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An Investigation of Uses of Digital Technology Assisted Teaching of Early Childhood Teachers: Case Study of Teachers at International Schools and Public Kindergarten Schools of the PEASO

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Abstract

The purpose of this research was to investigate the benefits and level of usage of digital technology in the early childhood classroom. Early Childhood (EC) who were born later (BLC: Born Later Children) where surroundings more fully provided by digital technologies than a First Born Child (FBC), causes of the BLC perceives digital technologies smarter than the FBC. Therefore, the BLC has better creative thinking, ability, and competency development than the FBC (Caldeiro- Pedreira, Renés-Arellano, Castillo-Abdul, & Aguaded, 2022) at the same time the BLC is finished to be total dimensional growth to preach their future characteristics. In this way, early childhood student teachers (EC Teachers) must have digital technology competences leading to learning management processes or felicitating and responding ECs' attentions and needs. The objectives of this study were to (1) investigate competences of usage, usage level, beneficiary, technological problem, and obstacle of EC Teachers, and (2) to investigate competences of usage, usage level, beneficiary, technological problems and obstacles of EC teachers based on different ages, nationality, experience, school, frequency of usage, and objective. Data was collected by online questionnaire from EC teachers at ISs and PKSs of the PEASO, and then the quantitative data were analyzed by statistics. It was found that: (1) usage of digital technologies assisted teaching of EC teachers, teachers focused on objectives, competence, usage level of digital technologies assisted teaching. There was a statistically significant benefit of .05, (2) there was statistically significant difference at .05 of usage level of digital technologies assisted teaching of EC teachers, (3) there was statistically significant difference at .05 of usage level of digital technologies assisted teaching of EC teachers on objectives, competence, usage level of digital technologies assisted teaching, and beneficiary, and (4) there was statistically significant difference at .05 of usage level of digital technologies assisted teaching of EC teachers that frequency of use was different.

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Introduction

In social context that surrounded by information and communication technology (ICT) or digital technologies, they are the main factors of educational management for early childhood learners (ECLs), this context must be provided for response of learners' curiosities those being closely perceived. Digital technologies are the learning sources aside from traditional learning resources that includes guardian or home, and teacher or school, which have been the main learning sources. Nowadays, learners are self-alterable of digital technologies learning (Bada & Olusegun, 2015; Caldeiro-Pedreira et al., 2022). In fact, digital technology plays important roles in people's thought, learners in this generation have obviously logic thought and practices from the previous generations. Logic thought and practices of those generations have been derived from traditional logic thought and practices. Having received technological advancement, this generation's characteristics distinguish from the previous generations. Their behaviors are curiosity, not adhering to the rules, sensitivity, high self-esteem, high consciousness, easygoing, close communication (Apaydin & Kaya, 2020). Therefore, the development of early childhood learners (ECL) has been influenced from their own characteristics, guardians, and social surroundings. The impacts of those factors on EC's development of physical health, intelligence, language, society, and emotion and then they're finished before entering to school (Anderson et al., 2003). Therefore, it's indispensable for ECL's teachers and guardians to promote ECL's uniquely learning nature according to their unique skills and needs (Ziatdinov & Cilliers, 2021). Additionally, the distinctly assured data of ECs' development of reading comprehension are better than childhood children. Meanwhile, their age is separated by only 2-3 years. By comparing from evaluation report of the Office of the Basic Education Commission (OBEC) (2022a; 2022b) in academic year 2022, the comparison showed the mean of reading comprehension from Reading Test (RT) of student grade 1 across the country (N=618,126) are at 77.28% (SD=20.11). Meanwhile, evaluation of learners' quality (called NT) on Thai language of student grade 3 across the country (N=649,123) are at 55.86% (SD=19.75). It means that EC is closely perceived to accrued learning resources. These resources response to cognitive development and better adjustment where learners absorb, perceive, learn information sources are of the

factors promote and enhance reading comprehension very well. Perceived digital content impacts on informal learning to develop ECL's creative thinking, ability, and competency (Caldeiro-Pedreira et al., 2022). In consequence, EC teachers must have digital technological competence and skill and can implement the learning process for ECL's developments.

Objectives

1) To investigate competences of usage, usage level, beneficiary, technological problem, and obstacle of EC teachers at international schools (ISs) and public kindergarten schools (PKSs) of the Primary Educational Service Area Office (PEASO)

2) To investigate competences of usage, usage level, beneficiary, technological problems obstacles of EC teachers at ISs and PKSs of the PEASO that different age, nationality, experience, school, frequency of usage, and objective.

Research methodology

1. Population and samples

1.1 Population are EC s teachers in 5 public kindergarten schools (PKSs) of the Primary Educational Service Area Office (PEASO) in Prachin Buri, Nakhon Nayok, and Chachoengsao and 1 international school (IS) of academic year 2023. The total populations are 95 persons.

1.2 Sample are EC teachers in 5 public kindergarten schools (PKSs) of the Primary Educational Service Area Office (PEASO) in Prachin Buri, Nakhon Nayok, and Chachoengsao and 1 international school (IS) of academic year 2023. The total populations are 77 persons. The sample was determined from the Krejcie and Morgan (1970).

2. Research instrument

The collected data instrument was a questionnaire that was divided into 2 sections including (1) *Section 1*: The focus of questions were on respondent's general data such as gender, age, nationality, affliating school, EC teaching, frequency of using digital technology in teaching. (2) *Section 2*: Contained a Likert 5-rating scale for questions (Likert, 1967) on uses of digital technology that assisted teaching.

Research instrument construction

Instrument Construction: to construct the questionnaire, the researchers followed the steps including: (1) studied theories, documents, and related research papers, (2) specified conceptual framework, (3) constructed

Likert 5-rating scale questions (Likert, 1967), and (4) presented the draft of questionnaire to peer reviewers and revised based on suggestions from reviewers.

Instrument Quality Inspection: the inspection procedures included (1) Taking the revised questionnaire to 5 specialists for checking construction validity and grammatical language correctness using The Index of Item-Objective Congruence (IOC), (2) Tested the edited questionnaire, and (3) Collected data with the completed version of the questionnaire.

3. Collection of data

Data were collected by (1) the researchers distributing the questionnaire via Google form to the sample by cooperation with their school principals, and (2) checked and analyzed the respondents' data.

4. Data analysis

The data was statistically analyzed by a statistical computer software, the steps included (1) respondents' status was analyzed by frequency and percentage (2) the use of digital technologies of EC teachers were analyzed by mean and standard deviation according to the concept of Srisa-ard and Nilkeaw (1992) (3) comparison analysis of the use of digital technologies in teaching of EC teachers on gender, age, nationality, and school were analyzed by Independent t-test, and (4) comparison analysis of the use of digital technologies of EC teachers on work experience were analyzed by One-Way ANOVA.

Results

The results are presented in order of their findings as follows:

Table 2 Comparison of digital technology assisting teaching of EC teachers at international schools and public kindergarten schools of the PEASO discriminated by issues of independent t-test.

Variable	School	N	\bar{X}	SD	t	df	Sig.
Objective of digital technology uses	International	9	4.30	0.68	2.28*	75	0.04
	Public kindergarten	68	3.74	0.81			
Digital competence	International	9	4.09	0.77	2.59*	75	0.01
	Public kindergarten	68	3.52	0.61			
Digital technology assisted teaching	International	9	3.76	0.76	0.90	75	0.37
	Public kindergarten	68	3.53	0.72			
Level of Digital technology assisted teaching	International	9	4.26	0.57	2.90*	75	0.01
	Public kindergarten	68	3.65	0.73			
Beneficiary of Digital technology assisted teaching	International	9	4.27	0.55	2.08	75	0.06
	Public kindergarten	68	3.85	0.69			
Problem and obstacle of Digital technology assisted teaching	International	9	3.17	1.40	-1.07	75	0.29
	Public kindergarten	68	3.46	0.67			

*p ≤ .05 (Level of statistical significance at .05)

The research found that there was statistically significant difference, at $*p \leq .05$ of uses of digital technology assisted teaching of EC teachers discriminated by school on objective of digital technology uses, digital

Table 1 Number and percentage of respondents discriminated by gender, age, nationality, school, EC teaching experience, and frequency of the use of digital technology assisted teaching of EC teachers.

	Item	Number (77)	Percentage
Gender	Male	5	6.50
	Female	72	93.50
Age	18-25 yrs.	4	5.20
	26-30 yrs.	14	18.20
	31-35 yrs.	19	24.70
	36-40 yrs.	14	18.20
	41-45 yrs.	8	10.40
	46-50 yrs.	3	3.90
	51-55 yrs.	9	11.70
	56-60 yrs.	6	7.80
Nationality	Thai	74	96.10
	Non-Thai	3	3.90
EC teaching experience	6-10 yrs.	19	24.70
	11-15 yrs.	20	26
	16-20 yrs.	5	6.50
	21-25 yrs.	6	7.80
	40 yrs. and more	27	35.10
School	International	9	11.70
	Public kindergarten	68	88.30
Frequency of digital technology use	3-5 hrs. a day	48	62.30
	6-8 hrs. a day	18	23.40
	More than 8 hrs. a day	5	6.50
	2-3 times a week	6	7.80

The research found as presented in Table 1 that: (1) the majority of respondents are female (N=72, Percentage=92.50), (2) the age ranges were between 31-35 years old (N=19, Percentage=24.70), next age range was between 26-30 years old (N=14, Percentage=18.20), which is equal to the age range between 31-35 years old (N=14, Percentage=18.20), (3) the majority of respondents nationality are Thai (N=74, Percentage=92.50), (4) EC teaching experience of respondents are more than 40 years as shown at N=27, Percentage=35.10 also in second rank the teaching experience are 11-15 years (N=20, Percentage=26), (6) Most respondents worked at public kindergarten schools (N=68, Percentage =88.30), and (6) the frequency of digital technology assisted teaching are 3-5 hours a day (N=48, Percentage=62.30), and then 8-6 hours a day (N=18, Percentage=23.40).

competence, and level of digital technology assisted teaching, and there was not a statistically significant difference on the other issues.

Table 3 Comparison of digital technology assisting teaching of EC teachers at international schools and public kindergarten schools of PEASO discriminated by One-Way ANOVA on EC teaching experience.

Source of Variance		SS	df	Ms	F	Sig.
Objective of digital technology uses	Between group	5.30	4	1.325	2.15	.084
	With in group	44.46	72	.617		
	Total	49.76	76			
Digital competence	Between group	1.51	4	0.38	0.89	0.47
	With in group	30.36	72	0.42		
	Total	31.87	76			
Uses of digital technology assisting EC teaching	Between group	4.62	4	1.16	2.37	0.06
	With in group	35.14	72	0.49		
	Total	39.76	76			
Level's uses of digital technology assisting EC teaching	Between group	1.03	4	0.26	0.47	0.76
	With in group	39.96	72	0.56		
	Total	40.99	76			
Beneficiary's uses of digital technology assisting EC teaching	Between group	0.84	4	0.21	0.44	0.78
	With in group	34.42	72	0.48		
	Total	35.26	76			
Problem and obstacle of uses of digital technology in EC teaching	Between group	0.37	4	0.09	0.15	0.96
	With in group	45.98	72	0.64		
	Total	46.36	76			

* $p \leq .05$

The research found that there was no statistically significant difference of uses of digital technology assisting EC teaching within teachers who had different experiences as shown in Table 3.

Table 4 Comparison of digital technology assisting EC teachers at international schools and public kindergarten schools of PEASO discriminated by One-Way ANOVA on frequency of digital technology uses.

Source of Variance		SS	df	MS	F	Sig.
Objective of digital technology uses	Between group	1.091	3	.36	0.55	.65
	With in group	48.67	73	.67		
	Total	49.76	76			
Digital competence	Between group	2.64	3	0.88	2.20	0.10
	With in group	29.23	73	0.40		
	Total	31.87	76			
Uses of digital technology assisting EC teaching	Between group	5.09	3	1.70	3.57*	0.02
	With in group	34.67	73	0.48		
	Total	39.76	76			
Levels of using of digital technology in EC teaching	Between group	2.44	3	0.81	1.54	0.21
	With in group	38.55	73	0.53		
	Total	40.99	76			
Beneficiary of using digital technology in EC teaching	Between group	2.48	3	0.83	1.84	0.15
	With in group	32.78	73	0.45		
	Total	35.26	76			
Problem and obstacle of using digital technology in EC teaching	Between group	3.21	3	1.07	1.81	0.15
	With in group	43.15	73	0.59		
	Total	46.36	76			

* $p \leq .05$

The research found that frequency of different usage of digital assisted teaching of EC teachers at international schools and public kindergarten schools of PEASO showed levels of statistically significant difference at .05. Whereas the Scheffe's Method was used

to test for pair differences, and showed there was no statistically significant difference as well as, the other issues that showed no statistical significance difference as noted on Table 4.

Conclusion

The comparison of uses of digital technology assisting teaching of EC teachers at international schools and public kindergarten schools of PEASO discriminated by gender, age, nationality, school, ECS teaching experience, and frequency of using digital technology of EC teachers, found that:

1) The use of digital technology in assisting teaching of EC teachers at international schools and public kindergarten schools of PEASO when discriminated by gender showed levels of statistical significance difference at .05. The other issues contained no statistical significance of difference.

2) The use of digital technology in assisting teaching of EC teachers at international schools and public kindergarten schools of PEASO when discriminated by nationality, difference of objective of digital technology uses and level of digital technology assisting EC teaching, showed statistical significance level at .05, The other issues showed no statistical significance of difference.

3) The use of digital technology in assisting teaching of EC teachers at international schools and public kindergarten schools of PEASO when discriminated by school, difference of objective of digital technology uses, digital technology competence, and level of digital technology assisting EC teaching, showed statistical significance level at .05, The other issues showed no statistical significance of difference.

4) The use of digital technology in assisting teaching of EC teachers at international schools and public kindergarten schools of PEASO, based on different age, objective of digital technology uses, digital technology competence, and level of digital technology assisted EC teaching, level of digital technology uses, beneficiary of digital technology assisted EC teaching, showed no statistical significance differences. The Scheffe's Method was used to test for pair differences and showed no statistically significance differences in any pairs and in other issues.

5) The use of digital technology in assisting teaching of EC teachers at international schools and public kindergarten schools of PEASO, based on different experiences, showed no statistical significance of difference.

6) The use of digital technology in assisting teaching of EC teachers at international schools and public kindergarten schools of PEASO, based on different frequency of different uses, showed levels of

statistical significance difference at .05. The Scheffe's Method was used to test for pair differences, and showed no statistically significance differences as well as other issues showing no statistically significance difference.

Discussion

The key findings are discussed as follows:

1. It was found that (1) the mean of EC teachers' digital technology uses assisted teaching at ISs and PKs of PEASO on objective of digital technology usage, digital technology competence, uses and use level of digital technology assisted teaching, beneficiary of digital technology assisted teaching, were much more level, (2) the mean of problems and obstacles of digital technology assisted teaching was shown at a moderate level. These findings are in accordance with the research of Tiangtrong and Chatrurachewin (2022). The OBEC has announced they will focus on digital technology uses for learning in every grade (Office of the Basic Education Commission (OBEC), 2021). Teacher who uses digital technology and learning resources with teaching and learning activities, must be trained to use digital learning resources (Makharova, Nurzhanova, Adilbayeva, Dossanova & Aimagambetova, 2022) particularly EC teachers (Aditya, Ismiatun, Atika, & Permadi, 2022). Because trained teachers on educational technologies will have competency level higher than untrained teachers (Ruíz-Palmero, Guillén-Gámez & Tomczyk, 2023). In addition, EC teachers must be trained on digital technology uses, they must have digital technology competence and learning resources access skills. Wangkeawhirun and Meekopthong (2022) stated that Thai teacher's most important skills must adjust and change to keep up with the up to date of information and communication world. Their skills can access information resources timely. Teachers must adjust and self-develop to bring technologies for learning and teaching efficient enhancement, continuously improve quality of the whole of teacher production and development of the related corporate bodies. These will finally affect learner's quality.

2. It was found that (1) statistically significance difference level at .05 of uses of digital technology assisted teaching of EC teacher at ISs and PKs of PEASO when discriminated by school, on objective of digital technology uses, digital technology competence, and level of digital technology assisting EC teaching. This finding is in accordance with the research of Tasarabiab, Juttiphol, & Tipmas (2019) who found that

it may be caused by different preparedness in different school type or different curriculum and subject or teaching method or technique which has an effect on digital technology usage. The difference of digital technology objective, digital competence, and use level of digital technology assisted teaching, may be caused by EC teachers having to search information in order to customize creating teaching media which ECLs are interested in and to ensure ECL's curiosity, as such EC teachers must always engage digital technologies.

3. EC teachers who have different experience of using digital technology assisted teaching showed there was not a statistically significance difference according to the research of Ritsomboon (2023). This may be caused by teachers' different skills who have different age or work experience. A new teacher who has digital competence with no teaching can teach better than an accumulated experienced teacher with traditional teaching and no innovative creation of information technology. It can be said that a teacher who has 1-5 years of work experience always has higher teaching achievement than a teacher who has 6-10 years and more than 10 years of work experience; as such Kruearchaisu, (2007) stated that nowadays the advancement of information technology plays important roles on humans' ways of life and society. IT has created organization's changes and opportunities such as changing relationship structure and industrial competition, adjustment of organization's operation, enhancement of production and service's efficiency.

Suggestions

Key findings from the past and implications for the future are proposed as follows:

Implication for findings implementatio

1. EC teachers' digital competence on technologically savvy and some teachers were troubled by touch screen usage, whereas teachers should be continuously promoted and trained to use digital technologies for learning and learning efficient enhancement.

2. EC teachers' digital technologies assisting teaching should be selected in accordance with the learning situation, and regularly using digital technology in teaching and learning, whereas teachers should be focused on educational quality and standards by using digital technology in learning and teaching management.

3. EC teachers' problem and obstacles in digital technology usage on the number of digital technology

tools and equipment in the school is insufficient. A few parents do not yet have digital technology tools and equipment to facilitate student learning whereas up dated technology should be sufficiently provided for developing teachers and students' digital competences.

Implication for the future research

1. The quantitative and qualitative research methodology should be advanced in EC students, EC teachers, and EC schools.

2. All dimensions of EC should be investigated for EC's development coverage.

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