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Educators' Perception Towards Early Childhood Education in Technology Integration: A Case Study

Akhmad Sutiyono[1]✉, Tommy Hastomo[1] ,Mereyke Jessy Tanod[2]
Pendidikan Bahasa Inggris, Sekolah Tinggi Keguruan dan Ilmu Pendidikan PGRI Bandar Lampung, Indonesia(1); Pendidikan Guru Sekolah Dasar, Sekolah Tinggi Keguruan dan Ilmu Pendidikan PGRI Bandar Lampung, Indonesia(2)
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Abstract
The use of technology can be integrated into early childhood education to college. Several studies explain that technology can improve the learning process in early childhood education. This study aims to investigate teachers' perceptions of the integration of technology into early childhood learning. The researcher applies a case study as a research design. The data obtained are primary. The research instrument consisted of observations, interviews, and surveys where teachers of private kindergarten schools in Bandar Lampung were research respondents. The study findings show that most teachers show a positive attitude towards using technology in the classroom and have tried to integrate it into learning activities. Meanwhile, there are two obstacles to applying technology in learning English in early childhood: maintaining their attention when using technology devices in the classroom and choosing suitable technology for children.

Keywords: *case study; early childhood education; technology integration*

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✉ Corresponding author : Akhmad Sutiyono
Email Address : akhmadsutiyono678@gmail.com (Bandar Lampung, Indonesia)
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Introduction
Technology that can be used for the level of Early Childhood Education (ECE) is still rare. Few ECE teachers use technology tools and digital resources in their learning activities (Donohue & Schomburg, 2014). In addition, there are findings Lee et al., (2015) that 50% of teachers agree that the digital resources found are not in accordance with the characteristics of PAUD children, so they cannot help students achieve learning targets. One of the resources in question is games, which are technology-based media but are not free so they are difficult to access. The early childhood class is one of the classes that require technology as a teaching medium to support learning activities. For example, there is a school n India where one class uses a robot teacher as an assistant to a human teacher (Crompton et al., 2018). Early childhood students can ask the robot teacher when there is unclear material. The robot teacher can help the main teacher cope with a class with a large number of students so that students can get help when participating in learning activities. Thus, the presence of technology in early childhood learning can help students and teachers and increase the ideal potential students can get (Parette et al., 2010).

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In this modern era, almost every level of education uses technology to support learning activities (Duffy et al., 2013). Although rarely found in ECE contexts, teachers can innovate using technology to help students develop creativity and increase student potential. There is a finding that children's education can reach its maximum potential if it is supported by learning technology (Scardamalia & Bereiter, 1994). However, teachers must be careful to determine the appropriate learning technology according to the needs of early childhood students. The goals of early childhood learning can be achieved if the teacher can optimize the teaching media to be used, one of which is the use of computers and Interactive Whiteboards (IWB) (Kennewell & Beauchamp, 2007).

One of the most common examples of technology integration in learning is using computers. Several studies show that technology integration can help early childhood students to improve their literacy, logical and social skills under the guidance of adults and teachers (Keengwe & Onchwari, 2009). Group activity can develop children's social skills (Cooper & McEvoy, 1996). The results of international literature studies Nurdiantami & Agil, (2020) show that early childhood education supports the use of technology as learning adapted to early childhoodBased on the results of research Ayuni & Setiawati, (2019) Early childhood can learn the shape of numbers and practice recognizing letters and sounds by utilizing software or applications that are in accordance with learning objectives. Meanwhile, several schools provide tablets as learning tools for students to carry out learning activities. However, the main issues in integrating technology into education are affordability and funding. At the same time, using an IWB or smartboard is another example of technology integration in early childhood.. Through the integration of learning technology, teachers can ask students to collaborate to carry out learning activities so that it can be interesting learning for them (Kukulska-Hulme & Shield, 2008).

On the other hand, there are some concerns about technology integration in ECE, even though new technologies and software are being developed (Keengwe & Onchwari, 2009). Such technology integration can focus on student readiness to use it, digital competence, and alignment between software and teacher training. Teachers must pay attention to each child's needs and cultural context in determining the technological tools that will be integrated with learning activities. Based on the author's observations, early childhood educators are not accustomed to using technology as a learning medium. Thus, the superficiality handled at the university makes reformulation of the teacher training curriculum very important as a teacher's digital competence. In the 21st century the teacher has an important role because the teacher is able to keep up with increasingly rapid technological developments, research has shown that the use of technology can increase children's learning motivation than traditional learning (Hendraningrat & Fauziah, 2021).

Many studies discuss teachers' perceptions of the use of technology in education. Improving teaching practice can be done by considering the teacher's attitude (Harris & Brown, 2013). In early childhood education, technology can help teachers to pay more attention to their students. Using laptops in the classroom allows teachers to adapt to teaching practices and the diversity of student characteristics. Previous research has revealed that teachers with young students have positive thoughts about using technology in the classroom because it provides opportunities to personalize their learning process (Sadik, 2008). Teachers who have a positive attitude towards technology tend to have positive experiences. Meanwhile, teachers who reject technology integration in learning activities will have a negative attitude.

As the results of research (Ayuni et al., 2020; Dong et al., 2020; Safitri et al., 2021) during Covid-19 there were teachers who experienced difficulties when using technology-based learning. This is because teachers do not understand the use of technology. Such as not being able to operate learning using applications, some teachers have not used smartphones and computers, internet data packages that cost quite a lot, it is difficult to carry out learning that covers all aspects. The use of technology is an obstacle for some teachers, especially early

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childhood education teachers who are no longer young, so some teachers have difficulties in online learning during the Covid-19 pandemic.

Furthermore, there is research on teachers' perceptions of the use of technology in ECE. ECE teachers in Turkey show a positive attitude toward integrating technology into early childhood learning activities (Konca et al., 2016). This is in line with the Turkish government's efforts to provide Internet, IWB, computers, and tablets for learning activities from early childhood to secondary school. Meanwhile 50% of ECE teachers in the US have high confidence in using computers in the classroom to support learning activities (Chen et al., 2014). However, more than 50% of teachers still need help operating computers, while less than 30% have mastered the understanding to determine the right software for early childhood. These previous studies explain that exploratory efforts on ECE teachers' attitudes and perceptions towards technology must be carried out to identify the main challenges and opportunities in integrating technology into learning activities (Blackwell et al., 2013). The results of (Ayuni & Setiawati, 2019) research show that the use of technological media has a significant effect on children, especially children's numeracy skills. Research shows that children are interested in the media used. The media can attract learning because there are interesting audio, visual, interaction, and colors.

The novelty of this research with previous researchers is to find information about teachers' attitudes towards the use of technology in learning English in PAUD environments, teachers working with integrating technology into PAUD classes, teachers' opinions about the main challenges and opportunities for integrating technology in PAUD learning. This study aims to determine teachers' perceptions of technology integration into early childhood learning

Methodology

This current study used a case study as the research design. This research investigated teachers' attitudes and perceptions toward implementing technology for teaching English in ECE. The researchers tried to analyze classroom regularities in the five English-language lessons in this descriptive-qualitative method (Sugiyono, 2017). The population of the research was the teachers who work in ECE International schools in Bandar Lampung. The reason for taking English is because the school they are studying is an international standard school, the majority of their children use English. The research sample was four teachers who work at one International school in Bandar Lampung. The researchers conducted the study in four ECE lessons in the ECE school. There were three to five years old as age range of students. In this current study, 50 students were involved as ECE students taught in this school. Those students consist of 23 students who are five years old, 14 who are four years old, and 13 students who are three years old.

There are three steps for collecting the data in this research: interviews, surveys, and observation. First, the researchers conducted an observation of the five English lessons. Second, the researchers tried to disseminate a survey to four teachers. Third, the researchers interviewed the four teachers about the research topic. This data collection was conducted in October 2022. The steps for performing the data collection can be seen in Figure 1.

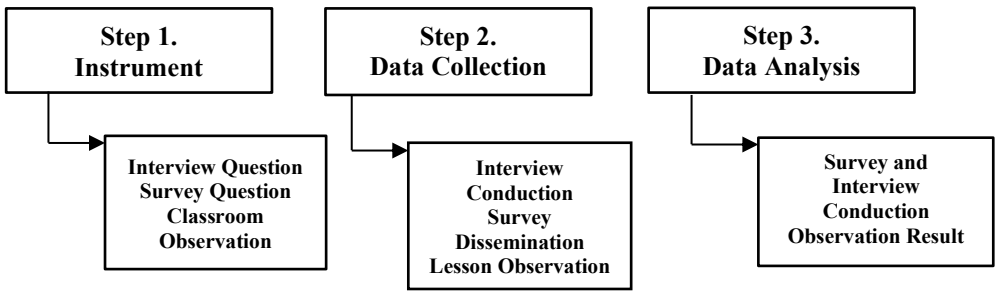

Figure 1. steps for performing the data collection

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This current study had to prepare the research instrument before collecting the data. The instrument was adopted from the previous research, which investigated the technology implementation in early childhood education students. There were four items in the template: students' typology, interaction with technology, presence of technology, and class/level. The research team filled out the template during the five lessons. They also included annotations of the most relevant aspects related to the 4-items. The instruments developed have been validated by experts.

Moreover, there were 20 items presented on a 5-point Likert scale as the survey instrument. This instrument was adopted from Koc's research (Koc & Bakir, 2010). The researchers presented the items in English to ease the respondents' understanding. Furthermore, the questions of the interviews were developed based on Kol's study in 2010 (Koc & Bakir, 2010). After conducting the lesson observed, the researchers could administer the interview and survey activity.

For analyzing the data from interviews and observation, the researchers used NVivo 12 plus. Moreover, this current study examines the survey data using Microsoft Excel. Then, the research was initially established in six coding categories. The researchers derived a preview scientific literature review and explored the formulation of the problems. Finally, the thematic analysis was employed for re-defined and re-examined activity to ensure that those data were taken in this current study, not the previous study. Last, the research team established the data into four coding categories: (i) opportunities of technology in ECE, (ii) challenges of technology in ECE, (iii) utilization of technology integration in ECE, (iv) educator's attitude on the utilization of technology in ECE.

Result and Discussion

The Attitude of Teachers to The Use of Technology in Learning English in the ECE Environment

This study described and discussed the data gathering in this section to answer the three research questions.

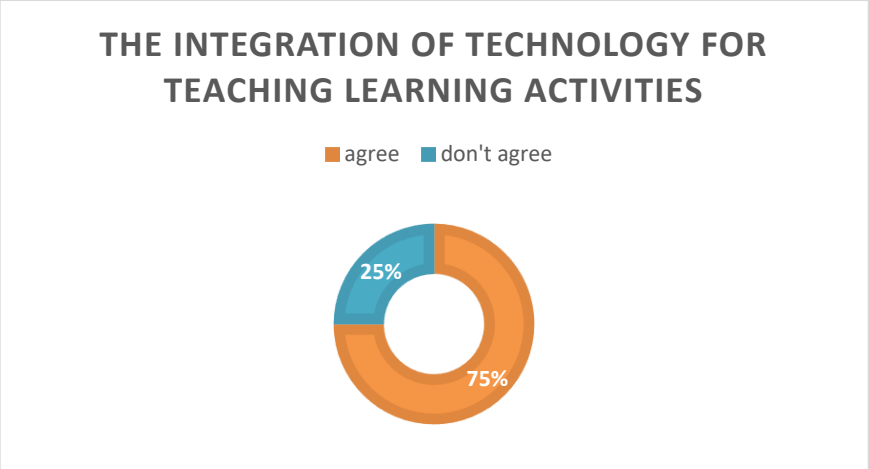

Chart 1. The Integration Of Technology For Teaching Learning Activities

Based on chart 1 the findings show that 75% (3) teachers agree that the ECE quality can be improved based on the integration of technology for teaching learning activities. This statement was taken from the survey of Teachers' Attitudes on Technology Integration into ECE. Moreover, promoting autonomous and active learning and responding to all the students' needs were the main targets of ECE teachers when they utilized this technology in ECE:

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> *"The use of technology can foster the student's ability to achieve the learning target. The teachers also can choose the appropriate technology based on the individual characteristic. [...] For example, student A can learn English vocabulary by using vocabulary cans, student B can learn new vocabulary using songs, and student C is a child with kinesthetic characteristics, so he needs to touch something to learn a new vocabulary. [...] The teachers can solve this problem through the use of technology as a way of teaching English to ECE. They can use an application on their smartphone to play a song for student B, use an augmented reality program to show the vocabulary can for student A, and employ a different approach to student C. So, that's the role of technology in helping the students to maximize their potential in teaching English."*

> *"In this International school, the teacher is not the source of information, and the students are not prepared to receive all the knowledge. This school wants the students to participate in the autonomous learning activity in which they can be more critical in learning English vocabulary. So the students can have the skills to determine what they want based on these methodologies. And this thing can be required for the next educational steps. (Homeroom teacher)"*

Many types of research supported the use of technology to help younger students. For example, the learning experience of ECE students could be improved significantly based on the implementation of digital audio as a technological tool in the learning context (Bennett, 2021). Furthermore, using IWB was another example of integration technology that can encourage active learning. Therefore, the students not only have the chance to acquire the information but could also be involved in group collaboration (Barth et al., 2007).

The student's interests and the group's age were the two aspects that could play roles in choosing the appropriate technology for the classroom. Therefore, these two aspects would influence the right strategy and the possibilities to facilitate the students involved in integrating technology that can support the ECE students to participate in an active learning environment (Rodríguez et al., 2018). Moreover, the homeroom teacher stated that online tools could help the students to expand their ability to achieve the learning target. Therefore, the teachers agree that integrating technology and methodology can flip the idea that the source of information is the teacher. So, the students can take part in the study independently so that the learning process can be more active than the conventional method.

Students showed that they felt more enjoyable participating in the learning activity because of the role of implementation technology in the classroom (Ayuni & Setiawati, 2019; Hendraningrat & Fauziah, 2021; Priyanto et al., 2014). The finding supported this statement that 75% of educators claimed that educational technology could facilitate students' more enjoyable teaching-learning activities. In contrast, they were still confused about the function of technology which can support making concrete concepts for ECE students to comprehend abstract theories or ideas. This statement was taken from the interview, which stated:

> *"In teaching vocabulary, I integrate technology tools to facilitate the students in learning new vocabulary. So, I use augmented reality for ECE students to study and play with fun activities. This augmented reality application can be downloaded from Rumah Belajar, which Kemdikbud designed. While they download this application of AR, they can learn how to read and improve their new vocabulary. (First homeroom teacher)"*

This above statement was in line with the second homeroom teacher who stated:

> *"I use simple augmented reality applications to teach animals topics. So, the students can do a project about the vocabulary of parts of animals' bodies. They can study new vocabularies based on the content of augmented reality. Furthermore, this technology integration also facilitates the students to do collaborative projects with their classmates. And they can study how to use augmented reality while advancing in learning. (Second homeroom teacher)"*

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In summary, this present study concluded that the teachers positively perceived integrating technology in constructing the teaching-learning activity in one of the International schools in Bandar Lampung.

Technology Implementation

The teachers utilized the video-song activities to teach basic vocabulary in the language based on all the lessons observed. The researchers found that the two classes used augmented reality as the integration technology for teaching vocabulary, while the other two used the IWB. However, the four classes displayed the same activities even though the technology used differed. The video-song activities were the main activities that can be conducted using IWB and AR. The ECE students said they like IWB and AR for playing video activities better than using a CD player. Integrating technology can facilitate the students to be more concentrative with the learning activity for longer periods than with conventional learning strategy (Coman et al., 2020).

According to the researchers' observation, the teacher used IWB for conducting online quizzes for 4-year-old students. In this section, the teacher asked the students to say specific words by pointing out the pictures and the icons associated with the previous vocabulary learning activity. Unfortunately, the researchers thought that the student's particular interests and needs were not responded to by the quizzes used, so this activity seemed not to be very effective for the ECE students observed.

Furthermore, the five-year-old students also did the same activity. The teacher introduced the vocabulary with different degrees of difficulty. She taught the vocabulary from lower to higher progression. According to observation, the teacher also introduced peer-teaching activity in which the ECE students were asked to instruct their partner about the picture and word they must match. On the other hand, the different finding show in the lesson where augmented reality was employed that five years had already practiced vocabulary plenty of time using them. Therefore, they can remember the vocabulary easier using this augmented reality. Moreover, this current study also found that a small indicator displayed that the integration of technology can motivate ECE students, such as they can clap along whenever one of their classmates responds correctly. Research shows that augmented reality affects the motivation, attention and conceptual skills of preschoolers. Interesting augmented reality application for preschoolers (Aydoğdu, 2022).

Challenges and Opportunities

The opportunities and challenges are the results of every teacher's learning strategy. Moreover, the teachers can develop a better approach in the future based on the result finding of technology integration. Globally, 21st century skills are Tools for work: General knowledge and skills of information and communication technology (Prayogi & Estetika, 2019). In this context, the teachers show that they are aware and optimistic about the student's need for more exercise in the field. They also gave feedback about the ECE students' digital ability and understanding, which were the most challenging aspects teachers can find in ECE.

> *In my opinion, the biggest challenge is students' ability to operate the technology. Sometimes, if the technology used is not children friendly, they will have difficulty managing it. So, the characteristics and features of the technology must be appropriate to the needs of the ECE students. Finally, the teacher must ensure that she can better understand the criteria for choosing the right technology for the ECE learning activities. (Third homeroom teacher).*

Using technology is quite essential to maximize the potential of students' capabilities. Moreover, age appropriateness is an aspect that teachers must focus on because there is a danger that implementing technology can not be suitable for ECE (White & Robertson, 2015).

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However, she also explains that this problem could be overcome if the teacher can maximize the use of detailed information provided by the education technology industry. However, some previous studies claimed that choosing an appropriate application for ECE is important because it relates to the learner's developmental stage and learning objectives. Therefore, the teacher must determine which application can be used for ECE students (Tatminingsih, 2020). For example, the teacher can find applications involving sorting or matching games that can facilitate students to develop their skills in cognitive development. On the other hand, all teachers as respondents can not determine whether integration technology in classroom activities can distract ECE students' focus during lessons based on the survey. On this occasion, the fourth homeroom teacher claimed that:

> *"There are negative and positive impacts of using technology in classroom activities. For example, students from Middle School can get distracted easily because they have smartphones for accessing games and social media. While the little ones can get distracted because they can choose from one application to another, and their focus will be lost (Fourth homeroom teacher)."*

On the other hand, there is a task for the educators to make sure the students focus on the material and prevent them from getting distracted based on the teacher's interview. This task must be conducted because it could be the potential dangers of using technology on students' attention. The teacher also mentioned that keeping students focused can be reached if the school can provide a special education teacher for ECE students.

> *"The use of technology in learning activities can make students not focus on the material because they can get distracted by many things. So, the teachers must make sure they already choose the appropriate tools as educational technology media to maximize the student's potential ability. Furthermore, the specialist can choose the best tool for keeping the students' attention (Fourth homeroom teacher)"*

The findings from the classroom observation could be more clarifying despite investigating no relationship between surveyed and interviewed teachers in this respect. This current study found that a teacher could introduce the augmented reality media and ask the students to make small groups so that the ECE students' focus could be maintained for up to no more than five minutes in the 3-year-old groups. This duration is in line with the appropriate attention span for this age from the finding of Neville (Neville, 2017). On the other hand, if the students faced trouble fulfilling the tasks, their friends would help their peers solve the problem. Moreover, integrating technology can keep students more concentrated for longer than conventional media (Gikas & Grant, 2013).

According to the survey, this current study found that no clear consensus on the student-teacher is undermined. In this study, 25% or 1 teacher said that interaction was reduced, and 50% or two teachers claimed that interaction was not reduced. On the other hand, interviewed teachers did not tell the researchers about this problem. Therefore, this phenomenon is normal when they try to integrate technology into their classroom.

In contrast, four surveyed teachers agreed on the chances of the utilization of technology for helping the students to achieve the learning target. They believe that integration technology can facilitate the ECE educators to work more easily, while 75% (3) teachers claimed that it could foster the educator to work effectively. Moreover, this present research found various ideas related to technology effects to improve education quality. 50% (2) teachers thought that it could enhance students' learning experience, 25% (1) teachers seemed to be neutral, and 25% (1) teacher believed that it did not enhance the learning process. Moreover, this current study found that integrating technology in classroom activities positively impacted the ECE environment based on the interview data from research

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participants. They believe that an appropriate technology tool can foster the students' opportunity to achieve the learning target (Hendraningrat & Fauziah, 2021).

> *"Technology can help many learners, such as ECE learners. In this school, all teachers tried integrating technology into the classroom activities to facilitate the students to expand their potential skills and achieve the learning target. For example, some teachers used augmented reality media to help the ECE students to learn and remember new vocabulary. The learning target could be achieved if the teachers could determine what technology tool could be implemented in the ECE context."*

In summary, the teachers seemed to positively perceive technology integration in the ECE environment despite being aware of technology's potential difficulty or challenges. They stated that those tools could help the ECE students create a quality environment that fosters significant learning, facilitate the students to cope with the diversity of abilities and interests, and improve their motivation to learn English vocabulary.

This present research has already revealed the effect of technology integration in the ECE context. The findings unraveled the positive attitude towards its use. The teachers agree that this integration can not be conducted easily because choosing the appropriate application could sometimes be difficult. These tools can hinder learners' attention. However, they also claimed that there was an opportunity to improve the student's motivation in their adaptability to different learning styles and interests. Moreover, they agreed with the potential ability to integrate technology in the ECE context.

Augmented reality and IWB were the two main technological tools found to be used in this current study. Augmented reality is an educational tool that can be used to facilitate students to study more effectively and enjoy learning experiences in ECE settings. Moreover, the IWB was another tool that could be extended in the educational landscape. Nonetheless, using two academic about needs significant teacher guidance because of the complexity of using both tools.

The research method carried out by Konca & Tantekin Erden, (2021) distributed questionnaires to 167 early childhood education teachers from 52 different schools to see the use of technology in schools. The results found are that teachers have a positive attitude towards the use of technology. This shows that classrooms are equipped with technology, such as: television, DVD, computers and smartphones. Teachers tend to use television and computers in learning activities such as watching cartoons and listening to children's music.

In line with the results of Ventouris et al., (2021) research that teachers support the use of technology in learning. Because using technology can be used as a teaching and learning tool that is used in a balanced and effective manner in the classroom in supporting children's development. Servei's research was conducted by Ishak et al., (2022) The results showed that 78 teachers in Malaysia had used smartphones a lot in learning during the Covid 19 pandemic. Teachers considered that the use of technology as a learning tool was a challenge in the current technological era. With educational technology teachers believe that it can help the learning process and is able to increase the competence of teachers and students.

This research is different from the results of Aljaberi, (2021) algebraic research in that these findings show that kindergarten and elementary school children use digital technology and are under parental supervision. Children are more interested in traditional games than using technology. In addition, studies show that teachers' perceptions of technology are not good, only in the early stages, so teachers are not yet prepared for technology-integrated learning. in line with Ogegbo & Aina, (2020) research which shows that teachers have a positive attitude towards the use of technology in teaching and learning in the early years. But the level of acceptance of the use of technology by teachers seems low because of poor support from parents, such as a lack of technological resources and teacher knowledge that is still lacking because teachers do not have knowledge of using technology.

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Based on the explanation above, it can be concluded that the results of the research conducted have similarities and differences. The similarity in the research results is that teachers have a positive attitude towards the use of technology in the learning process so that they can develop children's development. The difference with previous research is that there are still a number of teachers who are not ready to use technology in education because teachers have limitations in both infrastructure and competence. The use of technology in education is adjusted by the readiness of each school in a particular area (Isdianto, 2013).

This study's limitations lay in the small-sized respondents used as the research sample. Nevertheless, the next researchers can analyze the comparative analysis between traditional settings and technology-enhanced ones in an ECE context with a larger population. This recommendation could draw a clear-cut conclusion and help generalize results in this field.

Conclusion

Technology that is used as a learning process has a positive impact, as research conducted shows that teachers have a positive attitude towards the use of technology in the learning process so that it can develop children's development. The use of technology in learning is able to motivate, make learning more enjoyable, child-centered learning, and increase children's opportunities to achieve learning targets. For this reason, the technology used as a means of the learning process needs to be selected according to the characteristics and needs of early childhood.

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