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THE USE OF DIGITAL TECHNOLOGY IN THE CLASSROOM BY PRESCHOOL TEACHERS IN VIETNAM'S CENTRAL AND CENTRAL HIGHLANDS

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Abstract. The aim of this study is to determine the status of preschool teachers toward applying digital technology (DT) in early childhood education (ECE) and the barriers they face. A quantitative online survey was conducted with 823 full-time preschool teachers in Vietnam's Central and Central Highlands. Results showed that teachers just often use smart TV and laptop computers among technical devices. Technical tools were mainly used to gather information and documents for lesson planning, compose lesson plans, communicate with parents, and present information to children. In addition, preschool educators faced many barriers in applying DT into their classrooms, such as lack of technology devices, lack of technical support or assistance, and lack of technical skills. The results also showed the differences between urban, rural, and mountainous areas in many aspects. The findings of this study may provide reliable information for educational management agencies and preschool teacher training institutions in making and implementing policies related to the application of DT in ECE and fostering technology application capacity for preschool teachers. Some suggestions for enhancing technology use in early childhood classrooms are proposed.

Keywords: Technology, preschool teacher, Early Childhood Education, kindergarten, Vietnam.

1. Introduction

Children are living in the digital revolution 4.0 and will play an increasingly important role in all areas of society in the future. As digital technology (DT) for young children becomes more and more prevalent, educators and parents ask if, when, and how to use it responsibly to assist early development. While some studies suggest that early technology use can adversely affect children's development, many researchers claim that DT positively impacts learning in the early years [1], [2]. In 2011, the American Academy of Pediatrics Council on Communications and Media policy statement pointed out that high-quality interactive media can have educational benefits for children over the age of two as boosting social skills, language abilities, and even school readiness [3].

Since then, using technology in early childhood education (ECE) institutions has been accepted and incorporated into educational strategies in most countries and territories worldwide. Jack, C., & Higgins, S. (2019) also concluded that technologies are being used in more pedagogically appropriate ways than previously reported, and educational technologies appear to be increasingly embedded within ECE. In terms of research, the question of technology

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use in preschool education has received substantial international attention [4]. A variety of scientific subjects have been investigated, for example, "teachers' and parents' perception, beliefs, attitude and practice in ICT use at preschool" [5] [6], "how to integrate ICT in early childhood classroom" [7] [8] [9], "impact of ICT use on preschoolers" [10] [11]. These studies have contributed to clarifying the general picture of DT application in ECE.

Using technology in ECE in Vietnam was initiated in 2000 through IBM's KidSmart early education project. Until July 5, 2006, the Ministry of Education and Training issued decision number 3382/Decision-MOET to approve the project *"Applying ICT in ECE from 2006 – 2010"*, assigned to the Department of ECE (of the Ministry of Education and Training) and the provincial departments of Education and Training implementing and directing. Since then, the issues of investing in technology facilities, fostering information technology application skills for teachers, and using technology in organizing educational activities for children have been paid attention to and implemented widely in ECE, which achieved encouraging results. However, the number of studies on ICT use in ECE in Vietnam is very meager. A few studies were done to understand the status of ICT use in preschool [12] [13] and propose measures to use ICT in preschool classrooms [14]. However, these studies were conducted only within a province or city. There is a lack of specific evidence regarding an overall view of the general situation in teachers' use of DT in the preschool classroom in the Central and Central Highlands areas of Vietnam and on large sample sizes.

This article investigates the current status of teachers' use of technology in the preschool classroom by surveying 823 teachers in Vietnam's Central and Central Highlands. In this context, for these questions, answers were sought:

(1) To what extent do teachers use technology devices in their preschool classrooms?

(2) How do teachers use technology in their preschool classrooms?

(3) What are the barriers to teachers when using technology in preschool classrooms?

The research results may provide reliable information for educational management agencies and preschool teacher training institutions in making and implementing policies related to the application of DT in ECE as well as training and fostering technology application capacity for preschool teachers.

2. Content

2.1. Literature Review

2.1.1. Digital technology in Early Childhood Education

DT is a field of scientific or engineering knowledge that deals with the creation and practical use of digital or computerized devices, methods, systems, etc. Many studies on the use of DT in ECE focus exclusively on computers. However, DT concepts include computers, printers, telephones, smartphones, electronic toys, Internet connections, tablet computers, interactive whiteboards, digital cameras, facsimile machines, and voice recorders, etc. [15], [7]. Digital technologies have become an integral component of modern life [16]. Thus, DT attracts teachers because of its features that assist the learning of children and the professional development of teachers. According to NAEYC & Fred Rogers Centre (2012), it is a fact that the education policies of early childhood in Europe have emphasized the importance of integrating ICT into the ECE curriculum. In Spain, the current Organic Law for the improvement of the quality of education [17] presents ICT as one of the areas that should be stressed for the transformation of the educational system.

When Data Transformation Services (DTs) were first introduced, they were thought to be dangerous to young children and that their use in ECE was ineffective. For example, the policy

statement of the American Academy of Pediatrics (AAP) Council on Communications and Media (2011) states unequivocally that children under age two should not be exposed to any screen media and it emphasizes the value of unstructured play for the young child's developing brain. In another study, media use has been linked to obesity, poor sleep patterns, aggressive behavior, and attention issues in preschool and school-aged children [18]. The more time children under the age of five spend in front of a screen, the less they connect with others, and the less creative their play becomes [19].

On the other hand, many studies assert that applying DT in preschool teaching can help children learn more efficiently and more enjoyable, helping preschool teachers save time in designing and making toys or painting pictures. These various types of DT may support children's learning and enrich their playing experiences. Furthermore, it has a potential position to enhance educator professional development and improve communication between kindergartens and parents. Some academics stressed the importance of DTs in the education of young children and performed studies into the integration of DT into ECE [7]. In 2011, Yelland claimed that rapid technological advancements have given rise to new types of DT, as well as requests for their incorporation into ECE. At the same time, the American Academy of Pediatrics (AAP) recognizes that high-quality interactive media can have educational benefits for children above age two, improving "social skills, language skills, and even school readiness" [17, p. 1041]. Among these positive effects, some studies highlight the development of literacy, science, mathematics, problem-solving and self-efficacy [20] [21]. Therefore, interactivity plays an important role in DT products as well as in organizing activities using DT for preschool children. However, a DT device is just a tool to serve in preschool teaching and learning process, the effective use of DT in the classroom requires teachers to stimulate interaction between children and children, between children and teachers. Children need to learn how to use DT as tools to learn and connect with the real-world.

To sum up, it can be said that the effectiveness of using technology in preschool classrooms depends greatly on teachers. For example, Nuri, K. & Kursat, C. (2017) confirmed in their research that ICT use in early educational environments might also be affected by the teachers' views and intentions [22]. Blackwell, Lauricella and Wartella (2014) found in their study that early childhood teachers' perspectives and attitudes toward the role of technology are extremely important in terms of technology use [23]. Besides, both the age and years of experience of a teacher can influence their DT integration [15]. Above factors can have great impacts on the effectiveness and learning process of children. It can be stated that because early childhood teachers are the primary practitioners in early educational settings, understanding their current practices, opinions, and beliefs about the use of technology might be crucial in integrating new technologies.

2.1.2. Preschool teachers with the use of digital technology in Early Childhood Education

In light of the benefits of DT, the application of DT in ECE has also begun to be paid attention and implemented in recent years. Teachers' DT usage in ECE can be classified into three groups based on their impacting features. First, their DT usage may be influenced by factors such as their grade and educational experience [6]. Second, teacher self-efficacy is related to DT usage in the classroom. Teacher self-efficacy is defined as "a teacher's judgment of his or her capabilities to bring about desired outcomes of children engagement and learning, even among those children who may be difficult or unmotivated" [24]. Third, the characteristics of teachers relating to DT may be important factors influencing DT usage in the classroom. The DT competency of teachers can be a barrier to the application of DT in ECE [24]. Furthermore, the attitudes of teachers towards DT in the classroom may explain their usage of DT. Blackwell et al. (2014) declared, personal beliefs of early childhood teachers are of great significance in

terms of technology use [23].

However, the application of DT in the classrooms of preschool teachers also faces many challenges and obstacles. The barriers can be divided into extrinsic (lack of equipment, training and technical support) and intrinsic barriers (attitudes and beliefs) [25]. Ertmer [25] suggests that most extrinsic barriers have been tackled in schools; however, technology use is still not as widespread as some would like. Some preschool teachers pointed to certain difficulties in terms of DT hardware and a lack of technical support from the institution in which they worked [26]. This expression parallels the view that technology supports the learning of children, but is also difficult to use [26]. Hence, teachers prefer to use DT mostly for the preparation of plans and for music-based classroom activities. According to Nuri, K& Kursat, C. (2017), pedagogical issues regarding technology use included challenges in one-to-one interaction, insufficiency in teacher knowledge of technology use, and restricted technology use abilities [22].

In Vietnam, there are still certain challenges in using DT in kindergarten teachings, such as a shortage of budgets for infrastructure and software, as well as teacher skills in using DT in the classroom, crowded classrooms, and a lack of computer labs [12]. According to Nguyen Thị Ha Lan (2019), because of objective conditions such as facilities, educational equipment, and a lack of time, especially the limit of some mountainous areas' preschool teachers' IT skills and qualifications, leading to application capabilities and efficiency in classrooms of preschool teachers are not high [13]. Besides, we have found few studies that presented empirical data on how ECE teachers use DT, the degree to which they use them and the factors that influence their use. For example, the survey research of Thuy, T. T. H., & Qalati, S. A. (2020) has shown that ICT integration makes teaching more comfortable, improves children's critical thinking, promotes teaching and learning, facilitates problem-based education. However, the issues and challenges related to ICT integration in Vietnam are the lack of collaboration among teachers and children, lack of technical knowledge, and lack of support from the management and lack of qualified staff [27].

Based on an overview of studies in preschool teachers' use of DT in classrooms, it can be stated that more detailed research should be conducted to understand the current practices of early childhood teachers towards DT use in Preschool classrooms in the context of Vietnam. Therefore, this study is to investigate the status of kindergarten teachers' use of DT in preschool classrooms in Vietnam's Central and Central Highlands.

2.2. Method

2.2.1. Data Collection and Participants

We designed an online survey using Google form and distributed the survey link through Zalo, Facebook, and email in August 2021. The survey was based on studies of Kamaruddin, K.F. et al (2017) [28] and Konca, A., & Erden, F.T. (2021) [6] to generate information on DT devices using by teachers, ways of using and barriers to them in using DT in preschools classroom. We utilized a stratified random sampling strategy to ensure a representative kindergarten teachers sample at varying levels of age, qualifications, seniority, and region. After eliminating invalid responses, we retained a final sample of 823 full-time teachers working in provinces including Thua Thien Hue, Lam Dong, Gia Lai, Dak Nong. The participants were informed on the purpose of the research project, their voluntary participation, and their right to withdraw from the research at any time. It also explicitly highlighted participants' right to privacy by ensuring anonymity and confidentiality for data protection. Table 1 summarizes the demographic information of the participants.

Table 1. Demographic and background characteristics of the sample

Variables		N	%
Age	20 – 30	510	62
	31 – 40	256	31.1
	40 +	57	6.9
Gender	Male	1	0.1
	Female	822	99.9
Teacher of class	24-36 months old	122	14.8
	3-6 years old	178	21.6
	4-5 years old	228	27.7
	5-6 years old	295	35.8
Qualification	Intermediate degree	329	40.0
	College degree (3 years of training)	238	28.9
	Bachelor degree	253	30.7
	Master degree	3	0.4
Seniority	1-5 years	463	56.2
	6-15 years	296	36.0
	16 +	64	7.8
Region	Mountainous area	133	16.2
	Rural area	531	64.5
	Urban area	159	19.3

2.2.2. Measures

The main instrument was a questionnaire with multiple options designed according to the 5-point Likert scale (1 = never/ not a barrier, 5 = daily/ almost always/ significant Barrier). The questionnaire was piloted with thirty teachers outside of the study, and necessary corrections were made after that. A total of 30 items were included in the questionnaire. The final version of the questionnaire was used to collect data from preschool teachers. The Cronbach's alpha coefficient for internal consistency of the variables was 0.838, which indicates a relatively high consistency [29]. Specifically, the preschool teachers' use of DT devices was measured by eight items ($\alpha = 0.611$), and how teachers use technology in their preschool classrooms was measured by eleven items ($\alpha = 0.844$). Eleven items measured teachers' barriers in applying technology in the preschool classroom ($\alpha = 0.944$).

Obtained data were collected and analyzed using IBM SPSS software version 26.0 in order to calculate the percentage, mean, standard deviation (SD), and analysis of variance (ANOVA) by areas. As difference and relation's meaningfulness level, $p<0,05$ has been regarded as sufficient.

2.3. Results and discussion

The findings of a survey of 823 preschool teachers on the level of usage, ways of usage and barriers to using technology devices in preschool classrooms are shown in Tables 2, 3 and 4 below.

Table 2. Preschool teachers' level of using Digital technology tools in classrooms

Digital technology tools		**%**					**Mean**	**SD**
		Never	***Once/ month***	***Once/ Week***	***2–3 times/ week***	***Daily***		
1	Desktop computers	61.0	8.5	7.0	12.9	10.6	2.04	1.466
2	Laptop computers	5.8	6.7	10.0	41.6	36.0	**3.95**	1.118
3	iPads or Tablet PC	85.3	5.5	3.8	4.3	1.2	1.31	0.830
4	Digital camera	86.4	6.1	3.3	3.5	0.7	**1.26**	0.747
5	Overhead projector	64.3	15.3	7.7	9.5	3.3	1.72	1.148
6	Smart television	19.8	6.9	11.7	31.6	30.0	3.45	1.476
7	Electronic whiteboards	61.5	10.3	8.5	13.1	6.6	1.93	1.346
8	Video games devices	66.5	11.5	10.9	8.4	2.7	1.69	1.121

Note: 1 ≤ Mean ≤ 5; n = 823

As shown in Table 2, kindergarten teachers varied used technology devices in the classroom in terms of choices of devices, with the average scores ranging from 1.26 to 3.95. The most common applications were laptop computers (3.95) and smart TVs (3.45), while other surveyed devices did not reach the same level of application, including digital cameras (1.26); iPads or tablet PC (1.31); video games devices (1.69); overhead projector (1.72). Notably, devices used by teachers at "often" and "always" rates are mostly laptop computers (77.6%), smart TVs (61.6%). In contrast, the majority of teachers "rarely" and "never" used digital cameras (92.5%), iPads or tablet PCs (90.8%), and video game devices (78%).

Moreover, ANOVA analysis demonstrates a significant difference between teachers in rural, mountainous, and urban areas. The time spent on technological devices was not considerable in mountainous and rural areas: desktop computers (0.00), laptop computers (p = 0.00), smart TVs (p = 0.00) and video game devices (p = 0.003).

There are two main conclusions drawn from this survey. First, DT devices used by preschool teachers were not diverse, mainly laptop computers and smart TVs. Second, the technology devices used in preschool by region were not the same. Among explanations for this gap, surveyed teachers stated that "schools are not fully equipped with technology equipment," "many places are still very difficult, equipment is still outdated," or "teachers are not fully equipped with technology," "no time to learn how to use technology devices". Others expressed their concerns about the combination of using technology with other methods and forms of organizing activities to improve the effectiveness of educational activities.

The results of the survey on preschool teachers' ways of using DT devices in their classrooms are illustrated in the Table 3 below:

Table 3. Preschool teachers' ways of using technology devices in their classrooms

Ways of using technology devices		**%**					**Mean**	**SD**
		Never	***Rarely***	***Some-times***	***Often***	***Always***		
1	Let children play games with technology tools individually	47.4	15.8	27.7	7.9	1.2	2.00	1.085

2	Let children play games with technology tools with friends	35.8	20.3	33.3	9.0	1.6	2.20	1.074
3	Use technology tools for documentation purposes such as taking videos and photos	3.0	7.4	34.0	39.9	15.7	3.58	0.943
4	Use technology tools to present information to students	1.8	3.5	26.0	46.5	22.1	3.84	0.872
5	Use technology tools to communicate with parents	4.1	8.3	32.7	41.4	13.5	3.52	0.966
6	Use technology tools to post class information and children's photos on an electronic bulletin board, website, or blog	13.4	12.3	34.6	29.9	9.8	3.11	1.158
7	Use the Internet to gather information for lesson planning	1.5	2.3	15.3	48.6	32.3	**4.08**	0.833
8	Use technology tools for individual instruction	12.5	16.6	34.0	30.1	6.7	3.02	1.112
9	Use technology tools for small group instruction	14.6	18.0	36.2	27.0	4.3	2.88	1.091
10	Let children choose any technology tools to play with during free time	42.3	23.1	23.8	8.6	2.2	2.05	1.096
11	Let children use the Internet to search for information on the web	55.5	20.7	15.3	6.8	1.7	**1.78**	1.043

Note: $1 \leq Mean \leq 5$; $n = 823$

The investigation shows that surveyed teachers adopted ways of technology integration in the classroom with average scores ranging from 1.78 to 4.08. In which, the ways often used by teachers were "use the Internet to gather information for lesson planning" (4.08), "use technology tools to present information to students" (3.84), "use technology tools for documentation purposes such as taking videos and photos" (3.58) and "use technology tools to communicate with parents" (3.52). Meanwhile, they did rarely "let children use the Internet to search for information on the web" (1.78); "let children play games with technology tools individually" (2.00); "let children choose any technology tools to play with during free time" (2.05). Specifically, the methods "often" and "always" used by teachers are "use the Internet to gather information for lesson planning" (80.9%), "use technology tools to present information to students" (68.6%). The ways teachers used with "never" and "rarely" levels are "let children use the Internet to search for information on the web" (76.2%), "let children choose any technology tools to play with during free time" (65.4%), and "let children play games with technology tools individually" (63.2%). This result shows that teachers mainly used devices to collect

information for lesson planning, present information to students, create teaching materials such as video recording, take pictures, and communicate with parents. Many teachers also admitted that in addition to the limitation of technological equipment in the classroom, skills in using technology and knowledge and skills on effectively integrating DT in organizing educational activities are the main reasons for the above results.

In addition, one-way ANOVA analysis shows a significant difference between teachers in rural, mountainous and urban areas in the ways of using technology devices such as "let children play games with technology tools with friends" ($p = 0.049$); "use technology tools for documentation purposes such as taking videos and photos" ($p = 0.001$); "use technology tools to present information to students" ($p = 0.036$); "use technology tools to communicate with parents" ($p = 0.002$) and "use technology tools to post class information and children's photos on an electronic bulletin board, website, or blog" ($p = 0.00$).

The Barriers to teachers' using DT in Early Childhood classrooms are indicated as Table 4 below:

Table 4. Barriers to teachers' using DT in Early Childhood classrooms

	Barriers	**%**					**Mean**	**SD**
		Not a barrier	***Small barrier***	***Mode-rate barrier***	***Signifi-cant Barrier***	***A great barrier***		
1	Lack of technology devices in the classroom	8.4	15.1	17.7	43.9	14.9	**3.42**	1.161
2	Lack of technical support or assistance	7.0	16.6	19.0	46.2	11.2	3.38	1.103
3	The technology devices in the school are outdated	14.2	14.5	19.3	40.3	11.7	3.21	1.242
4	Lack of courses on technology application in ECE at universities and colleges	11.8	15.2	21.1	40.8	11.1	3.24	1.190
5	Lack of formal coursework about how to use technology in the children classroom	8.4	18.6	22.0	38.5	12.5	3.28	1.153
6	Lack of time in schedule to use technology in the classroom	10.0	18.7	25.5	37.5	8.3	3.15	1.127
7	The lack of time for teachers to learn how to use technology	10.1	16.8	22.0	41.9	9.2	3.23	1.143
8	Lack of experience on how to apply technology in accordance with educational topics and activities in preschool	11.5	15.7	22.8	39.5	10.4	3.22	1.177
9	Lack of awareness of the advantages of technology in	11.9	19.9	21.9	36.6	9.7	3.12	1.190

	early childhood							
10	The government curriculum does not contain information on integrating technology into children's learning	8.3	17.1	23.8	40.8	10.0	3.27	1.112
11	Lack of good access to internet	20.4	17.9	17.3	28.9	15.6	**3.01**	1.382

Note: 1 ≤ Mean ≤ 5; n = 823

According to Table 4, most of the above factors could be regarded as barriers to kindergarten teacher's use of technology, with average scores from 3.01 (Moderate Barrier) to 3.42 (Significant Barrier). In which, the factors that often make it difficult for teachers to use technology are "lack of technology devices in the classroom" (3.42); "lack of technical support or assistance" (3.38). The less problematic factor is "lack of good access to the internet" (3.01); "lack of awareness of the advantages of technology in early childhood" (3.12); "lack of time in the schedule to use technology in the classroom" (3.15).

Notably, up to 58.8% of teachers faced significant difficulties with "lack of technology devices in the classroom", followed by "lack of technical support or assistance" with 57.4%. One of the factors that made it the least difficult for teachers to use technology is "lack of good access to the internet," with 38.3% of surveyed teachers agreeing that this factor causes a small barrier or not a barrier. All other factors were quite hindering for teachers, such as "lack of courses on technology application in ECE at universities and colleges" (51.9%); "the technology devices in the school are outdated" (52%).

The results of this study are similar to those of Ertmer, P. A. (1999) [25] and Stipek, D. J. & Byler, P. (1997) [26], Nuri, K. & Kursat, C. (2017) [22] and is similar to domestic studies such as Dao Minh Tam (2011) [12], Nguyen Thi Ha Lan (2019) [13]. It points out that the above difficulties need to be addressed by ECE administrators, provincial and district departments of education as well as rector boards of preschools.

Furthermore, one-way ANOVA analysis shows that there is a significant difference between teachers in rural, mountainous and urban areas in the difficulties that hinder the use of technological devices such as: "lack of technology devices in the classroom" ($p = 0.00$); "Lack of technical support or assistance" ($p = 0.00$); "the technology devices in the school are outdated" ($p = 0.008$); "lack of courses on technology application in ECE at universities and colleges" ($p = 0.031$); "lack of formal coursework about how to use technology in the children classroom" ($p = 0.001$); "the lack of time for teachers to learn how to use technology" ($p = 0.020$); "lack of experience on how to apply technology in accordance with educational topics and activities in preschool" ($p = 0.021$); "Lack of awareness of the advantages of technology in early childhood" ($p = 0.001$); "The government curriculum does not contain information on integrating technology into children's learning" ($p = 0.001$). Many teachers in mountainous areas admitted that "the school's conditions are very difficult, the equipment is not adequate and modern", "the ability to use technology is still very limited", and "there is no formal coursework about how to use technology in the children's classroom". Thus, in different regions, there are different socio-economic conditions, so the equipment or support for the application of technological devices is not equivalent in schools, and at the same time, individual knowledge and experience are not the same. Another reason is that teachers' choices of technology devices in teaching were different due to the training process and learning ability of each person. It poses an urgent requirement that it is necessary to equip technology devices for local preschools, organize training courses to foster skills in using these means for teachers.

3. Conclusion

DT has been accepted as a strategy to improve playing and learning quality and effectiveness in young children. This study was conducted to determine the status of using DT in early childhood classrooms by teachers.

The study results pointed out that teachers often use smart TV and laptop computers among technical devices because these devices are available in preschool classrooms. In terms of the technology-using way, teachers mainly use devices to gather information for lesson planning, prepare lesson plans, communicate with parents, and present information to children and documentation purposes such as taking videos and photos. Furthermore, teachers also faced many barriers in applying DT into their classrooms, such as lack of technology devices, technical support or assistance, and technical skills. The results also showed the difference between urban, rural, and mountainous areas in many aspects.

This study's findings offered strategic insights for making policies to improve the effectiveness of using DT in ECE. Based on the results of this study and similar studies in the literature, the following suggestions can be made to enhance technology use in early childhood classrooms:

- The Government, the Ministry of Education and Training, the Department of Education and training, and Kindergarten managers should pay more attention to the investment in financial and technical support for preschool teachers and adequate technical devices for early childhood classes, especially for preschools in rural and mountainous areas.

- It is necessary to mobilize social resources to support high-quality software programs, apps, and availability of Internet access for kindergartens;

- The government ECE curriculum framework should provide developmentally appropriate models for integrating technology into lesson plans and childrens' activities;

- Provincial and district education departments and agencies need to have a yearly plan to provide technological training opportunities for kindergarten teachers;

- Preschool teacher training institutions need to promote the construction and implementation of a course at the university level about integrating technology into subject areas in early childhood;

Despite the implications and insights offered, this study encountered some limitations that can be addressed in future research. First, the study used only a quantitative study design to understand kindergarten teachers' use of technology in early childhood classrooms. Although the study design provides large-scale research data and presents a big picture, the depth of technology use and teacher constraints remains largely unexplored. Future studies should use a combination of observations and in-depth interviews with quantitative research to explore further the current state of technology facilities, views, and thoughts of administrators and teachers. Second, while online surveys are convenient for data collection and analysis, this approach can be unfriendly for teachers who are elderly and have limited technical skills. It may affect the accuracy of the collected data. To tackle this limit, researchers should use a combination of paper and online surveys in future studies. In addition, it is necessary to conduct research on policies and measures to promote the application of information technology in preschool education and improve technology capacity for preschool teachers.

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