachers.

Most teachers held positive expectations for EdTech-utilized learning in the elementary level, which fueled their motivation to use EdTech and develop related professionalism. They expected affective benefits for learners like heightened interest in English, reduced learning anxiety, and increased student engagement and participation. Environmental advantages such as more English exposure and opportunities for one-on-one communication in EFL settings were also expected, as Teacher 4 explained:

> Teacher 4: "Tools like AskUp and Zepeto, built on social media, offer students continuous engagement. My main expectation from EdTech was to facilitate self-directed learning by providing these tools to students."

Furthermore, the teachers acknowledged the varied instructional potentials of EdTech, foreseeing the ability to offer diverse educational materials and streamline outcome assessment. They also expected that EdTech would enable more meticulous preparation for English lessons, as Teacher 8 described:

> Teacher 8: "I used translation tools mainly for verifying uncertainties during English lesson preparation, primarily for my use rather than for students' direct engagement."

4.2.3. Contextual conditions

Contextual conditions are background factors that influence the entire process where the central phenomenon occurs, as outlined by Strauss and Corbin (1998). This study identified several contextual conditions based on interviews with participating teachers, which include 'Enhancing teacher professionalism and classroom innovation,' 'Social demands for using EdTech,' and 'Changes in learners' characteristics.' These conditions emerged as teachers recognized the potential benefits of EdTech tools, motivating them to explore new teaching methods. This drive stemmed from a dissatisfaction with traditional teaching methods and an awareness of the profound influence of AI tools on foreign language education. Additionally, the concept of future-oriented English lessons, reflecting the characteristics of an evolving society with a knowledge-based focus, significant scientific and technological advancements, and global connectivity, encouraged teachers to value and implement EdTech in English classes (Min, 2022). Teacher 4's comment exemplified this perspective:

> Teacher 4: " I expected that AI in English learning would enable students to continuously practice English and build their language skills. Considering the advantages of AI technology, teachers should consider how students can use AI effectively and beneficially."

4.2.4. Actions and interactions

In this study, actions and interactions are defined as strategic behaviors and responses of participating teachers in response to the central phenomenon of integrating EdTech in elementary English classes. These strategies are process-oriented and aimed at achieving

specific goals. Firstly, during lesson preparation, teachers needed to familiarize themselves with EdTech, prepare the physical environment for its use, establish connections between English lesson content and EdTech tools, and proactively address EdTech-related issues. Teacher 1 stated:

> Teacher 1: "Planning how to integrate EdTech with specific units and contents systematically during lesson preparation is crucial. It's not just about completing EdTech missions but also about strategizing feedback for each student's performance."

Secondly, significant changes in interactions were observed during lesson implementation. Teachers noted the formation of a new communication paradigm involving students, AI, and teachers, increased student conversations around EdTech, expanded teacher-student communication opportunities, and enhanced learner collaboration using online tools. This led to a broadened scope of interaction in English classes. Teacher 4 elaborated:

> Teacher 4: "EdTech enhances communication between students, and between students and teachers. AI introduction changes this by facilitating interactions with AI among students, teachers, and the curriculum, marking a shift in communication dynamics."

Thirdly, in the lesson reflection stage, teachers enhanced their professionalism through reflective practice. They found EdTech methods effective for gathering student outcomes and providing feedback. This also led to improvements in the quality and quantity of teacher feedback. The methods for student evaluation diversified, encouraging peer and self-evaluation. Teacher 6 explained:

> Teacher 6: "Before using EdTech, it was hard to provide sufficient feedback to each student in speaking activities. With EdTech, this limitation is overcome, encouraging students' more active participation."

4.2.5. Intervening conditions

Intervening conditions in this study refer to personal and social factors influencing the behaviors and responses of teachers, or the development of their professionalism in using EdTech, either facilitating or hindering these strategies in specific contexts (Strauss & Corbin, 1998). These conditions significantly impact the process of professional development and teaching innovation among elementary English teachers.

For learners, improvements in motivation and English skills were noted. Teachers benefited by shifting to learner-centered methods and quickly assessing learner performance and progress. These experiences motivated teachers to enhance their EdTech skills. Further, these positive classroom experiences significantly motivated teachers to develop their professionalism in utilizing EdTech. Teacher 2 commented:

> Teacher 2: "Teachers can quickly analyze student performance and provide instant feedback on assignments, allowing students to retry challenges without pressure. This approach has effectively implemented process-centered assessment and learner-centered lessons."

Conversely, factors impeding EdTech professionalism development were identified as inadequate physical environments, relational challenges, and insufficient teacher support. These obstacles led to frustration but also encouraged collaborative problem-solving within the teaching community and fostered teachers' self-motivation and dedication toward enhancing their EdTech skills. Teacher 1 shared:

> Teacher 1: "A major issue with AI PengTalk was voice recognition errors, causing student frustration and questioning the tool's reliability."

4.2.6. Outcomes

Outcomes in this study relate to the professionalism elements in EdTech utilization that emerge from teachers' actions and interactions. Teachers identified new elements of professionalism in elementary English teaching, such as guiding English learning content, designing EdTech-utilized tasks, instructing on using EdTech tools, and fostering digital literacy. They acknowledged the expanded need for teacher consortia, increasing authenticity in lessons, understanding and customizing lessons for individual learner levels, fluency in English, adaptability in teaching scenarios, encouraging confidence and motivation for slow learners, appropriate textbook utilization, and English curriculum literacy. Teacher 1 exemplified:

> Teacher 1: "EdTech promotes learner-centered and authentic lessons by increasing learner participation and allowing for customized activities. Effective use requires careful planning on when and how to integrate these tools into the curriculum."

Further, teachers continued to consider how to integrate generative AI, like ChatGPT, into

elementary English lessons based on their existing technological pedagogical content knowledge. They believed that elementary learners should be able to plan and engage in learning autonomously using such tools and independently solve problems encountered with generative AI. Therefore, elementary English teachers need not only fluency in English but also skills in effectively communicating with students and generative AI. They foresaw the necessity to manage students effectively using tools like ChatGPT, accurately assessing students' learning statuses and offering tailored guidance suited to diverse student abilities and levels. Teacher 4 stated:

> Teacher 4: "For using LLM (Large Language Model) chatbots like ChatGPT effectively, teachers and students need to know how the chatbot responds and checks facts. This helps decide where and how to use it."

4.3. Core Category of Experience and Professionalism Development Process in Using EdTech

The core category integrates and represents all the concepts and categories derived from the data analysis. In other words, the core category is a concept that succinctly encapsulates the main content of the study (Strauss & Corbin, 1998). By synthesizing each condition of the paradigm model derived through open coding and axial coding, the following core categories were derived in this study: Developing English teachers' professionalism through self-directed experiences of using EdTech.

The dimensions and attributes of the core category are specified in Table 4.

TABLE 4

Dimensions and Attributes of the Core Category

Core Category	Dimension	Attribute
Developing English teachers' professional-ism through self-directed experience of using EdTech	Adoption triggers for EdTech tools	Continuous (strong)-Temporary (weak)
	Motivation for developing professionalism in using EdTech	Continuous (strong)-Temporary (weak)
	Process of developing professionalism in using EdTech	Continuous (strong)-Temporary (weak)
	Changes in EdTech-enhanced classroom instruction	Positive (professional development) - Negative (passion decrease)
	Formation of EdTech utilization competencies for English teachers	Discovery (of new elements) - Diminishment (of existing elements)

The core category emerged from teachers' experiences with EdTech. They embraced it to adapt to future teaching changes, influenced by their teaching community and social support.

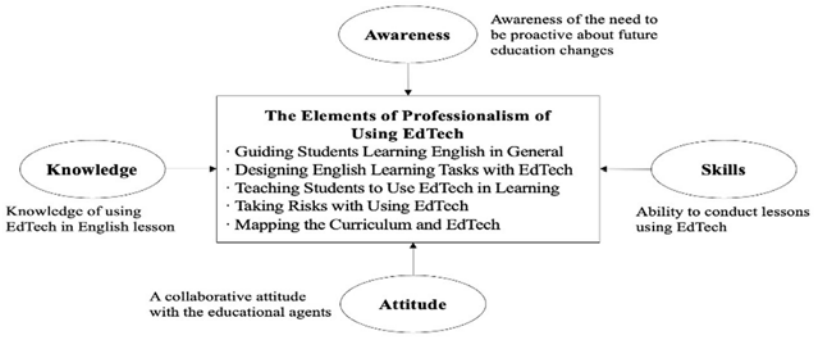
Their curiosity led them to explore new tools, anticipating benefits for both learners and teachers, fostering their professional development in English teaching. They improved their professionalism through research and creative EdTech implementation, emphasizing the importance of teachers' learning communities and support systems. Collaboration within these communities was essential for effective EdTech use. Teachers observed various outcomes, with positive changes reinforcing professionalism and negative ones posing challenges.

This resulted in the addition or modification of elements in their professionalism. These included forming professional learning communities of teachers, individualizing lessons, motivating slow learners, using authentic materials, adapting to classroom situations, and improving English fluency. This emphasizes the importance of community activities, learner-centered teaching, language teacher identity, teaching skills, and language proficiency in English teacher professionalism.

In addition to the existing teacher professionalism that were highlighted, new elements of elementary English teachers' professionalism required in the context of EdTech-enhanced English teaching were also identified through selective coding. The newly emerged elements include 'Guiding Students' learning English in general,' 'Designing English learning tasks with EdTech,' 'Teaching students to use EdTech in learning,' 'Taking Risks with Using EdTech,' and 'Mapping the curriculum and EdTech.' The new elements encompass teacher awareness, knowledge, skills, and attitudes. These align with the key areas of English teacher professionalism early outlined by Freeman (1989), illustrating how these emerging elements are applicable within the specific context of English language teaching. Taken together, the newly identified elements of English teachers' professionalism in using EdTech from this study are shown in Figure 2.

FIGURE 2

The Elements of EdTech Utilization Professionalism in English Teachers



The development of these elements of elementary English teacher professionalism in

using EdTech stems from their curiosity, peer collaboration, teaching practice, deep reflection, and proactive adaptation to societal changes. These elements became ingrained in the teachers, guiding their preparation for future lessons with emerging technologies like generative AI. This proactive approach anticipates and readies them for the competencies and professionalism required of future English teachers.

4.4. Matrix Analysis of the Core Category of Experience and Professionalism Development Process in Using EdTech

Matrix analysis can explain how various types of conditions related to the key phenomenon are connected to actions/interactions and influence the results depending on micro and macro situations (Strauss & Corbin, 1998). The matrix analysis of this study's core category 'Developing English teachers' professionalism through self-directed experiences of using EdTech,' based on the results of open and axial coding, revealed that this core category is expansively divided into individual, organizational, and social dimensions. This means that teachers' self-directed professional development is shaped by their personal educational interests and their relationships with other teachers within their organizations. Additionally, this development is influenced by the rapidly evolving technological environment in the education sector, where the use of EdTech is emphasized. This can be illustrated schematically in Figure 3.

FIGURE 3

Matrix Analysis of the Core Category

4.4.1. Individual dimension

The study found that personal factors at the micro-level significantly influenced the actions, interactions, and professional development of elementary English teachers. These teachers showed a keen interest in EdTech, continually exploring new tools to enhance their teaching methods and student learning. They believed that EdTech tools could broaden students' English proficiency and foster a lifelong learning mindset. They also emphasized that the use of EdTech enables lessons to be individually tailored to learners with different needs, such as slow learners. Their educational approach focused on holistic student development, considering EdTech essential for achieving these goals.

To address the evolving learner needs, teachers used EdTech to overcome educational limitations, embraced learner-centered teaching, and supported slow learners. This approach contributed to their professional growth as they actively engaged with students, providing personalized feedback during EdTech-integrated lessons. The teachers' commitment to ongoing learning and resource gaining enabled them to adeptly integrate EdTech into their teaching, resulting in professional development in using EdTech.

4.4.2. Organizational dimension

Organizations, including schools and teacher communities, are pivotal in nurturing teacher professionalism and fostering innovative teaching practices. These organizations serve as platforms for collaborative problem-solving and sharing resources, which is crucial for addressing the dynamic challenges of integrating EdTech into elementary English education. Teachers leveraged these communities to enhance their expertise, sharing knowledge and classroom experiences.

In these communities, peer evaluation, stable collaborative relationships, and access to developmental resources were deemed vital for professional growth. Teachers engaged in collective reflection, which played a significant role in their professional development. This process underscored the value of community-based learning in acquiring new skills and promoting innovation in teaching methods.

4.4.3. Social dimension

Teachers' professional development in EdTech use, both individually and organizationally, highlights the importance of social support. El Shaban and Egbert (2018) identified three key social support mechanisms for enhancing English teachers' technological capabilities: access to necessary software, assistance from software experts, and institutional support for practice. Such support is crucial for the integration of technology

in education, which was also found to be important in this study.

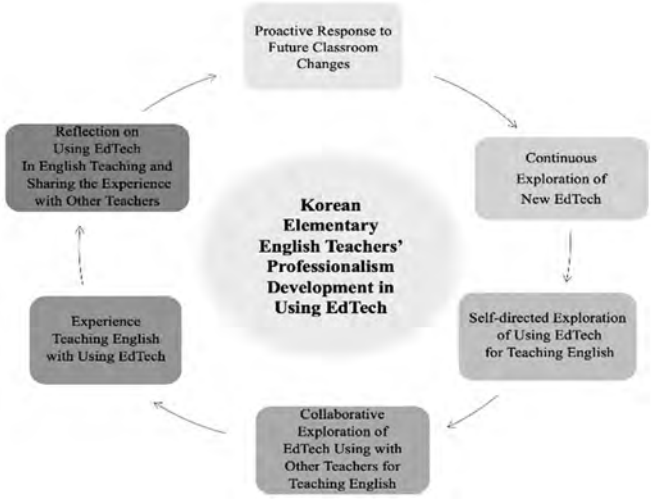
The widespread use of digital tools by students and parents, coupled with expectations for EdTech's educational benefits, has encouraged institutional support for teachers. This support has significantly shaped elementary English teachers' professionalism, particularly when EdTech practices become promotional educational materials. Training from educational offices and equipping schools with smart devices have prepared teachers to address future educational challenges and innovations. Moreover, the learning gaps and challenges faced by slow learners, worsened during the COVID-19 situation, have highlighted the need for societal support and the potential of EdTech to address these issues effectively.

4.5. Theory Generation on the Process of Experience and Professionalism Development in Using EdTech

Based on the results and following the research procedure of Grounded Theory, a theoretical model was derived for the process of forming teaching professionalism elements among elementary English teachers due to their experience in using EdTech. The cyclical process of forming professionalism elements in EdTech utilization as derived from the experience of elementary English teachers using EdTech in their classes, can be represented as shown in Figure 4.

FIGURE 4

A Theoretical Model of English Teachers' Professionalism Development in Using EdTech



4.5.1. Proactive response to future classroom changes

The teaching landscape is rapidly changing with technological advancements, introducing new tools into English education. This change requires English teachers to enhance their TPACK, facilitating education that improves students' digital skills and literacy. Teachers are actively responding to student needs by exploring innovative teaching methods using technology. Reflecting on future teaching, they shape their educational approaches and identities, aiming to meet students' learning needs more effectively. Their commitment to adapting to these changes strengthens their proficiency in using EdTech for English teaching.

4.5.2. Continuous exploration of new EdTech

In the stage of exploring new teaching tools, teachers initially encounter and begin adopting these tools, responding keenly to the rapid technological evolution and changes needed in schools. They adopt an open and proactive mindset to enhance their teaching methods (Freeman & Johnson, 1998; Wallace, 1991). At this stage, teachers' motivation and capability to innovate are vital. The teachers in this study individually expanded their interest and exploration of new tools, significantly contributing to their professional growth. This highlights the crucial role of personal motivation and practical teaching skills in professional development.

4.5.3. Self-directed exploration of using EdTech for English teaching

In this study, a crucial phase is teachers' autonomous exploration of using EdTech tools in teaching. Elementary English teachers research and adapt EdTech manuals and creative application methods to align with their values and goals. They vary the use and timing of EdTech in their classes, reflecting their learner-centered teaching philosophy and shaping their teaching identity. Teachers' educational goals and pedagogical knowledge significantly influence their EdTech usage decisions (Lai & Jin, 2021). This stage, marked by teachers' desire to improve their professional skills and openness to new EdTech challenges, lays the groundwork for collaborative approaches.

4.5.4. Collaborative exploration of EdTech using with other teachers for English teaching

The collaborative exploration stage in using EdTech tools for teaching involves teachers strengthening their expertise through communication with fellow teachers, parents, and students. Recognizing the value of teacher-student interactions in EdTech-utilized classes, teachers used collaborative skills to tailor EdTech tools to individual learners, thereby

boosting motivation and achievement. Teachers formed consortia and professional learning communities, focusing on shared growth and knowledge exchange. This collective approach helped them enhance their teaching skills, effectively integrate technology, and improve English education for students (Nazari, Nafissi, Estaji, & Marandi, 2019).

4.5.5. Experience teaching English with using EdTech

Teaching practice is vital for enhancing elementary English teachers' professionalism, as it transforms theoretical knowledge into practical application in the classroom (Kwon, Kim, & Ahn, 2016). Teachers' teaching activity should go beyond just imparting knowledge to being a dialogic mediation (Johnson, 2009). This approach makes the classroom a learning space for teachers, continually improving their teaching methods. In practice, teachers apply their professional skills and work to surpass their limitations through interactions with students. The next reflective stage is essential for teachers to systematically examine and evaluate their teaching methods using EdTech.

4.5.6. Reflection on using EdTech in teaching English and sharing the experience with other teachers

The process of applying and reflecting on EdTech tools is key for teachers to refine their teaching practices. Teachers document their experiences with these tools, collaborate with peers for feedback, and engage in reflection to improve their teaching professionalism. Sharing and exchanging knowledge within their teaching community is crucial for enhancing their teaching skills. This stage builds confidence and competence in using EdTech, encouraging teachers to try varied instructional strategies, thereby increasing their self-efficacy (Harris & Jones, 2010). Through this reflection, teachers develop the professionalism needed to adapt to future changes proactively. This process, depicted in Figure 6, is cyclical: teachers continuously evolve their professionalism in using EdTech by exploring new technologies, applying them in teaching, and engaging in reflection.

5. CONCLUSION

This study, using Grounded Theory, delved into how nine Korean elementary English teachers develop professionalism in using EdTech. Extensive interviews uncovered the teachers' detailed experiences, revealing the benefits and challenges of EdTech in elementary English education and identifying crucial elements of teaching professionalism. Key findings include the importance of collaborative groups for teachers, designing

personalized lessons for students, enhancing students' confidence and motivation, and improving English curriculum literacy skills. Additionally, it spotlighted new aspects like designing EdTech-utilized learning tasks and embracing risk-taking.

The study's core category, 'Developing English teachers' professionalism through self-directed experiences of using EdTech,' emerged from analyzing teachers' individual experience, organizational and social contexts. This highlights the need for teachers' self-directed professional growth, continuous learning, reflective teaching, and practical application of learned theories. It also underscores the necessity of educational support systems for continuous collaboration and the development of technological pedagogical content knowledge.

The key for elementary English teachers is enhancing communication with educational agents and adapting to future teaching changes. Teachers' competencies to integrate pedagogical and technological knowledge are crucial for effective English learning environments. Based on this, English teachers' professional growth emerges from their self-directed effort and reflection.

This study focused on a select group of teachers who have extensive experiences of using EdTech in English lessons. Thus, it suggests a need to explore how other teachers in varied contexts are coming to know and use the rapidly developing variety of EdTech. Future research should investigate a more diverse group of teachers and further explore professionalism elements in using EdTech. This can inform teacher training programs, especially in the rapidly evolving EdTech and AI technology landscape.

Applicable levels: Elementary, tertiary

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