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IMPROVING THE EFFICIENCY OF INFORMATION TECHNOLOGY APPLICATIONS FOR PRESCHOOL TEACHERS IN MOUNTAINOUS COMMUNES, CAM XUYEN DISTRICT, HA TINH PROVINCE

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Abstract

Information technology is increasingly important in people's lives and society. Technological advances bring exciting opportunities but also affect the educational environment for children. Therefore, improving the capacity to apply information technology for teachers is an urgent requirement in today's education, especially at the preschool level. The research results show the advantages and disadvantages of preschool teachers in applying information technology to the teaching process in the mountainous communes of Cam Xuyen district, Ha Tinh province. Hence, measures are proposed to improve the effectiveness of information technology applications for preschool teachers. The results of this study provide useful information for preschool education managers, and preschool teacher training institutions, especially in mountainous areas and ethnic minority areas, in the implementation, management, training, and retraining to improve the effectiveness of technology use in early childhood education.

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NÂNG CAO HIỆU QUẢ ỨNG DỤNG CÔNG NGHỆ THÔNG TIN CHO GIÁO VIÊN MẦM NON TRÊN ĐỊA BÀN CÁC XÃ MIỀN NÚI HUYỆN CẨM XUYÊN, TỈNH HÀ TĨNH

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Từ khóa

Công nghệ thông tin, giáo viên, mầm non, miền núi Hà Tĩnh, ứng dụng..

Tóm tắt

Công nghệ thông tin đóng một vai trò ngày càng quan trọng trong cuộc sống của con người và xã hội. Tiến bộ công nghệ mang lại những cơ hội thú vị nhưng cũng ảnh hưởng đến môi trường giáo dục. Do đó, nâng cao năng lực ứng dụng công nghệ thông tin cho giáo viên là yêu cầu cấp thiết trong giáo dục hiện nay, đặc biệt là ở bậc học mầm non. Kết quả nghiên cứu chỉ ra những thuận lợi và khó khăn của giáo viên mầm non trong việc ứng dụng công nghệ thông tin vào quá trình dạy học trên địa bàn các xã miền núi huyện Cẩm Xuyên, tỉnh Hà Tĩnh, từ đó đưa ra những biện pháp nhằm nâng cao hiệu quả ứng dụng công nghệ thông tin cho giáo viên mầm non. Kết quả nghiên cứu này cung cấp thông tin hữu ích cho các nhà quản lý giáo dục mầm non, các cơ sở đào tạo giáo viên mầm non, đặc biệt ở các vùng miền núi, vùng nông thôn trong việc triển khai, quản lý, đào tạo và bồi dưỡng nhằm nâng cao hiệu quả của việc sử dụng công nghệ trong giáo dục mầm non.

1. Introduction

Information technology (IT) has become an indispensable tool in various fields, including education. The integration of IT in education has been proven to bring numerous benefits, such as enhancing engagement and exciting opportunities, improving teaching methods, and accessing vast amounts of information (Tran Viet Nhi et al., 2022; Zomer, N.R. & Kay, R.H.,2016) [1][2]. In the field of early childhood education (ECE), the application of IT has the potential to bring similar benefits to both teachers and children. Previously, some individuals regarded technology as a threat to the learning and development process of children (Healy, J. M., 2003)[3]. However, recently, researchers have embraced and advocated for the use of technology in organizing educational activities in preschools to support children's exploration and learning (Hatzigianni, M., & Margetts, K., 2012; Tran Viet Nhi et al., 2022) [4][1]. Jack, C., & Higgins, S. (2019) [5] concluded that technology is being used more pedagogically appropriately than before and is increasingly utilized in ECE.

Some studies assert that IT application in ECE aims to organize the objectives of the teaching curriculum and technology into a comprehensive and harmonious whole to enhance the effectiveness of children's education. The perspectives, beliefs, and abilities of teachers play a crucial role in achieving this goal (Tran Viet Nhi et al., 2022; Ertmer, P. A., 1999; Konca, A., & Erden, FT (2021) [1][6][7]. Therefore, the benefits of technology for children's development partly influence the decisions and application of technology in the classroom by teachers. Recent related research has shown that the majority of early childhood teachers hold a favorable view towards IT application in early childhood classrooms (ECC).

In Vietnam, the implementation of IT applications in organizing educational activities for children has received significant attention and development. Preschools in urban areas are utilizing various new technologies such as computers, projectors, televisions, and educational software applications to enhance children's learning experiences. However, research on the use of IT in ECE in mountainous regions, rural areas, and ethnic minority communities is limited. There is scarce published data providing survey information on the perspectives of teachers in these regions regarding the use of IT applications in ECC.

This study aims to explore the barriers to IT application for preschool teachers and the training needs for IT application competencies of preschool teachers in the mountainous communes of Cam Xuyen District, Ha Tinh Province. The study aims to propose measures to improve the effectiveness of IT applications for preschool teachers. The research findings will provide a comprehensive perspective on the challenges faced by teachers in IT application in preschools in mountainous areas, rural regions, and ethnic minority communities, as well as their desire to improve the current situation. This will serve as valuable information for early childhood teachers, training institutions, and educational management authorities at all levels in understanding the current situation and planning policies and training programs for preschool teachers.

2. Research Methodology

In this study, we employed two research methods:

+ Methodology of theoretical research: An overview of the literature about the research topic of integrating information and communication technology (ICT) into classroom teaching for preschool teachers, collecting information from research reports, synthesizing, analyzing, and summarizing information on the integration of ICT into ECC; measures to enhance the utilization of ICT for preschool teachers.

+ Practical research methodology: This survey utilizes a questionnaire survey method. The survey instrument is a combination of paper-based surveys and surveys designed on Google Forms, linked through Zalo and email in May 2021, targeting 56 teachers from preschools in the mountainous communes of Cam Xuyen district, Ha Tinh province. The questionnaire is designed with both closed-ended and open-ended questions. For closed-ended questions, we designed them in a question format with predefined answer options, with a five-point rating scale provided for the response options. They are arranged in a continuous order of increasing levels. The survey data aims to collect and analyze the information as a practical basis for proposing effective measures to enhance the application of ICT skills for kindergarten teachers in the mountainous communes of Cam Xuyen district, Ha Tinh province. In addition to closed-ended questions, we also used open-ended questions to gather comprehensive information for assessing the current situation.

Participants were informed about the purpose of the study, their voluntary participation, the right to withdraw from the study at any time, and the confidentiality of their information based on the principle of anonymity.

3. Results and Discussion

3.1. Issues regarding the application of information technology in preschool classrooms

Integrated education is one of the advanced approaches to developing educational curricula at various levels, as discussed by Herbart, Froebel, and Steiner in the late 19th and early 20th centuries (Nhi, TV, & Tuyen, HTT (2022) [8]. The integration of ICT in organizing educational activities in preschools has also received special attention in preschool programs in countries such as Austria, Finland, France, Germany, and Sweden (Le Thi My Tanh, Tran Viet Nhi, 2022) [9].

The integration or application of ICT in preschool education serves two purposes:

- Developing competencies and skills for young children: Integrating ICT aims to facilitate the development of competencies and skills for preschool-age children, aligning with the goals of preschool education programs set by participating countries' Ministries of Education.

- Providing professional support for preschool teachers in effectively incorporating new technologies into the teaching and learning process: Integration of ICT in preschool education includes providing training courses and professional development opportunities for preschool teachers to enhance their proficiency in utilizing new technologies. This support aids in fostering innovative processes in preschool education through the application of technology.

The application of ICT in ECE has brought about a significant transformation in the teaching effectiveness of the ECE sector, creating an educational environment characterized by high interaction between teachers and children.

- The ICT-based teaching methods in ECE establish a highly interactive, dynamic, engaging, and effective learning environment that employs a multisensory teaching approach for children.

- The content and instructional materials introduced to children are authentic and diverse. The application of ICT enables children to familiarize themselves with natural and social phenomena that are difficult to encounter in real-life situations.

- ECE teachers can proactively explore educational resources through various media and the Internet. These resources are incredibly abundant, incorporating vivid and natural images, sounds, texts, and videos, which have a positive impact on the cognitive development of young children as well as the formation of their holistic personality.

- The application of ICT helps save time for teachers and reduce costs for early childhood education institutions.

However, the implementation of ICT in early childhood education, such as designing electronic lesson plans, utilizing devices, and employing educational software, also encounters certain challenges due to the lack of equipment and infrastructure, limited experience in appropriate ICT integration with different topics and educational activities in preschools, as well as insufficient technical support during the ICT implementation process (Nguyen Thi Ha Lan, 2017, 2019); Tran Viet Nhi et al., 2021) [10][11][12].

3.2. The current state of technology integration in preschool classrooms by preschool teachers in a mountainous region of Cam Xuyen District, Ha Tinh Province

The district of Cam Xuyen, Ha Tinh Province, comprises 23 communes and townships. We conducted a survey on several preschools, including Cam Quan, Cam My, Cam Thinh, Cam Minh, and Cam Son. These preschools are all located in the mountainous areas of the district, characterized by challenging economic conditions and limited infrastructure and equipment. While most teachers have experience in teaching, their access to technology remains a significant barrier.

We surveyed with a total of 56 teachers from the preschools in Cam Xuyen district, as follows:

• Cam Quan Preschool in Cam Quan commune: 12 teachers.

• Cam My Preschool in Cam My commune: 12 teachers.

• Cam Thinh Preschool in Cam Thinh commune: 12 teachers.

• Cam Minh Preschool in Cam Minh commune: 12 teachers.

• Cam Son Preschool in Cam Son commune: 8 teachers.

3.2.1. Information on teachers' utilization of information technology in preschool education

Table 1: Information about teachers using information technology in teaching in kindergartens

The number of teachers used	**Result (n=56)**		
	Yes	52	92,9%
	No	4	7,1%

The data in the table above indicates that the vast majority of teachers (92.9%) at rural mountainous schools incorporate ICT into their teaching practices. This suggests that despite the challenging conditions in terms of infrastructure and equipment shortages in these remote regions, the teachers at ECC have made efforts

to integrate technology into their educational approaches. This, in turn, partially demonstrates the significance and impact of ICT in the teaching and learning process. However, it is worth noting that a small fraction of teachers (7.1%) still do not utilize ICT in ECC. This could be attributed to limited access to technological resources in difficult-to-reach areas or possibly due to confusion or misunderstanding about the concept of ICT integration among teachers during the survey response process.

3.2.2. Teachers' perspectives on the benefits and appropriateness of implementing information technology in early childhood classrooms

We conducted a survey of teachers' views on the benefits and suitability of using technology equipment such as computers and projectors; searched for information resources from the Internet; applied teaching software; designed electronic lectures… in ECC and obtained the following results:

Table 2: Teachers' views on the benefits and relevance of the application of information technology in the preschool classroom

Evaluation Criteria		Opinion (n=56)									
		Disagree		Disagree		Half agree, half no		Agree		Agree	
		N	%	N	%	N	%	N	%	N	%
1	The application of ICT in ECC enhances children's interest in learning	1	1,8	0	0	6	10,7	48	85,7	1	1,8
2	The application of ICT in ECC helps learning activities become more intuitive, lively, and effective	2	3,6	3	5,3	7	12,5	42	75	2	3,6
3	ICT integration in ECE provides favorable conditions for teachers' workflow and classroom management	1	1,8	0	0	11	19,6	42	75	2	3,6
4	Having one or more technology devices in the classroom is an essential part of a child's learning	0	0	1	1,8	11	19,6	42	75	2	3,6

The results of the survey presented in Table 2 indicate that the majority of teachers either "agree" or "totally agree" with the content regarding the benefits and appropriateness of integrating ICT in ECE, as shown in the questionnaire. Among these, the statement with the highest level of agreement among teachers is "The application of ICT in the classroom enhances children's interest in learning" (with a combined "agree" and "totally agree" level of 87.5%). The remaining statements, "The application of ICT in ECC helps learning activities become more intuitive, lively and effective", "ICT integration in ECE provides favorable conditions for teachers' workflow and classroom management" and "Having one or more technology devices in the classroom is an essential part of a children's learning" also received high levels of agreement or totally agreement. The variation in the level of agreement among teachers regarding the benefits and appropriateness of ICT integration in ECE is not significant. This demonstrates that the role and benefits of ICT integration in ECE are highly necessary.

Particularly, teachers can actively explore and seek educational resources through mass media and the internet to integrate ICT into ECE, thereby creating a highly interactive, dynamic, engaging, and effective learning environment that appeals to children's multiple senses. Additionally, the importance of ICT integration in helping teachers assess and manage the classroom cannot be denied. Despite the numerous advantages that ICT integration brings to teaching, assessment, and management in ECE, there are also several challenges and barriers to its implementation.

3.2.3. Barriers to the use of technology in the classroom by preschool teachers

Table 3 below shows the results of the survey on the views of the ECE teachers on the difficulties and barriers in applying ICT to the ECE:

Table 3: Barriers to the use of technology in the classroom by preschool teachers

	Evaluation Criteria	Opinion (n=56)									
		Very low		Low		Normal		High		Very high	
		N	%	N	%	N	%	N	%	N	%
1	Lack of technology in the classroom	8	14,3	3	5,3	8	14,3	34	60,8	3	5,3
2	Lack of technical assistance or support	3	5,3	6	10,7	7	12,5	38	67,9	2	3,6
3	Outdated school technology equipment	6	10,7	4	7,2	8	14,3	36	64,2	2	3,6
4	Lack of formal courses on how to use technology in ECC	7	12,5	3	5,3	11	19,6	34	60,8	1	1,8
5	Insufficient time for using technology and for teachers to learn how to use it in ECE	8	14,3	7	12,5	7	12,5	32	57,1	2	3,6
6	Lack of awareness about the advantages of technology in ECE	7	12,5	7	12,5	9	16,1	30	53,6	3	5,3
7	Lack of skills in designing technology-based learning activities	7	12,5	2	3,6	6	10,7	38	67,9	3	5,3

The survey results in Table 3 indicate that most of the factors mentioned above act as barriers to ICT integration in ECE for teachers in mountainous areas, specifically in Cam Xuyen district, Ha Tinh province. In addition to obstacles related to equipment and infrastructure, teachers face numerous difficulties concerning their capacity, policies, and training, such as "lack of technical assistance or support", "insufficient time for using technology and for teachers to learn how to use it in ECE" and "lack of awareness about the benefits of technology in ECE".

Specifically, the most significant hindrance is the "lack of technical assistance or support" (with a combined "high" and "very high" level reaching over 70%). On the other hand, the factor "lack of awareness about the benefits of technology in ECE" is perceived as the least obstructive, with a combined "high" and "very high" levels of 58.9%. The barriers related to "lack of technology devices in the classroom", "lack of regular courses on how to use technology in ECE", "insufficient time for using technology and for teachers to learn how to use it in ECE" and "lack of skills in designing technology-based learning activities" are almost equally problematic. From these findings, it is evident that specific directions and measures need to be taken to enhance the effectiveness of ICT integration in ECE classrooms, especially in areas with limited equipment and infrastructure, such as remote mountainous regions like Cam Xuyen district, Ha Tinh province.

3.2.4. Orientation to improve the effectiveness of technology application in preschool classrooms

The following results show the orientations of the teachers to improve the effectiveness of technology application in preschool classrooms:

Table 4: Guidelines for enhancing the effectiveness of Technology integration in Preschool classrooms

Evaluation Criteria		Opinion(n=56)									
		Disagree		Disagree		Half agree, half no		Agree		Agree	
		N	%	N	%	N	%	N	%	N	%
1	Financial support	0	0	0	0	11	19,6	43	76,8	2	3,6
2	Technical assistance	0	0	2	3,6	5	8,9	46	82,2	3	5,3
3	Full equipment supply	0	0	0	0	5	8,9	49	87,5	2	3,6
4	Provide high-quality software programs and applications in ECC	0	0	0	0	8	14,2	46	82,2	2	3,6
5	The curriculum of the Ministry of Education should provide appropriate development models to integrate technology into lesson plans in ECC	1	1,8	0	0	7	12,5	46	82,1	2	3,6

As seen in Table 4, it can be observed that the majority of teachers demonstrate a high level of agreement with the proposed directions to improve the effectiveness of ICT integration in ECE, with the proportion of "agree" and "totally agree" responses both exceeding 80%. Among these directions, measures related to technical support, providing equipment, and implementing software programs in ECE classrooms receive higher rates of agreement compared to other suggestions. This indicates that teachers require support in terms of infrastructure, equipment, technical assistance, specialized training, and even funding to invest in personal technology devices to enhance the effectiveness of ICT integration in ECE.

From the analysis, it is evident that to enhance the effectiveness of ICT integration in ECE classrooms, a synchronized implementation of various measures is necessary, especially in ECE facilities located in regions with challenging conditions regarding equipment and human resources. Education managers should create favorable conditions, show concern, and organize training programs to enhance the practical skills of ICT integration in ECE for teachers. At the same time, teacher training institutions need to prioritize ICT integration courses in ECE for students to ensure that teachers have a strong foundation of knowledge and skills in ICT integration right from the beginning of their teaching careers.

3.3. Measures to enhance the effectiveness of Technology integration for Preschool teachers

3.3.1. Enhancing and fostering the ability to use technology devices for preschool teachers

Training content: Based on the specific content and form of child care and education activities in preschool and the basic requirements of ICT competence for preschool teachers, we propose several fostering contents. The capacity of ICT for preschool teachers is as follows:

Content	Specific content
Theory of ICT in ECE	- Information technology for preschool education - The trend of ICT in ECE today - Principles, requirements, design process, and use of ICT in ECE - Requirements on ICT competence for preschool teachers
Application of some computer software in education	- Audio editing (Cool Edit Pro/ Goldwave…) - Image editing (Photoshop) - Video editing (Camtasia Studio/ Proshow Producer…) - Electronic presentation design (Microsoft Powerpoint, iSpring Suite…) - Game design (Powerpoint, Quizzizz, Wordwall…) (Introduction to the interface, features, and practical exercises)

Content	Specific content
Internet applications in information exploitation, storage, and sharing	- Exploiting and searching for information on the Internet - Using the Internet to store and sharing information + Introduce some tools to store and share information on the Internet (Google Drive, Onedrive, Mediafire ...) + Instructions for using the Internet to store and sharing information

Training Approach:

In this aspect, a dual approach to training can be employed, combining both direct and remote methods (e-learning, telecommunication, TV channels, educational YouTube channels), with the support of a team of experts from Pedagogical Universities.

In the context of online training, several steps can be implemented: (1) Providing materials and resources for teachers to conduct self-study; (2) Offering video lectures by instructors in modular form; (3) Establishing forums for sharing and exchanging ideas between teachers and among themselves; (4) Evaluating the training outcomes.

Regarding direct training approaches, core teachers with a strong background and expertise in ICT will support other teachers in the school through practical activities such as organizing model activities and participating in classroom observation with specialized feedback and guidance provided by experts from pedagogical universities.

In addition to the aforementioned training methods, it is essential to emphasize the "school-centered training model" by regularly dispatching experts to preschools to support teachers and organizing seminars and specialized conferences on the application of ICT in preschool education."

3.3.2. Creating a supportive environment, strengthening infrastructure, and facilitating teachers to develop information technology applications in preschool classrooms

The lack of equipment and facilities will be a barrier to the application of IT in the Union. To improve efficiency and increase children's interest in activities at the preschool, it is necessary to build a favorable and comfortable environment between teachers and teachers, between teachers and children, and between children and children. On the other hand, strengthening and supplementing necessary facilities such as televisions, projectors, and computers to create conditions for teachers to develop their capacity and skills in applying IT in the international community. Specifically:

• Building physical environment:

Step 1: The teacher determines the child's working environment

Depending on the actual conditions of the school/ class, teachers arrange and arrange areas for children to operate most effectively.

Step 2: Select appropriate equipment, utensils, and technology

Based on each specific topic and topic, teachers can choose appropriate electronic devices and technology devices to help children's development in that environment.

Step 3: Arrange and decorate children's activity areas

To stimulate children's interest, elicit children's creative activity ideas, and help children feel comfortable, comfortable as well and active, teachers need to pay attention to arranging areas of activities in a manner that is appropriate for children reasonably and arrange equipment flexibly. To achieve a good educational effect, in the process of arranging teachers, it is necessary to call for the participation of children, together to choose the locations to place the means and equipment of technology, thus helping the children to be more impressed by the school location, as well as the educational content you want to convey.

• Building a spiritual environment

Teachers need to create a close, friendly, and comfortable environment between their - children and children - children need to create children's trust in teachers in that environment and create close relationships and mutual respect between children and friends around. During the process of children practicing activities, teachers need to encourage, motivate, and

encourage children to boldly demonstrate their skills in manipulating technology tools or expressing spoken language by Answering the questions posed by the teacher through technology devices.

3.3.3. Integrating information technology into learning activities at Kindergarten appropriately

To achieve good results in the integration and use of technology devices in educational activities in preschool, In addition to mastering how to use the software, teachers must ensure the following principles in the design process: (1) Ensure science; (2) Ensure the intuitiveness; (3) Ensuring pedagogy; (4) Ensure aesthetics.

When using technology devices, teachers must master techniques and coordinate smoothly between the presentation and the activities of teachers and children in the teaching process. The speed of the presentation must be suitable for the child's absorption, ensuring that the child can follow up. In terms of effectiveness, integrating IT in learning activities must comply with the lesson objectives; children actively participate in activities, be interested in awareness, deepen their knowledge, and promote the effects of IT.

For teachers, innovating teaching methods is not only applying IT and eliminating traditional methods but also knowing how to apply and combine with teaching methods positively to avoid overuse. IT.

Example in learning activities: Depending on specific topics and topics, different technological devices and materials are used.

Example topic: Family

• Topic: Distinguishing a circle and a square

• Tools and materials: Round objects such as cups, bowls, plates, baskets...; square-shaped household items such as picture frames, calendars, paintings, baskets, etc.

• Technological equipment, fixed objects: Computer, projector or television, desk, shelf, shelf, printer, phone...

• Combined use of electronic lesson plans: slides introduce objects in the family in the form of circles and squares to help children see features, contours, edges, similarities, and differences between a circle and a square.Bottom of Form

4. Conclusion

ICT has been accepted as a strategy to improve the quality and effectiveness of the organization of play and learning activities in young children. This study was conducted to find out teachers' views on the use of technology in preschool classrooms.

Research results on 56 preschool teachers in mountainous communes of Cam Xuyen district, Ha Tinh province, show that teachers highly agree with statements related to benefits and relevance as well as statements about barriers that teachers face concerning the use of ICT in international education. Moreover, teachers also showed a high degree of agreement with the orientations to improve the effectiveness of IT applications in the ECC. The study also proposes measures to improve the effectiveness of ICT training for preschool teachers in general and preschool teachers in mountainous and rural areas in particular. This research result provides useful information for ECE managers and ECE training institutions in implementing, managing, training, and fostering to improve the effectiveness of using technology in ECE.

Although there are certain scientific contributions, the study also shows a limitation in conducting surveys on a narrow sample space. Future studies should be conducted on a larger scale, such as in mountainous or rural areas in the central or northern provinces.

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