

## **Informatics Technology-Based Learning in Barunawati Kindergarten, Kupang City**

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### **INDEXING**

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Keyword 2; Information technology  
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Keyword 4; Digital learning media  
Keyword 5; Learning innovation

### **ABSTRACT**

Along with the rapid development of technology, the world of education is required to adapt, including in early childhood education. This study aims to describe the application of information technology-based learning at Barunawati Kindergarten, Kupang City. This study uses a qualitative approach with data collection techniques through observation, interviews, and documentation. The data obtained are analyzed and described qualitatively. The results show that Barunawati Kindergarten, Kupang City has integrated information technology in digital learning activities. The application of information technology-based learning is able to increase students' interest, activeness, and understanding of the learning material. In addition, contextual and varied learning helps students gain meaningful and enjoyable learning experiences. The success of this learning implementation is supported by responsive school management, teacher competence, and parental support. Thus, information technology-based learning at Barunawati Kindergarten, Kupang City can be an example of the application of learning innovation in early childhood education.

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## **INTRODUCTION**

The Early Childhood Education (PAUD) movement was initiated by the President of the Republic of Indonesia in 2003. The development of PAUD institutions has undergone continuous change and improvement over the years. The intensive PAUD development movement under the Directorate General (Ditjen) of PAUDNI (National Early Childhood Education) is clear evidence that PAUD institutions are beginning to experience improvement and change (Yani *et al*, 2018). Efforts to equalize PAUD institutions to reach early childhood children who are far from access to education are also evidence of the significant changes in the development of PAUD institutions. The government, through the Ministry of Education and Culture, the Directorate General of PAUD and Dikmas, strives to foster early childhood education by formulating and implementing policies in various areas, including curriculum, students, facilities and infrastructure, funding, and early childhood education governance (Liana, 2019). The purpose of these policies is to ensure that the implementation of early childhood education in the community is attentive to the needs and development of its students and in accordance with government-established standards. However, in reality, many PAUD institutions still fail to provide education according to standards. In the Journal (Wiyani, 2020) argues that quality Early Childhood Education (PAUD) services can be realized if there is optimal management of PAUD implementation. However, many PAUD institutions still struggle to provide optimal PAUD. Limited managerial competency possessed by PAUD managers is one of the causes of the difficulty in creating optimal

PAUD services. As a result, the teaching and learning activities provided are less than optimal. The teaching system implemented also tends to be monotonous because it ignores aspects of creativity and innovation. Readiness issues also often arise in the implementation of PAUD services. These readiness issues include minimal land, inadequate infrastructure, low-quality learning programs, and problems with incompetent teaching staff.

The readiness of an early childhood education institution to provide education is not only evident in its services meeting government standards, but also in how the institution is able to address the challenges of its environment. One of the challenges currently faced by early childhood education institutions is the impact of technology, which is not only changing a country's economic landscape but also impacting the educational landscape. Numerous obstacles and problems remain. This presents a challenge for educational institutions at all levels. Early childhood education institutions must implement learning processes using technological tools. Learning using information technology tools ideally accommodates students' learning needs, thus optimally developing their talents and interests. Achieving this requires educator readiness, an appropriate curriculum, the availability of learning resources, and stable network support for effective communication between educators and students Shaleh & Anhusadar, 2021).

Given the current conditions in the community, learning using information technology tools is currently considered less than ideal due to the various obstacles and problems faced by educational institutions. Obstacles faced by institutions implementing learning using IT devices relate to human resource readiness, the lack of an appropriate curriculum, unclear government guidance, and limited facilities and infrastructure, particularly technological support and internet connectivity. The learning method still relies heavily on assigning students assignments. Many early childhood education (PAUD) educators struggle with the implementation of IT learning policies because they are perceived as ineffective, given that not all parents have laptops or other gadgets to support their children in learning using IT devices. The readiness of educators, students, and parental support are crucial for achieving learning objectives using IT devices. Another challenge experienced by PAUD institutions in implementing IT learning is that the IT learning system negatively impacts early childhood development.

The lack of enthusiasm among children and the inability of parents to support their children in learning using IT devices also contribute to obstacles that must be evaluated. Many parents tend to be impatient and yell at their children, which can have a detrimental effect on early childhood development. Furthermore, many parents still consider IT-based learning difficult to implement, resulting in a decrease in children's motivation for online learning due to parents' lack of preparation in guiding their children. This highlights the need for collaboration between various parties, one of which is effective communication related to learning activities. Learning systems using personal computers (PCs), laptops, or gadgets connected to the internet can be utilized in learning using Information Technology devices today. Educators can conduct learning using group features on social media such as WhatsApp groups, Telegram, Instagram, Zoom applications, or other media at the same time as students even though they are in different rooms. Educators can also give students measurable assignments according to the objectives of the material being delivered.

With the availability of various digital technology facilities, it is hoped that early childhood education institutions can utilize them optimally as a medium for the learning process, ensuring that educational goals can be achieved even in emergency situations. However, in reality, many early childhood education administrators are still unable to implement technological advances in their institutions, particularly in early childhood

education institutions in Kupang City. This is due in part to limited facilities and infrastructure, as well as the lack of competent education in Information Technology (IT), especially since many educators in these institutions are unfamiliar with technological devices. One early childhood education institution that has successfully integrated technology into its learning activities is the Barunawati Kindergarten in Kupang City, a pilot institution in the formal early childhood education institution quality mapping program conducted by the Kupang City Education Office, and the Kupang City Culture Office, which implements online learning practices or IT-based learning.

Based on the background described, the author is interested in conducting research at the Barunawati Kindergarten in Kupang City. So that it becomes a source of additional knowledge information for the author and also as a reference for educational institutions in Kupang city in implementing technology-based learning.

## **LITERATURE REVIEW**

### **a. Learning**

Learning is a process undertaken to achieve behavioral change, either in whole or in part, from an individual's own experiences, resulting from interactions with their environment. According to Hamalik, as quoted in the journal Nasrulloh & Ismail (2017), learning is an aspect of development that leads to behavioral change as a result of practice and experience. Learning is a system that aims to create a conducive student learning process. Empowering all potential within students is a key focus in learning activities. Ideally, learning is a lifelong process and can be implemented anytime and anywhere. Learning can also be defined as a process undertaken to help students learn effectively and achieve optimal results. Therefore, the quality of educational services, including learning services, is greatly influenced by the quality of teachers, namely how teachers can assist and empower all potential possessed by students (Ulinafiah & Wiyani, 2019). According to Law Number 20 of 2003 concerning the National Education System, learning is the process of interaction between educators and students, as well as learning resources, that takes place within a learning environment.

From this explanation, it can be seen that the learning process consists of key components, including educators, students, and learning resources. Therefore, learning can be defined as a system involving a unified, interconnected set of components to optimally achieve desired outcomes in accordance with established learning objectives. In learning activities, educators provide facilities for students to be willing and able to learn, with the hope of creating behavioral changes. These learning activities are carried out by students more than once, so that structured behavioral changes can accumulate. Assessments are then conducted to determine the patterns of behavioral changes occurring in students in a structured manner.

### **b. Information Technology**

Shabankareh *et al* (2023) defines Information Technology as the technology used to communicate, create, manage, and distribute information. Communication technology encompasses everything related to the use of tools to process and transfer data from one device to another. Lull, (2021) defines the technology referred to here as computers, the internet, broadcasting technology (radio and television), and telephones. Information Technology-Based Learning referring to several operational definitions explained previously, the author would like to conclude the purpose of this research title regarding Information Technology-based learning through the management process implemented by institutions in implementing learning by utilizing advances in information and communication technology (Information

Technology) so that these services can be easily accessed by students. Hardiyana (2016) states that in this modernization, Information Technology has become a new development in all areas of life, including education. In terms of its use, Information Technology uses two components, namely hardware and software. The use of Information Technology (IT) is also highly valued in learning activities. IT-based learning is a learning program implemented using hardware and software, enabling users to create, store, display, and communicate information remotely, such as using internet-connected computers, LCD projectors, learning CDs, televisions, or even using specific websites.

c. Media in IT-Based Learning

The journal (Witasari & Wiyani, 2020) states that students in early childhood education institutions are more engaged when their learning activities are played. Therefore, early childhood education institutions implementing IT-based learning should be able to select and adapt devices that are appropriate to the characteristics of their students. Current technological developments are one way for the world of education to utilize IT developments in the learning process. Meanwhile, I Ketut Gede Darma Putra, in his journal (Muhson, 2010:8), mentions four types of media that can be used in Information Technology-based learning, as follows:

1) Internet

The internet is the true medium in Information Technology-based education. It is this internet that has given rise to the development of learning models, including e-learning, distance learning, web-based learning, and other Information Technology-based educational terms. Internet access has become a necessity for Information Technology-based learning. This global computer network will facilitate and accelerate access to and distribution of information and knowledge (learning materials).

2) Intranet

The intranet serves as an alternative learning medium when the internet experiences problems. The characteristics of an intranet are similar to those of the internet, except that it is limited to a local area (within a single classroom, school, building, or between buildings). In certain situations and conditions, using an intranet is an appropriate choice for implementing Information Technology-based learning.

3) Mobile Phone

Information Technology-based learning can also be conducted using mobile phones. Rapid technological developments have given rise to a variety of sophisticated communication devices, including mobile phones. People can access learning materials and participate in lessons via mobile phones, giving rise to a new approach to Information Technology-based education: M-learning (Mobile Learning).

4) CD-ROM/Flash Disk

Learning materials are stored on CD-ROM/Flash Disk media, and students can then access them on computers, laptops, and similar devices. Utilizing CD-ROM/Flash Disk media is the simplest and most affordable form of Information Technology-based learning. As stated by Supriyati, (2013), in addition to the media mentioned above, various learning applications have emerged and are integrated with each other to facilitate e-learning activities. These applications serve as references in implementing Information Technology-based learning.

d. Information Technology in Early Childhood Education

The use of information technology in the teaching and learning process is a new

phenomenon in the world of education. This is undoubtedly due to current developments. Technology has both positive and negative aspects for child development, so when implementing technology-based learning, early childhood institutions must consider children's needs and development. Educators and parents must prepare the best parenting and learning patterns for early childhood to optimize their development. This takes into account the stages of child development, which include the following early childhood development stages:

1) Children 0-2 Years

At this age, children begin to learn to hear and recognize their surroundings through stimuli that arise through movement and sound. Information technology at this age can be provided through audio, visual, and audiovisual media. Audio media can be played through religious songs or educational children's songs. Audio-visual media, such as children's cartoons, allows children to recognize the colors that appear through these media. This can shape the character of early childhood.

2) Children Aged 3-4 Years

Sentence use at this age is almost complete, as evidenced by the way children ask questions. Therefore, the provision of Information Technology (IT) at this age is almost the same as for children aged 0-2 years, but the stimulation provided should be more extensive and complex.

3) Children Aged 5-6 Years

During this period, children's introduction to IT increases. This introduction can include an introduction to computer hardware that children can see and touch directly, such as the CPU, monitor, mouse, keyboard, etc. This introduction is complemented by an explanation of the function of each device through hands-on practice (learning by doing). Although IT has many benefits for early childhood development, PAUD institutions that wish to implement IT in their educational activities must make thorough preparations and consider the appropriate types of IT for early childhood to ensure that its implementation does not have a negative impact on children. Furthermore, teachers and parents must work together to supervise students' use of technology. According to Hardiyana, as cited in Rifka Toyba Humaida & Suyadi, there are three types of IT-based learning media that can be implemented in PAUD institutions, including: Audio and Video Players, Computers; and Internet.

e. In-App Learning Media

The current situation has forced educational institutions, especially PAUD institutions, to be prepared for educational models utilizing technology. Not only are learning activities undergoing adjustments, but other educational activities must also adapt to the current situation. Various learning innovations are being implemented to maintain the quality of learning and ensure child development is achieved, even amidst the current situation. Learning service innovations that PAUD institutions can provide, based on Mila Faila Shofa's research on Saymara Inclusive PAUD, include:

1) Online Learning via WhatsApp Group

In this case, WhatsApp Group media is used as a means of communication between teachers and parents, and teachers can share learning activities and materials in the form of photos, videos, and voice notes. Furthermore, this media also functions as a means for parents to report the results of their home learning support to their teachers. Information related to learning,

administration, and discussions about issues parents face while supporting their children with learning from home is also provided through WhatsApp Groups.

- 2) Online Learning via Google Classroom: Through this application, teachers can send assignments, files in the form of documents, photos, audio, and videos to students registered in their Google Classroom.
- 3) Child Development Evaluation via Google Forms: Google Forms is a service from Google for creating surveys. This Google Form also functions to archive photos of students' activities while learning at home or anywhere, easily accessible to children and parents as a basis for evaluating their child's development.

## RESEARCH METHOD

### 1. Research Approach and Type

The research conducted at Barunawati Kindergarten in Kupang City used a qualitative research approach, which aims to obtain in-depth data, data that contains meaning. Qualitative research studies various things or phenomena that exist in the natural environment and seeks to gain an understanding of these things or phenomena based on the meanings of those who experience them. This descriptive qualitative research focused on Information Technology-based learning at Barunawati Kindergarten in Kupang City.

### 2. Research Location

This research was conducted at Barunawati Kindergarten in Kupang City. This location was chosen because Barunawati Kindergarten is one of the kindergartens whose implementation of Information Technology-based learning has successfully created a positive image among the surrounding community due to its optimal service in technology-based learning, successfully addressing educational challenges.

### 3. Research Subjects

The research subjects included: The Principal of Barunawati Kindergarten in Kupang City, who is responsible for all activities at the kindergarten. Barunawati Kindergarten, Kupang City, and teachers/educators as human resources and implementers of educational services at Barunawati Kindergarten, as well as parents as service users and supervisors of all academic activities at Barunawati Kindergarten, Kupang City. In this case, the object of this research is the implementation of Information Technology-based learning at Barunawati Kindergarten, Kupang City.

### 4. Data Collection Techniques

Several data collection techniques used in this study include:

#### 1) Interviews

Interviews were conducted with informants to gather information about the implementation of Information Technology-based learning, including:

- Principal of Barunawati Kindergarten
- Teachers/Educators
- Parents

#### 2) Observations

Observations were conducted directly in the field, including: the condition of facilities and infrastructure, the socio-cultural conditions of parents, the economic conditions of parents, Information Technology-based learning activities, and human resource development programs.

### 3) Documentation

The documentation activities carried out included documenting existing or past learning implementation activities, documentation of student learning assessment sheets, student learning outcome reports, and photographs of facilities and infrastructure.

## 5. Data Analysis Techniques

The data analysis in this study refers to the theory of Miles and Huberman, which divides data analysis techniques into three simultaneous activity streams. These three activity streams are:

### 1) Data Reduction

The process of filtering data by selecting, focusing, simplifying, and abstracting raw data from the field to align with the research objectives.

### 2) Data Presentation

The reduced data is organized into descriptive narratives, tables, and interview quotations to facilitate understanding and illustrate the relationships between the data.

### 3) Conclusion Drawing and Verification

After the data is presented, the researcher interprets and draws conclusions based on patterns or themes discovered during the research process. These conclusions are also continuously verified through data triangulation.

## RESULT AND DISCUSSION

Based on the results of the interview with the Head of Barunawati Kindergarten, learning has an important role in improving the quality of education, so it is appropriate that the learning held can bring benefits to students. The usefulness and meaningfulness of learning can be built through the creation of a pleasant learning atmosphere and is able to provide stimulation to students from various aspects while helping to explore their potential optimally. In this 21st century, the era of the industrial revolution which previously entered the 4.0 era and which will even enter the 5.0 era, space and time are no longer barriers and obstacles in the delivery of information and communication. Furthermore, in this technological era, another important competency for children to have is good communication, and how this communication can be formed in the learning process. One of the demands in the 21st century is the ability to collaborate and cooperate well, because with good cooperation can increase good competitiveness as well. Children need to have creativity and be able to think innovatively in this very rapid development of the era, so that it becomes the foundation for Barunawati Kindergarten to implement technology-based learning. The success rate of implementing technology-based learning is highly measured by the process itself, reaching a 90% success rate because the lessons provided feel real and concrete. Parental support for this technology-based learning is very good, even parents are involved in preparing the children's learning environment, such as providing LCD displays or installing brackets in the classroom.

According to the principal of Barunawati Kindergarten, "Change is always present every minute, especially in digital technology. We are now at five-point-O, or 5.0, so technological capabilities have become very rapid. However, this is also driven by human resources, which must be prepared." According to the principal of Barunawati Kindergarten, "The opportunities presented by IT significantly assist teachers in designing lessons with ease." A threat to implementing IT-based learning is when teachers are unable to compete with technology, meaning that teachers will be left behind, meaning that teachers are not listened to by students who have technological skills. However, so far, kindergarten teachers remain role models in learning, where children

certainly still enjoy being with their teachers. However, at higher levels, they are more vulnerable, as technology should not be more interesting than teachers, which becomes a major challenge.

The implementation of technology-based learning based on field results shows that teachers in the classroom utilize Canva more, because its features and elements are many that make children not bored so that this technology-based learning is very helpful in creating learning media and helping teachers to be more efficient in time making it easier for teachers to work or freeing teachers in working teachers are free to choose. in addition to preparing media for learning in the classroom in showing videos not only through the images provided for example, in information technology teachers forget to copy images other technology media can help teachers to immediately cover learning with other methods by using this technology-based learning media also makes it easier for teachers to calm children in information technology starting to get bored in the classroom for example like watching dance videos on YouTube where children are free to choose the videos they want to show so that independent learning is truly implemented in Barunawati Kindergarten of course with limitations that must be considered in the use of information technology for example videos that have been provided have educational elements that are directly monitored by teachers. With the existence of this technology-based learning, seen from the background of parents in terms of economic and cultural education at Barunawati Kindergarten, they are very supportive of all learning programs provided by educational institutions.

According to teachers as educators who know parents directly, so far there are almost no obstacles from parents in this technology-based learning, for example, there are parents with an elementary school education background but they are very supportive of their children's education. With this parental support, it can be seen from children who are able to use technology media, for example, like information technology watching a video and then an advertisement appears there, children can use the cursor to stop information technology or skip the video advertisement and then continue watching the video they choose, so from here it can be concluded that parents from a low educational background are also very supportive of the learning program provided by Barunawati Kindergarten.

The obstacles faced in this technology-based learning process such as information technology, power outages, Wi-Fi or network errors in this technology-based learning, all of which have been used by educators in creating learning media, but according to the B2 class teacher, the development that will be implemented is one of the jamboree applications that has not been implemented. This application can be played by children, which is the reason for implementing learning using this jamboree application because the teacher has attended training from stakeholders.

Based on interviews with parents, they expressed their gratitude for the technology-based learning services at Barunawati Kindergarten, Kupang. Since online learning during the COVID-19 pandemic, Barunawati Kindergarten has implemented technology-based learning for home learning, and teachers have prepared learning during children's study hours. Based on the parents' backgrounds and occupations, some are housewives, some work as nurses, and some work as police officers. From 2021 to 2024, most parents, especially mothers with working mothers, have found technology-based learning very helpful in assisting their children in learning. Indirectly, parents who previously failed with technology can now learn through the technology-based learning implemented by Barunawati Kindergarten.

According to the principal of Barunawati Kindergarten, to support classroom learning, and referring to a research journal, Hardiyana (2016:5) explains several types of

information technology that can be utilized in early childhood education, including:

a. Audio and Video Players

Audio media relates to hearing because it involves direct communication through hearing. Meanwhile, visual video media involves the sense of sight. Visual media actually contains two messages: verbal and nonverbal.

b. Computers or Laptops

Computers are devices that involve software and hardware technology. The use of computers has a significant impact on the learning process. Computers can help teachers implement challenging and enjoyable learning for students.

c. Internet

The internet is a technology service that provides a complete range of applications and information that can be used as learning resources and media. The internet can be optimized quickly, conveniently, and safely for users. Using the internet can make it easier for teachers to find and browse information related to the learning material being taught to children. The appropriate use of Information Technology in Early Childhood Education (PAUD) must consider the principles of providing learning facilities and infrastructure for early childhood, even though the IT practices can be controlled by or under the supervision of educators.

The positive impact of digital media-based learning provides children with new opportunities to engage and participate in learning, can improve attention and concentration, and can develop and enhance children's skills. In this regard, educators and parents should be smart about selecting and managing the time children spend using technology media. Therefore, the impacts of using Information Technology media in PAUD learning are divided into two: positive and negative. The author outlines these two impacts in the table below:

**Table 1. Positive and Negative Impacts of Technology-Based Learning  
TK. Barunawati Kupang**

No	Target	Positive impact	Negative impact
1	Learners	Increase interest in learning child, get a chance new information, obtain information quickly, and achieve six aspects of child development.	Lack of focus due to negative information that is not can be controlled, for example, the distribution of pornographic images and videos.
2	Teacher	Assist teachers in preparing learning, critical thinking, communication, collaboration and creativity.	Teachers are under pressure to improve their skills in accessing technology-based learning media.
3	School	Providing educational services that meet the demands of the times, preparing the next generation to face increasingly sophisticated technological advances, and increasing parental confidence in accessing information technology-based educational services.	Not all early childhood education institutions provide educational services that educate teachers and parents on the use of technology media to guide children in technology-based learning.
4	Parent	Increase cooperation between parents and educators in	Parents with a permissive parenting style tend to be passive in controlling their

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		monitoring the learning process to optimize children's potential.	children's use of technology-based learning media information Technology.
5	Public	Reducing the impact of global warming (reducing the use of ink and paper)	Online crimes include fraud, pornography, gambling, and stealing user data from applications.

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## CONCLUSION

The pedagogical foundation of learning at Barunawati Kindergarten in Kupang is 21st-century learning, utilizing technology that can be quickly and accurately accessed in the world of education and learning. This learning emphasizes students' active learning in a manner relevant to the topic. The learning implemented by Barunawati Kindergarten in Kupang has been successful in providing learning services to students. The Information Technology-based learning process at Barunawati Kindergarten in Kupang includes: First, an environmental analysis is conducted to identify various supporting factors in program implementation. Second, a strategy formulation process is carried out to develop a Learning Plan based on the results of the environmental analysis through the development of a vision and mission, the determination of goals and objectives, the selection of strategies, and the development of programs. Third, the strategy implementation process involves all stakeholders in achieving student development goals. Fourth, strategy evaluation and control are carried out through collaboration between parties to measure the strategy's effectiveness.

The success of the Information Technology-based learning program at Barunawati Kupang Kindergarten has had a positive impact on the institution as well as on students, this can be seen from the achievement of children's development during Information Technology-based learning. Students experience increased growth and development according to their age. In addition, the creation of a positive image from the community towards Information Technology-based learning services is also an indicator of the success of the learning program, this has an impact on increasing parental trust in getting educational services at Barunawati Kupang Kindergarten.

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